Marshall Islands Building Energy Efficiency

Part I: Project Information

GEF ID
10859

Project Type
FSP

Type of Trust Fund
GET

CBIT/NGI
CBIT **No**
NGI **No**

Project Title
Marshall Islands Building Energy Efficiency

Countries
Marshall Islands

Agency(ies)
IUCN

Other Executing Partner(s)
RMI Office of Energy

Executing Partner Type
Government

GEF Focal Area
Climate Change

Taxonomy
Climate Change, Focal Areas, Gender results areas, Gender Equality, Climate Change Mitigation, Influencing models, Transform policy and regulatory environments, Demonstrate innovative approache, Strengthen institutional capacity and decision-making, Stakeholders, Private Sector, Type of Engagement, Information Dissemination, Communications, Public Campaigns, Awareness Raising, Capacity Development, Energy Efficiency, Consultation

Rio Markers
Climate Change Mitigation
Climate Change Mitigation 2

Climate Change Adaptation
Climate Change Adaptation 0

Duration
42 In Months

Agency Fee($)
197,422.00

Submission Date
9/14/2021

A. Indicative Focal/Non-Focal Area Elements

Programming Directions	Trust Fund	GEF Amount($)	Co-Fin Amount($)
CCM-1-3	GET	2,193,578.00	2,600,000.00
	Total Project Cost ($)	**2,193,578.00**	**2,600,000.00**

B. Indicative Project description summary

Project Objective

To improve energy efficiency in the building sector in Marshall Islands to reduce greenhouse gas emissions and help achieve the net zero emission target

Project Component	Financing Type	Project Outcomes	Project Outputs	Trust Fund	GEF Amount($)	Co-Fin Amount($)
Component 1. Enabling activities and policy for energy efficient buildings in RMI	Technical Assistance	Outcome 1.1. Policies and regulations for energy efficiency are in-place and enforced by relevant government officials Outcome 1.2. Increased awareness of importance of energy efficiency in Majuro and Ebeye.	Output 1.1.1. Energy efficiency and conservation measures addressed through government processes and regulations: - Ensure the building code has a focus on energy efficiency - Whole-of-life costs and energy use included in Government procurement of major items - Mandate the purchase of Energy Star (or similar energy rated labelling) appliances for all government agencies - Minimum energy performance standard (MEPS) and appliance labelling scheme - Ban on incandescent lightbulbs - Prescribe air-conditioning temperature set points for government agencies	GET	499,122.00	500,000.00

Output 1.1.2. Developed and implemented energy efficiency enforcement mechanisms

Output 1.1.3. Increased awareness and capacity of banking sector to market and deliver loans for energy efficient appliances and improvements

Output 1.2.1. Increased awareness of energy efficiency importance and options among businesses and households in Majuro and Ebeye

Component 2: Government and public sector building energy efficiency improvements	Investment	Outcome 2.1. Building performance monitoring and evaluation Outcome 2.2. Demonstrating improved energy efficiency of government buildings through technology and practices Outcome 2.3. Nature-based solutions for energy efficiency in government buildings demonstrated Outcome 2.4. Increased capacity for energy efficiency Outcome 2.5 Selected private sector entities have specific and articulated plans for increasing energy efficiency in their buildings.	Output 2.1.1. Energy efficiency guidelines and data are updated and available for decision making Output 2.2.1. Reduced energy use in government buildings Output 2.3.1. Reduced energy use in buildings from NbS Output 2.4.1. Increased capacity of government staff to plan and implement energy efficiency projects Output 2.5.1 Private sector plans and implementation of pilot building energy efficiency projects.	GET	1,540,000.00	1,876,190.00
Component 3: Monitoring, evaluation, and knowledge management	Technical Assistance	Outcome 3.1 Communications plan and knowledge management plan developed and implemented Outcome 3.2. Project data and outcomes available to stakeholders and partners in RMI and the Pacific.	Output 3.1.1. Communications and knowledge management plan developed, implemented and evaluated Output 3.2.1. Project data secured and available to partners and stakeholders	GET	50,000.00	100,000.00
				Sub Total ($)	**2,089,122.00**	**2,476,190.00**

Project Management Cost (PMC)			
	GET	104,456.00	123,810.00
	Sub Total($)	**104,456.00**	**123,810.00**
	Total Project Cost($)	**2,193,578.00**	**2,600,000.00**

C. Indicative sources of Co-financing for the Project by name and by type

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Investment Mobilized	Amount($)
GEF Agency	IUCN (EESLI)	Grant	Investment mobilized	100,000.00
Donor Agency	European Union (EU EDF 11)	Grant	Investment mobilized	1,000,000.00
Recipient Country Government	Marshall Islands government (National Energy Office)	In-kind	Recurrent expenditures	500,000.00
Donor Agency	World Bank (SEDEP)	Grant	Investment mobilized	1,000,000.00
			Total Project Cost($)	**2,600,000.00**

Describe how any "Investment Mobilized" was identified

Co-financing from the IUCN Oceania Regional Office managed Energy, Ecosystems, and Sustainable Livelihoods (EESLI) project was allocated based on the EESLI III project plans which will work with various Pacific countries to establish links between energy needs and sustainable livelihoods and healthy ecosystems. The EESLI III has a particular focus on Covid-19 recovery efforts and health issues. The project will work with RMI to explore green/blue recovery efforts with energy efficiency and Nature-based Solutions. RMI's Electricity Roadmap is supported by the European Union through the EDF 11 programming with projects focusing on supporting the National Energy Office and its implementation of the roadmap's energy efficiency goals, including coordination, outreach, and achieving RMI's 2025 milestones. These will complement the MaIGEE's work towards the same milestones. The World Bank also supports RMI's implementation of the Electricity Roadmap through the Sustainable Energy Development Project. This includes components on improving RMI's distribution grid, generation capacity, renewable energy capacity and energy efficiency. Energy efficiency components have included and will continue to support energy efficiency improvements of lighting at the Majuro airport, energy efficient salt-water pumps for Majuro's sewerage system, improvements to grid distribution systems and awareness campaigns about energy efficiency. EU and World Bank co-financing were identified through the National Energy Office.

D. Indicative Trust Fund Resources Requested by Agency(ies), Country(ies), Focal Area and the Programming of Funds

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount($)	Fee($)	Total($)
IUCN	GET	Marshall Islands	Climate Change	CC STAR Allocation	2,193,578	197,422	2,391,000.00
				Total GEF Resources($)	**2,193,578.00**	**197,422.00**	**2,391,000.00**

E. Project Preparation Grant (PPG)

PPG Required **true**

PPG Amount ($)	PPG Agency Fee ($)
100,000	9,000

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount($)	Fee($)	Total($)
IUCN	GET	Marshall Islands	Climate Change	CC STAR Allocation	100,000	9,000	**109,000.00**
				Total Project Costs($)	**100,000.00**	**9,000.00**	**109,000.00**

Core Indicators

Indicator 6 Greenhouse Gas Emissions Mitigated

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO_2e (direct)	6253	0	0	0
Expected metric tons of CO_2e (indirect)	118161	0	0	0

Indicator 6.1 Carbon Sequestered or Emissions Avoided in the AFOLU (Agriculture, Forestry and Other Land Use) sector

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO_2e (direct)				
Expected metric tons of CO_2e (indirect)				
Anticipated start year of accounting				
Duration of accounting				

Indicator 6.2 Emissions Avoided Outside AFOLU (Agriculture, Forestry and Other Land Use) Sector

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO_2e (direct)	6,253			
Expected metric tons of CO_2e (indirect)	118,161			
Anticipated start year of accounting	2023			
Duration of accounting	20			

Indicator 6.3 Energy Saved (Use this sub-indicator in addition to the sub-indicator 6.2 if applicable)

Total Target Benefit	Energy (MJ) (At PIF)	Energy (MJ) (At CEO Endorsement)	Energy (MJ) (Achieved at MTR)	Energy (MJ) (Achieved at TE)
Target Energy Saved (MJ)	166,521			

Indicator 6.4 Increase in Installed Renewable Energy Capacity per Technology (Use this sub-indicator in addition to the sub-indicator 6.2 if applicable)

Technology	Capacity (MW) (Expected at PIF)	Capacity (MW) (Expected at CEO Endorsement)	Capacity (MW) (Achieved at MTR)	Capacity (MW) (Achieved at TE)

Indicator 11 Number of direct beneficiaries disaggregated by gender as co-benefit of GEF investment

	Number (Expected at PIF)	Number (Expected at CEO Endorsement)	Number (Achieved at MTR)	Number (Achieved at TE)
Female	623			
Male	1,364			
Total	1987	0	0	0

Provide additional explanation on targets, other methodologies used, and other focal area specifics (i.e., Aichi targets in BD) including justification where core indicator targets are not provided

We are unable to copy and paste tables into this box. Please see the Core Indicators Worksheet for full explanation.

Part II. Project Justification

1a. Project Description

1) the global environmental and/or adaptation problems, root causes and barriers that need to be addressed (systems description);

Introduction to the Project Site and Development Challenges

Climate change is recognized as a growing and significant global challenge to humanity and the biosphere. The 2015 Paris Agreement aims to address climate change, through sustainable development and poverty reduction, by pursuing efforts to limit temperature increases to below 1.5 degrees Celsius above pre-industrial levels. Increased levels of greenhouse gasses (GHG) will increase temperatures globally. The Republic of the Marshall Islands is particularly susceptible to global climate change because, among other threats, rising temperatures will results in rising sea levels that can inundate the low-lying atolls of the Marshall Islands.

The Republic of the Marshall Islands (RMI) is a Pacific Small Island Developing State (PSIDS) in the north Pacific Ocean. Twenty-nine atolls with 1,156 islands and islets comprise two island chains that give RMI an Exclusive Economic Zone (EEZ) of 1,900,000 km2 with only 180 km2 of land. The atolls consist of many small islands and islets with an average altitude above sea level of 2.1 meters. RMI's population of 58,413 is distributed among its many atolls and islands, but more than 65% is concentrated on Majuro (the capital) and Ebeye (an island on Kwajalein Atoll). Ten atolls are uninhabited due to lack of freshwater, poor soils, or nuclear contamination.

RMI is classified as a small island developing state (SIDS) and is an Overseas Development Assistance (ODA) upper middle income country with a per capita GDP of $3,866. RMI sits on the World Bank's Harmonized List of Fragile Situations as a country with "high institutional and social fragility." The economy is very small with an annual Gross Domestic Product (GDP) of approximately United States Dollar (USD) 200 million. Most of RMI's population depend on natural resources for subsistence living as only 15% of economic activity is driven by national activity and agriculture. As it is a relatively remote, "sea-locked," archipelagic state, RMI experiences high dependence on imported goods or high cost of production and limited access to global markets. The closest major markets to RMI are Guam (3,040 km), Honolulu (3,600 km) and Tokyo (4,480 km). The economy relies on fisheries, remittances, development assistance and grants from the US government under the Compact of Free Association . The public sector is the largest single employer in RMI.

RMI's economy grew at a rate of 6.5% in 2019. RMI was one of the first countries in the Pacific to shut its borders with the onset of the COVID-19 pandemic in early 2020. GDP is estimated to have dropped by 3.3% in 2020. Fisheries exports are expected to have declined during the pandemic due to the closed borders. RMI has a very small tourism sector and therefore did not experience a shock from loss of tourism that some of its regional neighbours experienced.

RMI's largest population centers are Majuro and Ebeye. The capital, Majuro, occupies an atoll of the same name with 64 coral islands and islets and has more than 25,000 inhabitants or close to 50% of the country's population. It hosts the majority of government buildings, fish processing facilities, and the main port. The second population center, Ebeye, is a single island on Kwajalein atoll and has more than 15,000 people inhabiting its 80 ha area.

Climate Hazards and Climate Change

RMI is one of the world's lowest-lying and climate-vulnerable countries. The Marshall Islands has a tropical climate which is heavily influenced by the northeast trade winds with a relatively dry season from December to April and a wet season from May to November. The southern atolls, closer to the equator, receive almost twice as much rainfall as the northern atolls which average 1,300 mm annually. Average annual temperatures range from 26.9 to 27.1 °C.

As a low-lying atoll state with few natural resources and high dependence on imports, RMI is extremely vulnerable to climate change impacts that exacerbate already difficult development challenges and poverty across the archipelago. RMI is also vulnerable to tropical cyclones with an average of 22 cyclones per decade since the 1950s. From 1982 to 2011, 11 of 71 tropical cyclones were categorized as severe events.

Climate change projections as detailed in the 2015 RMI Second National Communication to the UNFCCC and CSIRO include:

- Temperature – Warming trends are evident in both annual and half-year mean air temperatures in Majuro and Kwajalein. Further warming is expected over the northern and southern Marshall Islands up to 1.1 C by 2030. More warm years and decades are projected;
- Rainfall – Long-term average rainfall in northern and southern islands is expected to increase however this is expected to be less than natural variability and unlikely to be noticeable. There has been an observed decrease in rainfall at Majuro since 1954;
- Extreme temperatures – The frequency of warm days has increased and cool days decreased. Extreme temperature increases are expected to match overall temperature increases with an increase in frequency of extreme temperature days;
- Tropical cyclones – There are mixed predictions with low-confidence on the frequency and strength of tropical cyclone formation over RMI;
- Sea level – Sea level is projected to rise by 7-19 cm by 2030 and 41-92 cm by 2090. This will dramatically reduce the land area of RMI;
- Ocean acidification and coral bleaching are both expected to increase and result in decreased health and productivity of coral reefs surrounding RMI islands and atolls. This will increase the vulnerability to coastal erosion and livelihoods due to reduced fisheries production.

Climate change mitigation and adaptation are central to RMI's 2020-2030 National Strategic Plan with a specific pillar on environment and climate change. Resiliency and adaptation are built into the pillars on culture, infrastructure, and economic development. It is recognized that climate change is the central factor that will impact all elements of development and sustainability.

Greenhouse Gas Emissions and the Energy Sector

RMI contributes only 0.00001% of global greenhouse gas (GHG) emissions but has taken a global role in committing to being carbon neutral by 2050. RMI's Nationally Determined Contribution (NDC) commits the country to reducing GHG emissions by 32% below 2010 levels by 2025, 45% by 2030, and to have net zero emissions by 2050. RMI's commitment is guided by the Tile Til Eo 2050 Climate Strategy (2018) and the Navigating our Energy Future: Marshall Islands Electricity Roadmap (2018).

While it is acknowledged that all sectors must contribute to RMI's NDC commitment, the greatest achievements will come from the electricity sector. Emissions can be broken down into the electricity sector, transportation (land and sea), waste, and cooking/lighting. National emissions in 2010 were

estimated to have been around 116 kt CO2-e and 121 kt CO2-e in 2016 .

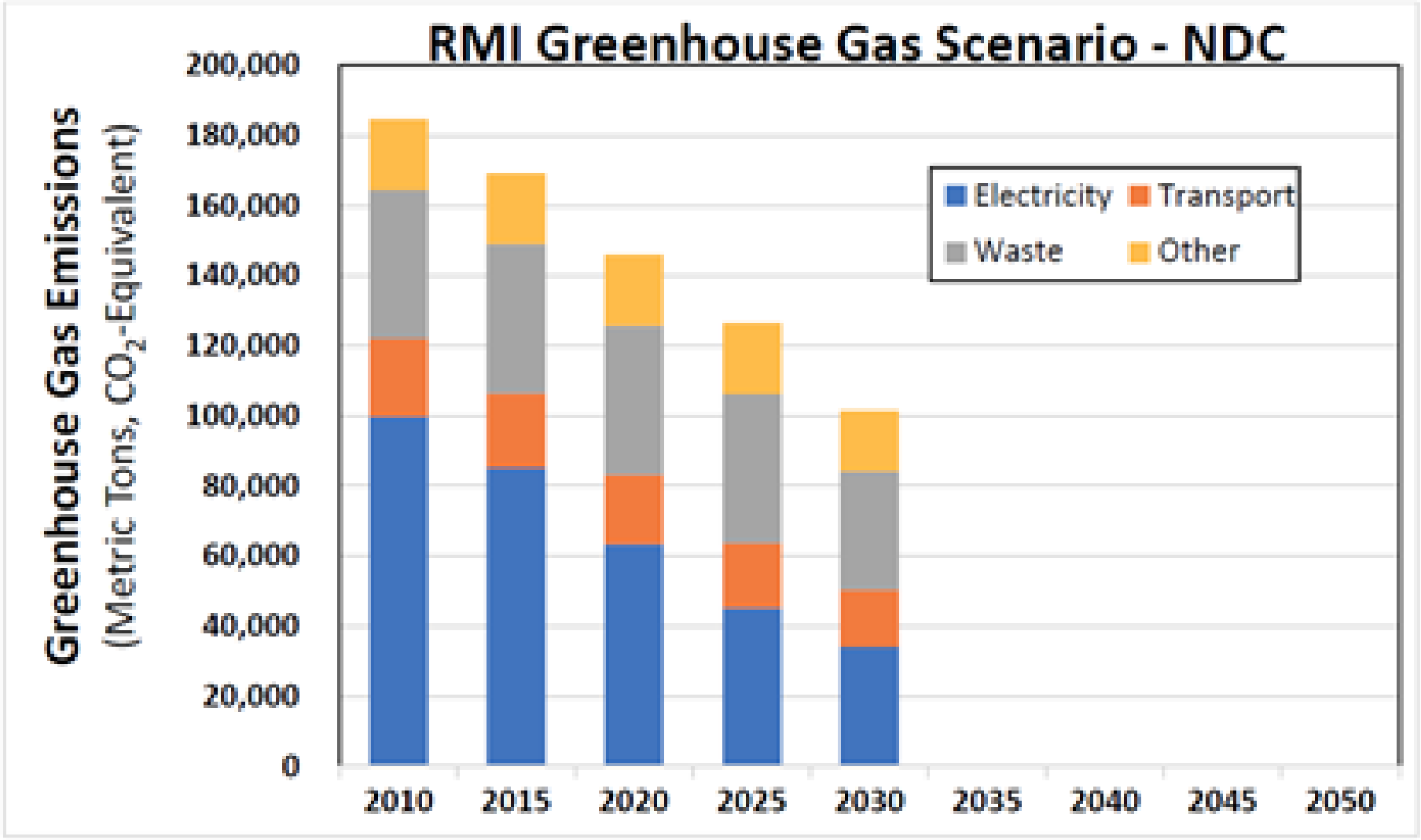


Figure 1: RMI's greenhouse gas scenario - NDC (source: Tile Til Eo 2050 Climate Strategy)

The 2050 Climate Strategy estimates that 10% of RMI's GDP is spent on importing fossil fuels for electricity generation alone. Emissions from the RMI electricity sector in 2010 were estimated at 60 kt CO2-e, or 52% of 2010 national emissions. In 2016, electricity sector emissions were around 57 CO2-e or 47% of national emissions. Decarbonizing RMI's electricity sector means reducing losses in generation and supply, improving energy efficiency (EE), and replacing diesel generators with renewable energy (RE) sources.

Root Causes of Greenhouse Gas Emissions

Current power production

RMI has three types of island electricity systems. Majuro and Ebeye have main energy grids. Some outer islands have mini-grids powered by diesel generators. Other outer islands have stand-alone systems powered by solar or diesel generators. The Majuro and Ebeye grids produce 74% and 22% of the electricity sector's GHG emissions respectively.

RMI currently has approximately 2% of its energy needs met by solar energy production. This includes 1 megawatt (MW) of solar photovoltaic (PV) installed in Majuro and a half megawatt in Ebeye. Thousands of stand-alone solar PV systems have been installed across communities on outer islands.

As the largest population center in RMI, Majuro has the largest electric grid with nearly 98% of its electricity generated at the Marshall Energy Company's (MEC) diesel power station. The remaining 2% comes from a mix of PV systems, a small heat-waste system, and privately operated generation. Typical daytime loads are around 6-7 MW. Total annual generation in 2016 was 54 gigawatt hours (GWh). It is generally recognized that Majuro's electricity infrastructure is struggling to meet demand and has a system average interruption duration index of several thousand minutes per year.

All of Ebeye's electricity is generated by the Kwajalein Atoll Joint Utilities Resources Inc. (KAJUR) diesel power station. Typical daytime loads in Ebeye are 1.7-2.1 MW with a total annual generation of 16.9 GWh. It is assumed that many businesses have private generators for back up.

RMI's dependence on imported fossil fuels makes it highly vulnerable to transportation disruptions and global price fluctuations. This poses challenges for governance and the socio-economic situation in RMI, including:

- Depending on ocean shipping for energy into the country is vulnerable to weather, climate and global political situations;
- The high costs of purchasing and shipping fuel and price fluctuations is a major threat to the economy of the RMI. In 2009 global fuel price shocks had major impacts on the country's economy;
- Diesel fuel causes pollution to RMI's fragile island and coastal ecosystems and can pollute delicate freshwater lenses if spilled;
- Generating electricity from fossil fuels will not allow RMI to meet its UNFCC NDC commitments.

RMI's Solution to Energy and Net Zero Emissions

RMI has a goal for net-zero carbon emissions, or 100% renewable energy, by 2050. To achieve this the electricity sector must reduce diesel use by 50% below 2010 levels by 2025, 65% by 2030 and 100% by 2050. RMI's "Marshall Islands Electricity Roadmap" provides the blueprint for achieving these reductions.

		NDC TARGET % REDUCTION GHG ECONOMY WIDE	NATIONAL EMISSIONS (KT CO_2-E/ YEAR) (EXCL FISHING)[5]	TARGET % REDUCTION GHG ELECTRICITY	ELECTRICITY (KT CO_2-E/ YEAR)	DIESEL USE MILLION USG/YEAR
2010 (baseline)	Actual	0	116	0	60	5.84
2016		–	122	–	57	5.6
2025	Target	32%	79	50%	30	2.9
2030		45%	64	65%	21	2.0
2050		100%	0	100%	0	0

Figure 2: Targets for the RMI Electricity Sector

While the decarbonisation of RMI's electricity means reducing losses in generation and supply, improving energy efficiency and conservation, and installing wind and solar generation, plus associated enabling technologies, the first and most cost-effective strategy is energy efficiency and conservation.

Majuro and Ebeye offer significant opportunity on the supply side to improve the efficiency of generation and reduce distribution losses. Businesses, government and households on these islands also offer significant opportunities for energy savings through energy efficient appliances, better maintenance, improved building design and construction, and changing the way people use energy.
The bulk of further reductions in diesel use, and therefore emissions, on Majuro and Ebeye will come from grid-connected wind and solar PV renewables generation, supported by diesel generators, batteries, and other enabling technologies. On outer islands, solar will be the primary form of energy, either in solar-diesel hybrid mini-grids or stand-alone solar-battery systems.

Assuming progress is made converting outer island mini-grids to renewables, to meet RMI's NDC targets, Majuro and Ebeye should each reduce diesel consumption from 2010 levels by at least 48% by 2025, 64% by 2030, and 100% by 2050 .

It is technically and economically challenging to take island grids of this size to high levels of variable renewables. The grids will move from aged diesel generators to automated systems that allow stable operation with little or no diesel generation, running during periods of high renewable energy resource availability. Other enabling technologies will include battery storage to provide operating reserve.

On Majuro, in particular, there is very little space readily available for the footprint required by large renewable projects. RMI has wind and solar resources providing variable renewable energy, but lacks dispatchable renewables that can generate on demand, such as hydroelectric power. Integrating high levels of fluctuating energy sources while maintaining grid stability and security of supply will require high levels of innovation.

These islands of Majuro and Ebeye are the country's centres of government and commerce and therefore require high reliability of service. Existing generation plants and networks are dilapidated and suffer from frequent outages, so as much attention needs to be given to the systems' security and reliability as to the

addition of renewable energy.

As the contribution from variable renewable energy sources increases, the contribution from the diesel generator decreases, and so more enabling technologies are required. The transition to renewable energy power systems from typical island diesel power systems can be broken down into the five distinct stages described in Table 1.

However, to achieve RMI's ambitious GHG targets for 2025, the grids of Majuro and Ebeye will need to move very rapidly from Stage 1, where they are now, directly to Stage 4. The most efficient and cost-effective pathway for the outer island mini-grids is to transition immediately to Stage 4 or 5.

Table 1: Stages for achieving net zero emissions (RMI Electricity Roadmap)

Stage 1: RE contribution 0% to 10%	Stage 1 is where all island power systems initially based on diesel generation start their renewable energy journey. The amount of renewables has no noticeable impact on the grid.
Stage 2: RE contribution up to 30%	In Stage 2, renewable energy is introduced in significant amounts and noticed by diesel generators as reduction of island power system load. There must always be enough running diesel capacity to cover full load, therefore the amount of renewables is limited by the diesel minimum load. Any sudden changes in renewable generation may result in grid instability.
Stage 3: RE contribution up to 50%	In Stage 3 enabling technologies are introduced to solve the problem introduced in Stage 2: when there is not enough running diesel generation to cover the current island load. Additional enabling technologies such as batteries support renewable generation by providing power system stability and reliability.
Stage 4: RE contribution up to 70%	In Stage 4, during the periods of sufficient renewable energy, a system can completely switch off the diesel generation fleet, with newly installed enabling technologies providing stability services. Renewable energy generation is increased further with additional solar and wind. Additional enabling technologies such as larger dump loads, sophisticated control systems and synchronous condensers are added.
Stage 5: RE contribution up to 100%	In the final stage of the journey, sufficient energy is generated from renewable energy sources, stored for low RE periods, and sufficient enabling technologies exist for stable and reliable power operation without diesel generation. Diesel generators might still be present in an island system but are mostly used in stand-by or emergency situations.

The technologies recommended for RMI in the first large steps of the energy transition, from now to 2030, include: wind turbines and solar PV for generation; battery energy storage systems (BESS); advanced control systems; and other enabling technologies, such as synchronous condensers and dump loads. Controllable loads and thermal storage, in the form of ice banks for cooling buildings or hot water, could also be used.

Waste-to-energy is a technology that requires further consideration and a feasibility study to determine whether it can be applied in the short term. Biodiesel generation is considered a key technology for cost-effective achievement of the 2050 target.

Energy Efficiency and Demand Side Management for Majuro and Ebeye

RMI's Roadmap to net-zero emissions by 2050 recognises that short term and long term advances in RE adoption cannot be made without concurrent investments in energy efficiency and managing demand growth. The Roadmap focuses on Majuro and Ebeye as the main population centres and the main users of diesel fuel and identifies air-conditioning, refrigeration, lighting, and water pumping as major uses of electricity that may benefit from EE initiatives. RMI has significant opportunities to improve energy efficiency through: large capital-intensive projects; by improving the efficiency of smaller appliances; and by changing individuals' behaviours.

The Roadmap sets nominal targets to reduce energy use on Majuro and Ebeye by around 10% in 2025, and 20% in 2030, over business-as-usual. In the near term, that will contribute to a reduction in diesel use, and, in the longer term, it will reduce the need for investment in renewable generation.

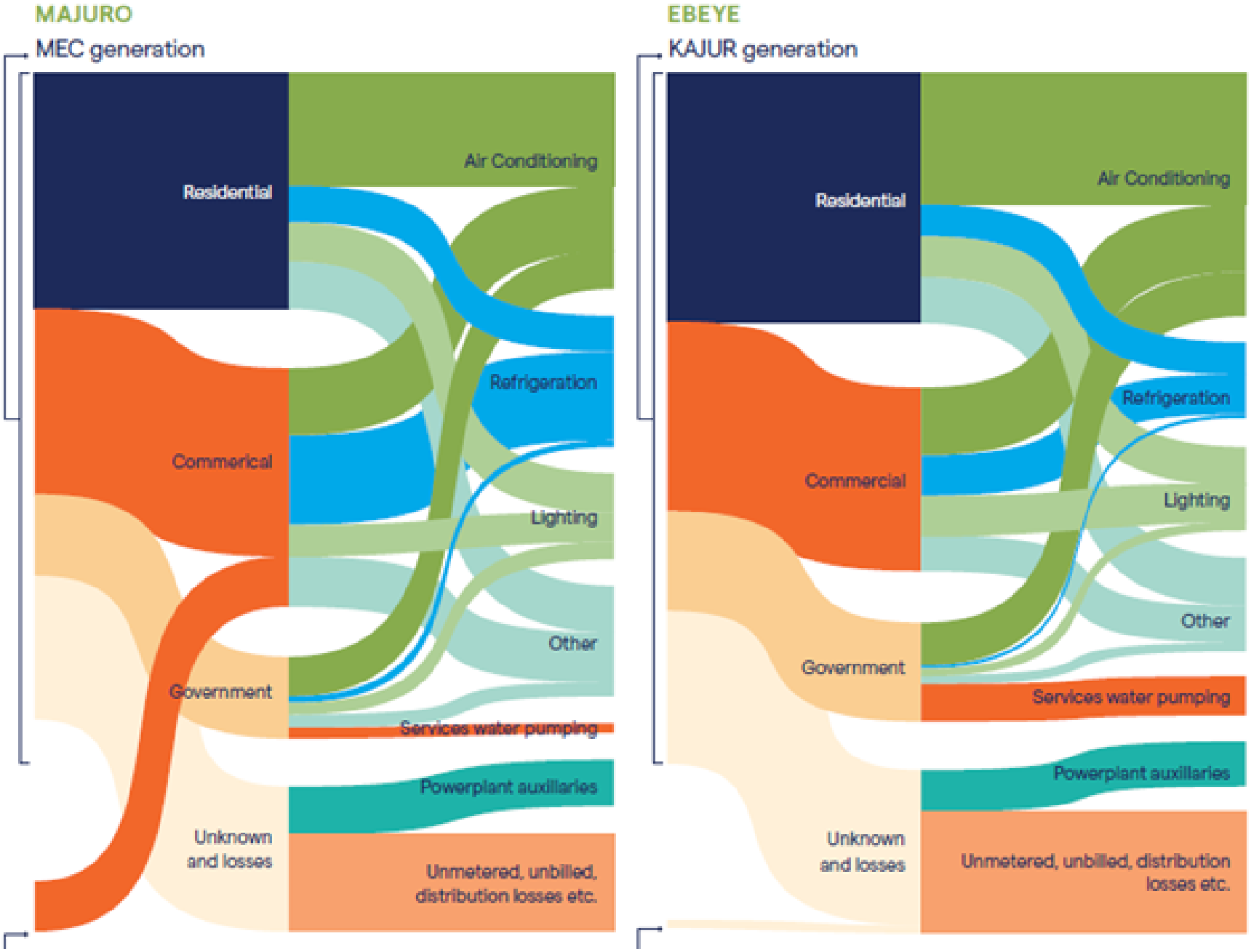


Figure 3: Energy Flows In Majuro and Ebeye (Source: Marshall Islands Energy Roadmap)

- Air-conditioning is the largest use of energy in both Majuro and Ebeye. Air-conditioning efficiency depends on the efficiency of the unit, its maintenance, its suitability for the size of the space, and temperature settings. Energy Star rated appliances can be 30% more efficient than regular and outdated appliances. Adjusting the temperature upwards by a few degrees can also save significant energy. Efficiency can also be improved through improving the building envelope and insulation and windows;
- Refrigeration is the second largest use of energy and is expected to increase in Majuro in the coming decades particularly for refrigerated containers at the Majuro port;
- Lighting and water pumping are the next largest users of electricity and can also benefit from efficiency initiatives. Specific opportunities, particularly for air-conditioning include the hospital in Majuro, the Nitijela (parliament building), and the International Conference Centre (ICC) complex. These 3 buildings use around 6% of the energy generated on Majuro.

The Roadmap identifies several key measures for energy efficiency and conservation in RMI. The Marshall Islands Government Energy Efficiency (MIBEE) project will assist with several of these measures. They include:

i. Government whole-of-life investment decisions – procurement of appliances and heating-ventilation-air-conditions (HVAC) should be based on the purchase prices, installation costs, and whole-of-life energy use costs rather than cheapest up-front costs;
ii. Government leadership – government will demonstrate leadership in energy efficiency and conservation behaviours by mandating temperature settings and ensuring that lights and appliances are not left on when not in use;
iii. Support a private sector advisory industry – training for energy efficiency support services will be led by government and include building capacity for energy efficiency audits;
iv. Low-interest loans and subsidies for energy efficient appliances – the Marshall Islands Development Bank (MIDB) will offer programmes of loans to homeowners in Majuro to purchase energy efficient appliances;
v. Remove disincentives to saving energy – some households on Majuro receive 1,000 kWh/month of free electricity. This is a major disincentive to energy efficiency in Majuro.

The government has set several targets for its energy efficiency goals including:

Table 2: Regulatory targets for government EE (RMI Electricity Roadmap)

Energy use	Short-term measures (before 2025)	Longer-term measures (post-2025)
Large building HVAC systems	When air conditioner is to be replaced, invest in right-sized, high efficiency design systems	Building envelope – insulation and leakage
Temperature set points (each half °C higher can save around 5% energy)	Mandate government offices temperature set point	Ensure all large buildings have fit-for-purpose systems using ice banks
Energy Star appliances – Energy Star air-conditioning can be 30% more efficient than others	Energy efficient technology – mandate all government agencies to buy Energy Star (or equivalent) appliances	

RMI Energy Human Resources and Policy Needs

The Roadmap also provides guidance on national energy human resources needs and policy needs. It is acknowledged that the process of decarbonising the economy will require international expertise, new Marshallese staff with new skill sets and the latest training for existing staff. The human resources development plan is built on a set of core principles and with carefully defined key strategies and initiatives. These include encouraging partnerships and collaboration, developing vocational training and internships, and encouraging women to be employed in the energy field.

Several key policies identified in the 2018 Roadmap have already been implemented. A proposal to establish a Ministry of Environment, Climate Change and Economy was successfully implemented in 2018 with the passing of the Ministry of Environment Act (2018). Agencies under the new ministry include:

1. Environmental Protection Authority, as established in the National Environmental Protection Act of 1984;
2. Climate Change Directorate;
3. National Energy Office, as established by National Energy Office Act, 2018;
4. National Council on the Environment.

A proposal for an Energy Sector Management Act is in preparation. The "Energy Bill" is currently in first draft form and consultations for the bill are expected to conclude in 2021 and be passed in 2022. A revised national energy policy may be developed after the Energy Bill is passed, but the Marshall Islands Electricity Roadmap will continue to guide the process of decarbonisation and meeting the 2050 NDC goals of net-zero emissions.

The Roadmap also sets out some key policies and regulatory processes (see Table 2) for energy efficiency. These recommendations also include the issue of some landowners continuing to receive free electricity, and specific EE measures.

Barriers to achieving net-zero emissions and energy efficiency

RMI's vision of achieving net-zero emissions by 2050 has a clear strategy and roadmap. The roadmap outlines the strategy to develop renewable energy and energy efficiency across the country. There are many technological and resource challenges to achieve the vision. Stages have been outlined with milestones

at 2025 and 2030 to measure progress. Barriers to implementing the roadmap relate to both energy efficiency and renewable energy improvements.

Land – Majuro and Ebeye are very small islands or groups of islets. They have limited land on which to place the most viable renewable technologies of PV panels and wind turbines. Roof-top PV systems can be installed but many buildings will require reinforced roofs and structures to support the additional weight and withstand storm winds. Building codes can help to overcome this for new buildings. There are plans to explore the possibility of floating PV in Majuro's lagoon area. Land can also be an issue when using Nature-based Solutions (NbS) for energy efficiency. Planting trees on the east and west sides of buildings can provide shade to reduce energy bills for air-conditioning. The high density of buildings on Majuro may make this a limited option for some buildings. MIBEE will review and, if necessary revise, the RMI building code, to help ensure that buildings can be suitable for rooftop PV panels. It will also produce guidelines for suitable NbS for reducing the need for air-conditioners through appropriate planting and landscaping techniques.

Energy efficiency improvements will help to reduce the total energy demand and reduce the need for additional land space to develop renewable energy resources.

Technological – There are many technological barriers to converting the Majuro and Ebeye grids from the current dilapidated diesel-generator-based linear grids to complex grids resourced by renewable energy sources. To achieve better energy efficiency of government buildings, there are challenges in establishing standard audit procedures and process and data management. Recommendations and regulations on procurement and installation of energy efficient appliances are needed to help the government make decisions on which appliances to purchase and install.

Human capacity - The RMI's electricity journey will require a wholesale transformation from diesel generation, with which there is a great deal of experience, to automatically controlled, high-tech renewable energy systems, with which there is almost no experience. The process of transformation requires the rapid design and build of large amounts of wind and solar generation, battery storage, advanced control systems, new high-speed automated diesel generators, and other enabling technologies as laid out in the Roadmap. These are supported by improvements in energy efficiency which will reduce overall demand for energy. The success of this ambitious program of work and the achievement of the RMI's climate change targets depends entirely on the skill and commitment of the people who work on these systems.

The RMI shares many challenges with other island states in terms of its small size, geographic isolation and vulnerability to natural and economic shocks. The small island population and remote location ultimately result in limited human capital, lack of education and skilled workers and low employment opportunities. The close relationships and social structures of small island communities often bring challenges in managing employees. With the right to live and work in the United States, around one-third of the total Marshallese population has moved to the United States seeking education and employment opportunities. MIBEE has capacity building objectives and awareness objectives built into all of its components to help address these challenges and build human capacity for energy efficiency in RMI.

Finance - In the period from now to 2025, a total of around $120 million capital investment is needed for renewable energy across the RMI (assuming the least-capital cost pathway using wind, batteries, and enabling technologies). Around $30 million of that is being invested under existing projects, $12 million is needed for generator replacements, and $40 million for network and general assets. Around $10 million has been committed in current projects by the ADB for a fuel tank farm, and the World Bank for diesel generators, leaving a gap of around $40 million. In the period from 2025 to 2030, an additional $45 million for new capital is needed to achieve the 2030 target, including investment in network and general assets.

Tariffs and subsidies cover basic operating costs, but do not allow for maintenance of the system or replacement. RMI is depending on development partners to finance most of its net zero emissions goal. Financing for initial capital investment will come primarily from development partner grants. Financing for operations, maintenance, and replacement will come primarily from electricity tariffs, diesel savings, and Government subsidies. Costs for international staff and the human resource development program will be sought from development partners.

MIBEE will work to build awareness among financial institutions and lenders in RMI to understand the long-term financial benefits of energy efficiency investments. This will include awareness programmes for residents in Majuro and Ebeye to promote taking loans to invest in household energy efficiency.

2) the baseline scenario and any associated baseline projects,

RMI, through the Electricity Roadmap, has identified several important policy instruments for achieving its NDC commitments, including through energy efficiency. The Ministry of Environment was established in 2018 through the Ministry of Environment Act to include climate change and energy issues related to mitigation and adaptation. This was complemented by the National Energy Office Act 2018 to establish the government body responsible for achieving the Electricity Roadmap and other energy policies. An Energy Sector Management Act is currently under development with support from EU EDF11. In 2019, RMI included import tariff exemptions for energy efficient appliances in its Import Duties (Amendment) Act 2019. The National Building Code also includes some aspects of building energy efficiency but these will be reviewed and revised, as needed, under this project.

RMI receives support from various donors to support its national climate change strategy, Tile Til Eo, its NDC commitments, and its 2018 Marshall Islands Electricity Roadmap.

The European Commission, through the governments of Germany and Spain are supporting the RMI NDC Deep Dive Project to accelerate implementation of priority action towards meeting RMI's NDCs. This will be done through strengthening existing systems and efforts towards coordination and collaboration amongst the various stakeholders on climate change issues as well as supporting sectoral transformation projects that would contribute to NDC implementation. The two-year, US$1.6 million project will focus on several climate change related projects including supporting implementation of the Electricity Roadmap by funding its Human Resource Coordinator.

The US$34 million World Bank Sustainable Energy Development Project (SEDeP) started in 2017 and has focused on providing assistance towards the design, supply, installation, and operational support for solar power generation, battery energy storage, and grid management equipment in the capital Majuro, as well the replacement of existing generators to ensure lower emissions and improve operation efficiency in Majuro and Ebeye, until renewable solutions can be deployed.

It has provided technical and operational assistance to reduce energy demand, by improving the efficiency for both the use and supply of electricity from the country's two public sector utilities KAJUR and MEC, and by encouraging more energy efficiency through public information campaigns overseen by the Ministry of Resources and Development's Energy Planning Division. Lastly, it has provided training and workshops focused on improving energy policies across the Ministry of Finance, Banking and Postal Services, and public sector utilities, in addition to the support of studies that will identify further assistance and investments needed in Ebeye and the outer islands of Wotje, Jaluit, Rongrong, and Santo.

The Taiwan-funded "Home Energy Efficiency and Renewable Energy Project in the Marshall Islands" is a US$4 million loan project from the Taiwan International Cooperation and Development Fund. The project supports the household energy efficiency and home solar system relending facilities to be carried out by the Marshall Islands Development Bank (MIDB) and the MEC. The Project consists of two components:

Component I Energy Efficiency: EE sub-loans will be made to households for the introduction of energy-saving appliances and light fittings and, if necessary, the upgrading of internal household wiring. The applicant households must take an energy audit carried out by the MEC free of charge to obtain a list of the inefficient appliances and light fittings in need of replacement, which will later be provided to the MIDB for loan approval.

Component II Renewable Energy: A RE sub-loan will be made to households for installing a solar photovoltaic system, provided that the applicant households have achieved the energy efficient level required by the MEC.

Anecdotal evidence suggests that there has been very little interest in households seeking loans under this project.

The Majuro Power Network Strengthening project is a 2017 Asian Development Bank (ADB) US$2 million project to install an advanced metering infrastructure to allow the MEC to identify and reduce losses on the Majuro power system, improve revenue collection, and plan for the installation of distributed renewable energy generation in the Majuro power system. It will also assess the MEC's business processes, management practices, policies and governance arrangements, and prepare a roadmap for action to help make the energy company a more self-sustaining and efficient electric power utility.

Under the Implementation of Support for the Energy Sector programme, two NGOs in RMI received $440,000 to work towards energy efficiency and renewable energy from the European Union under EDF11. The Marshall Islands Council of Non-Governmental Organisations (MICNGOS) has completed energy audits for NGO buildings in Majuro and will commence on energy audits for select government buildings in late 2021. The Research Education Community Organisation (RECO) is working with the National Energy Office on electric mobility with electric scooters on Majuro. Under EDF11, RMI has also planned an energy efficiency retrofit of the Ministry of Economy building, scheduled to being in 2022. From 2017-2019 EDF 11 funds were used to make improvements to the Majuro distribution grid cables and transformers to reduce energy losses and increase energy efficiency.

Regionally, there are several projects that focus on, or include, energy efficiency. These include:

GEF6 Federated States of Micronesia's "Micronesia Public Sector Building Energy Efficiency (MPSBEE) Project that will achieve (1) enforcement of policies and rules and regulations on the energy efficient and energy conserving design, retrofit, operation and maintenance of public sector buildings; (2) enhance management and monitoring of the energy performance of public sector buildings; (3) increase application of EC and EE technologies in public sector buildings and facilities; and (4) enhance awareness and knowledge on the cost-effective application of EE and EC technologies in public sector buildings.

Older projects include the REEEP Energy Efficiency, Auditing and Appliance labelling Programme (EEAAL) that included feasibility studies for appliance labelling programmes in Samoa and Vanuatu and energy auditing in Palau, RMI, and Vanuatu. The studies were published in 2010 without any follow up funding for implementation.

The Pacific Community (SPC) hosts the Pacific Centre for Renewable Energy and Energy Efficiency (PCREEE), which was established in 2018 and is based in Tonga. PCREEE was established by the Pacific Ministers of Energy and Transport as regional SE4ALL center of excellence operating under the umbrella of the

Framework for Action on Energy Security in the Pacific (FAESP). Through regional methodologies and tools, the center assists PICTs to address existing barriers and strengthen drivers for sustainable energy markets, industries and innovation. The centre represents an innovative fusion of regional and international efforts and capabilities. Its design leverages a network of intra and extra regional partnerships, serving as a "hub" for knowledge and technical expertise on matters related to sustainable energy project development and implementation. UNIDO provides technical services and mentoring throughout the first operational phase of the centre. However, with the countries of Micronesia poised to leave the Pacific Islands Forum it is unclear how the PCREE mandate may apply to RMI after 2022.

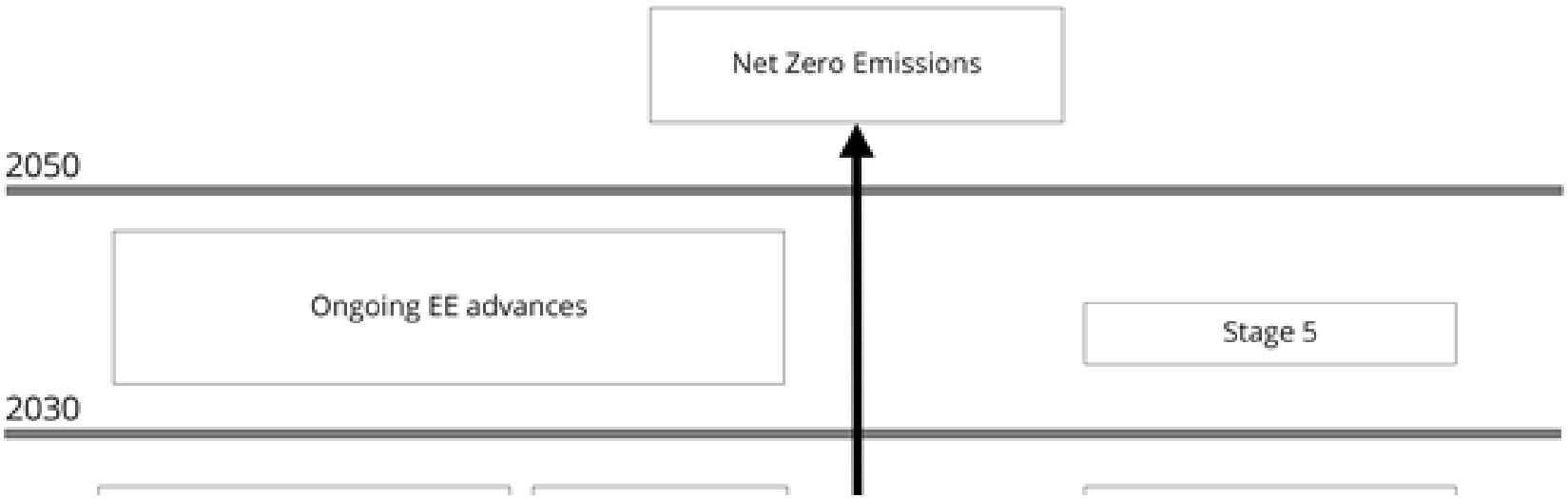
3) the proposed alternative scenario with a brief description of expected outcomes and components of the project;

Theory of Change

RMI's 2018 "Navigating our energy future: Marshall Islands Electricity Roadmap" outlines a full theory of change for the electricity component of its 2050 goal of net zero emissions. The theory of change focuses on renewable energy with acknowledgement of the role of energy efficiency in the process. It also includes human resources, policy and capacity changes that are need to achieve each of its five stages for RE adoption. The role of the MIBBEE project in this process is depicted in Figure 4.

The proposed alternative scenario MIBEE project will contribute to the Roadmap theory of change and help RMI reach its 2025 target of 32% reductions in emissions beyond 2010 levels. This includes reducing energy use on Majuro by 10% by 2025. The objective of the project is that energy efficiency in RMI is helping to achieve net zero emissions targets and greenhouse gas emissions are reduced.

Energy efficiency is not well established in RMI. The project will build lessons and examples in government buildings while raising awareness through the project demonstration sites. These lessons and the heightened awareness will be coupled with financial incentives and enforcement mechanisms to expand energy efficiency across public and private sector buildings.



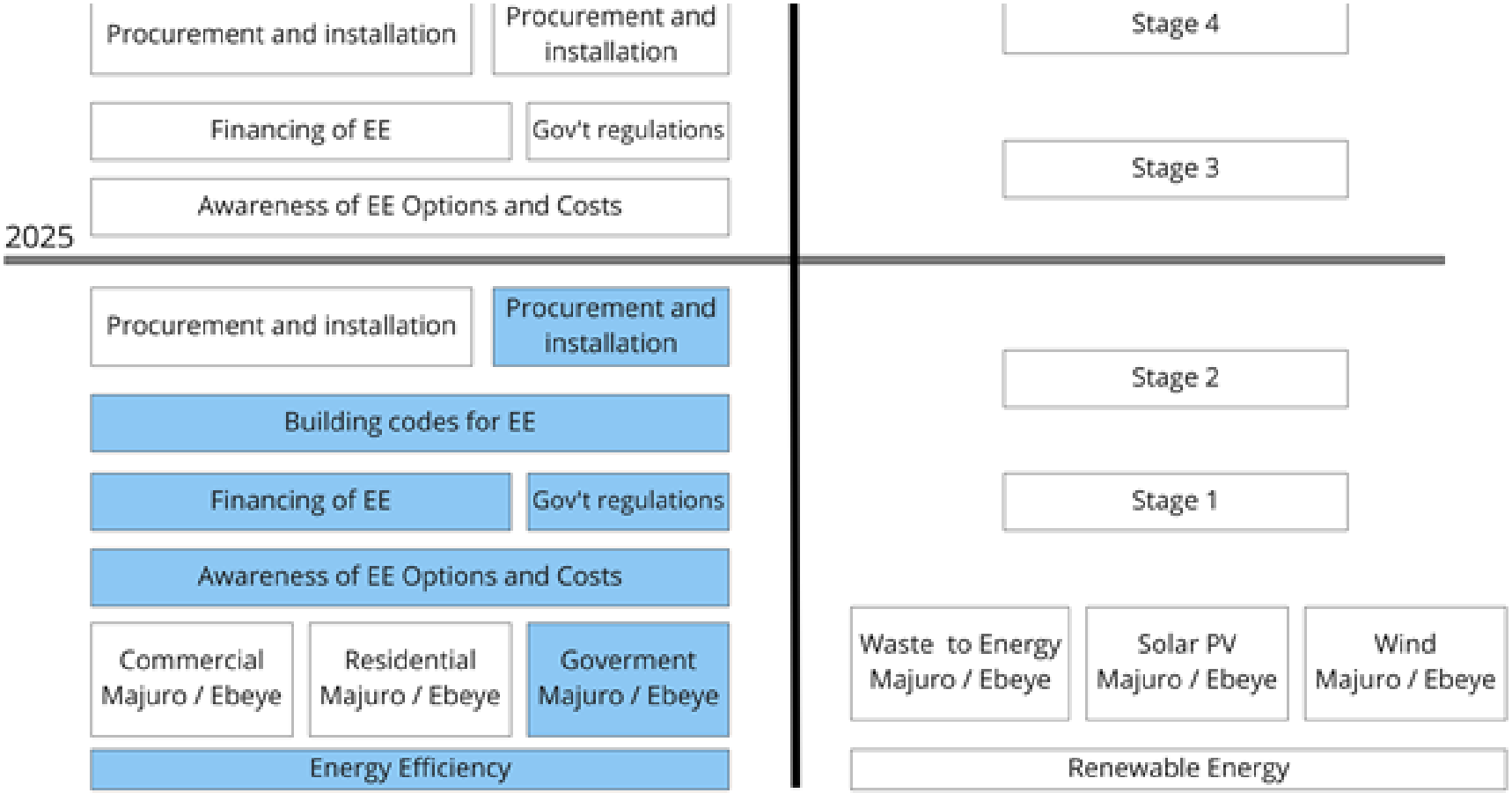


Figure 4: RMI Roadmap to net zero emissions (blue boxes indicate MIBEE objectives and/or outputs)

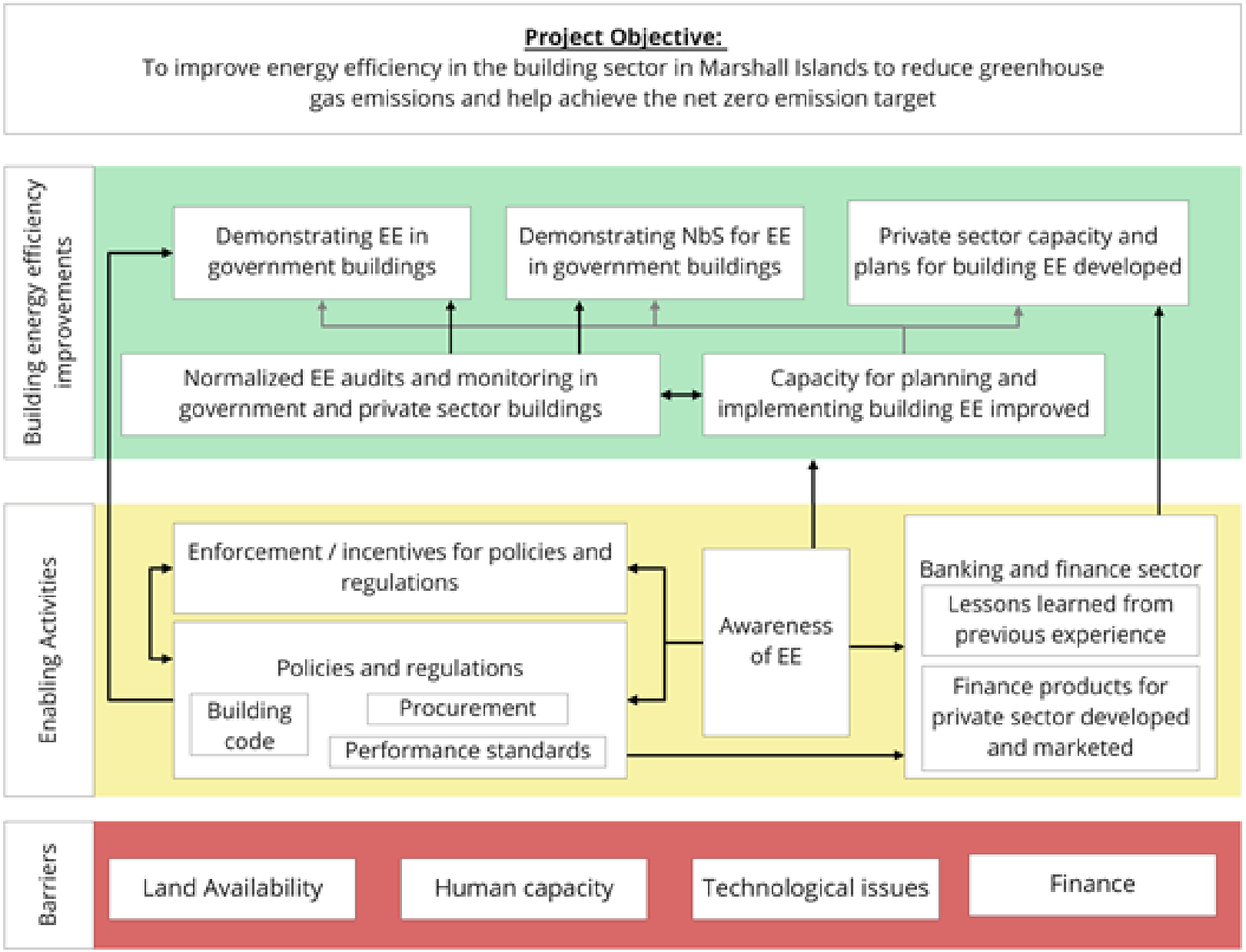


Figure 5: MIBEE theory of change diagram

Objective and Outcomes

The objective of the MIBEE project is to improve energy efficiency in the building sector in Marshall Islands to reduce greenhouse gas emissions and help achieve the net zero emission target. The project will achieve this through 3 components with 9 major outcomes. These include:

Component 1. Enabling activities and policy for energy efficient buildings in RMI
- Outcome 1.1. Policies and regulations for energy efficiency are in-place and enforced by relevant government officials
- Outcome 1.2. Increased awareness of importance of energy efficiency in Majuro and Ebeye

Component 2: Government and public sector building energy efficiency improvements
- Outcome 2.1. Building performance monitoring and evaluation
- Outcome 2.2. Demonstrating improved energy efficiency of government buildings through technology and practices
- Outcome 2.3. Nature-based solutions for energy efficiency in government buildings demonstrated
- Outcome 2.4. Increased capacity for energy efficiency
- Outcome 2.5. Selected private sector entities have specific and articulated plans for increasing energy efficiency in their buildings

Component 3: Monitoring, evaluation, and knowledge management
- Outcome 3.1. Communications plan and knowledge management plan developed and implemented
- Outcome 3.2. Project data and outcomes available to stakeholders and partners in RMI and the Pacific.

Component 1: Enabling activities and policy for energy efficient buildings in RMI

RMI has made significant progress in achieving the policy aims in the Roadmap and 2050 Climate Strategy Tile Til Eo since 2018. This includes establishing a Ministry of Environment that is also responsible for climate change and energy. Some key regulatory and policy gaps still remain or need to be reviewed and revised. Component 1 will work with the National Energy Office and other key government stakeholders to fill some of these gaps.

Under Outcome 1.1. (Policies and regulations for energy efficiency are in-place and enforced by relevant government officials) there are 3 major outputs.

Output 1.1.1. will ensure that government processes and regulations address energy efficiency and conservation measures. These include (a) working with the Public Works Department to ensure that the revised building code has adequate regulations for energy efficiency for new buildings and that the Public Works Department has the capacity to enforce the EE aspects of the code; (b) revising government procurement processes to account for whole-of-life costs of appliances, including expected energy consumption, rather than purchasing cheapest up-front cost appliances; (c) mandating the purchase of Energy Star (or equivalent) appliances for all government agencies; (d) establish a minimum energy performance and labeling scheme for government offices; (e) banning incandescent lightbulbs in government buildings; and (f) prescribing temperature settings for air-conditioning in government buildings. This output will address barriers on land availability by helping to make energy consumption more efficient and therefore reducing the overall energy production needs and space needed for renewable energy solutions that have significant space footprints. It will also address finance issues by mandating the use of energy efficient appliances and a need to finance them.

Output 1.1.2. will develop and implement enforcement mechanisms for the energy efficiency mechanism delivered in Output 1.1.1. This will be achieved by identifying specific roles or officers who can be trained and mandated to monitor and enforce energy efficiency regulations in each government building or office and a reporting system. Incentive systems will be established with awards for government offices that do the most to reduce energy usage. Energy

Managers will be identified for government offices, such as Administrative Finance Officers, who will monitor electricity consumption through audit processes and energy billing. Under this output private sector buildings will also be encouraged to establish energy efficiency enforcement and incentive mechanisms based on the lessons from the government offices. Policies to incentivize the public sector to implement this will be studied and proposed during the PPG phase. This will link to Output 2.4.1. As with Output 1.1.1 this will address barriers on land availability by reducing energy consumption.

Output 1.1.3. will work with the banking sector in RMI, including the Marshall Islands Development Bank, to understand the role of energy efficiency in RMI's climate change strategy but also the role of energy efficiency in the economy. It will build capacity for banks to develop and deliver loan mechanisms for companies and households to invest in EE appliances. A project financed by Taiwan established an EE lending mechanism but anecdotal evidence suggests that there has been very little interest from consumers and banks. Lessons from the Taiwan consumer loan project for energy efficiency will be developed and analysed and applied to building products for private sector companies. The output will then work with the Marshall Islands Development Bank and the electricity companies on Majuro and Ebeye to create lending products for private sector energy efficiency. This will be further developed during the PPG phases. This output will be combined with Output 2.5.1. on general awareness of EE across Majuro and Ebeye. This output will specifically help to address the barrier on finance availability by making adoption of energy efficiency in buildings more attractive across several sectors in RMI.

Outcome 1.2 (Increased awareness of importance of energy efficiency in Majuro and Ebeye) and Output 1.2.1 will leverage the governments EE efforts during the MIBEE project to raise awareness about EE across Majuro and Ebeye particularly with selected private sector entities. It will use government successes and demonstrations to highlight the need for EE and conduct custom EE awareness programmes. This will be accomplished by (a) conducting EE awareness surveys in Majuro and Ebeye; (b) developing awareness campaigns; (c) conducting awareness campaigns with monitoring; (d) establishing an EE website for RMI. This outcome will address identified barriers by raising awareness on EE and indirectly helping to achieve several of the barriers at one time.

Component 2: Government and private sector building energy efficiency improvements

Component 2 will focus on improving the energy efficiency of buildings in Majuro as a demonstration for how this can be achieved in other government and private sector buildings across Majuro and Ebeye. It will institutionalize energy audits in government buildings and establish a database for managing and monitoring EE progress. It will pilot EE retrofits of air-conditioning systems in key buildings across the capital demonstrating how to cost for retrofits and implement them. The use of Nature-based Solutions for EE, particularly through landscaping and planting of native and endangered tree species on sunny sides of buildings will set an example for low-cost solutions that will also help to stabilize fragile soils and water-tables.

Component 2 will address several identified barriers, including those on land availability, technological capacities, human capacity and finance.

Outcome 2.1. (Building performance monitoring and evaluation) and Output 2.1.1. will provide guidelines and data for making decisions about EE projects. It will deliver (a) standard building audit guidelines and processes; (b) develop a database for maintaining audit results for future monitoring and enforcement; (c) conduct EE audits on key buildings in preparation for retrofits; (d) and conduct the first energy audits on select private sector hospitality industry and other private sector buildings in and around Majuro. This outcome will address identified barriers on land availability by assisting with reducing electricity consumption and technological barriers by building systems and capacity for energy auditing.

Outcome 2.2. (Demonstrating improved energy efficiency of government buildings through technology and practices) and
Output 2.2.1. will directly reduce energy use in key government buildings and demonstrate energy efficiency conversions in Majuro by installing energy efficient appliances and other identified technologies. It will focus on air-conditioning as this is the biggest use of electricity in Majuro's government buildings. Output

2.2.1. will (a) develop an inventory and replacement plan for appliances in key government buildings; (b) procure and install energy efficient air-conditioners and solar-powered air conditioners; (c) establish costed plans for completing EE retrofits in all major government buildings; (d) installation of automatic switches and sensors for lights and air-conditioners. Other processes to demonstrate improved energy efficiency may include improved windows and doors, building envelops and improving ventilation to reduce the need for air conditioning. This outcome will address identified barriers of land availability by reducing overall energy consumption and technological barriers by identifying and addressing technological issues and challenges to achieve better building energy efficiency in an RMI context.

Outcome 2.3. (Nature-based solutions for energy efficiency in government buildings demonstrated) and Output 2.3.1. will explore Nature-based Solutions for reducing energy use in government buildings. Landscaping around government buildings and planting trees on the east and west sides of buildings can increase the shade in the area and reduce the heat island effect. This can also give habitat to birds and important pollinators that are required for community gardens on Majuro. This output will (a) develop guidelines for NbS for energy efficiency landscaping and tree planting on Majuro; (b) evaluate government buildings for landscaping and tree planting suitability; (c) demonstrate NbS for EE in key government buildings; (d) combine landscaping and tree planting with freshwater capture from roof tops. This outcome will address identified barriers of land availability by reducing overall energy consumption and technological barriers by identifying and addressing technological issues and challenges to achieve better building energy efficiency in an RMI context.

Outcome 2.4. (Increased capacity for energy efficiency) and Output 2.4.1. will build human resources capacity for EE among government staff and other stakeholders to plan, implement, enforce and monitor EE projects across RMI. It will (a) conduct capacity needs assessments with a focus on gender and vulnerable people; (b) develop capacity building plans, programmes and materials, (c) conduct capacity building as needed with a focus on gender and vulnerable peoples. This outcome will address identified barriers on human capacity by building specific capacity among government and other stakeholders to plan and implement energy efficiency projects.

Outcome 2.5. Selected private sector entities have specific and articulated plans for increasing energy efficiency in their buildings. Lessons from Outcomes 2.1, 2.2, and 2.3, combined with the results of Output 1.1.3, will be generated and harnessed to work with selected private sector entities in Majuro and Ebeye to develop costed plans for improving the energy efficiency of their buildings.

Component 3: Monitoring, evaluation, and knowledge management

Component 3 will focus on knowledge management overall communications about the project. Outcome 3.1 will develop and implement a project communications plan and knowledge management plan. These will be outlined in the PPG phase. Outcome 3.2 will focus on maintaining and disseminating project data and products to partners and stakeholders in RMI and across the Pacific.

4) alignment with GEF focal area and/or Impact Program strategies;

The proposed MIBEE project is fully aligned to the GEF7 Climate Change Focal Area Strategy through Objective 1: Promote innovation and technology transfer for sustainable energy breakthroughs – accelerating energy efficiency adoption.

The project will help meet this objective by:

1. Assisting the government of RMI with meeting its 2025 targets to reduce GHG by 10% through the replacement of appliances with energy efficient options;

2. Innovating the use of Nature-based Solutions for energy efficiency in Pacific SIDS and atoll states by using native vegetation and ecologically-appropriate landscaping to reduce air-conditioning needs in government buildings. This can be replicated across other Pacific SIDS and atoll states with the guidelines and success stories that will be produced and shared;
3. Establish critical enabling environments for government regulations, but also build awareness and capacity for energy efficiency with the general public in Majuro and Ebeye and with the financing and lending industry in Majuro and Ebeye;
4. Demonstrating government leadership and energy efficiency to the wider public in Majuro and Ebeye. Through the awareness campaign, government successes and lessons will be shared with the public and raise awareness about the possibility of energy efficiency solutions.

As RMI builds momentum towards it 2050 NDC net zero emissions goal it will be focussed on RE systems in major urban areas. The EE component of RMI's Electricity Roadmap is, as is the RE component, fully aligned with the GEF7 Climate Change Focal Area Strategy.

5) incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF, LDCF, SCCF, and co-financing;

The MIBEE will support RMI's efforts to implement the energy efficiency elements of its Electricity Roadmap to achieve its 2025 NDC targets. The baseline situation identified above details existing support for RMI's Electricity Roadmap implementation including renewable energy and energy efficiency investments from the World Bank, ADB, and European Union, amongst others. The majority of the baseline situation project funding focuses on the renewable energy elements of the Roadmap and updating RMI's distribution grid in Majuro and Ebeye.

The Roadmap identifies that a large portion of RMI's energy consumption comes from air conditioning and refrigeration (figure 3). This important element of the Electricity Roadmap and the subsequent contribution to the net zero emissions goal is not accounted for in baseline scenario projects. The Roadmap acknowledges that it will be funded primarily through grants and loans from development partners, particularly the World Bank and Asian Development Bank. Without GEF funding of the MIBEE project it is unlikely that the building energy efficiency aspect of the electricity roadmap and subsequent GEBs would be realized.

RMI's existing portfolio of energy related funding includes the mentioned support from the European Union and the World Bank among others, as noted in the Baseline Situation section. These include:

Donor	Title	Duration	Total funding	Energy efficiency funding	Notes
European Union	European Development Fund (EDF) Envelope 11 Budget Support Project	5 years (2017 – 2022)	Euro 9,700,000	USD 3,600,000	The project has invested in upgrades to the Majuro Electric Company grid to replace energy leaking transformers and cables. It has funded grants to NGOs to conduct energy audits of NGO and government buildings (2022), an electric scooter pilot programme, and a retrofit of energy efficient appliance in the Ministry of Finance building. Remaining funding is used for renewable energy projects.
World Bank	Sustainable Energy Development Project (SEDeP)	5 years (2017 – 2022) (anticipating 1 year extension)	USD 34,000,000	USD 1,000,000	Energy efficiency has been a target of airport and runway lighting replacement with LED, replacing salt-water pumps in Majuro with efficient pumps, and replacing 2 of 7 diesel generators at the MEC with more efficient and functional generator sets. Remaining funding is used for renewable energy projects.

6) global environmental benefits (GEFTF) and/or adaptation benefits (LDCF/SCCF); and

The global environmental benefits (GEBs) from the proposed MIBEE project would mainly come from GHG emission reductions from the energy efficiency improvements to government buildings through reduced energy consumption. The GHG emissions reductions would come from: (1) Direct emission reductions from completed energy efficiency technology and appliance demonstrations and replications; and, (2) consequential emission reductions from follow-up energy efficiency technology and appliance application projects in the country as influenced by the MIBEE project.

The historical annual GHG emissions from the combustion of fossil fuels (i.e., petroleum products) is shown in Figure 6 for the period 2010-2016 .

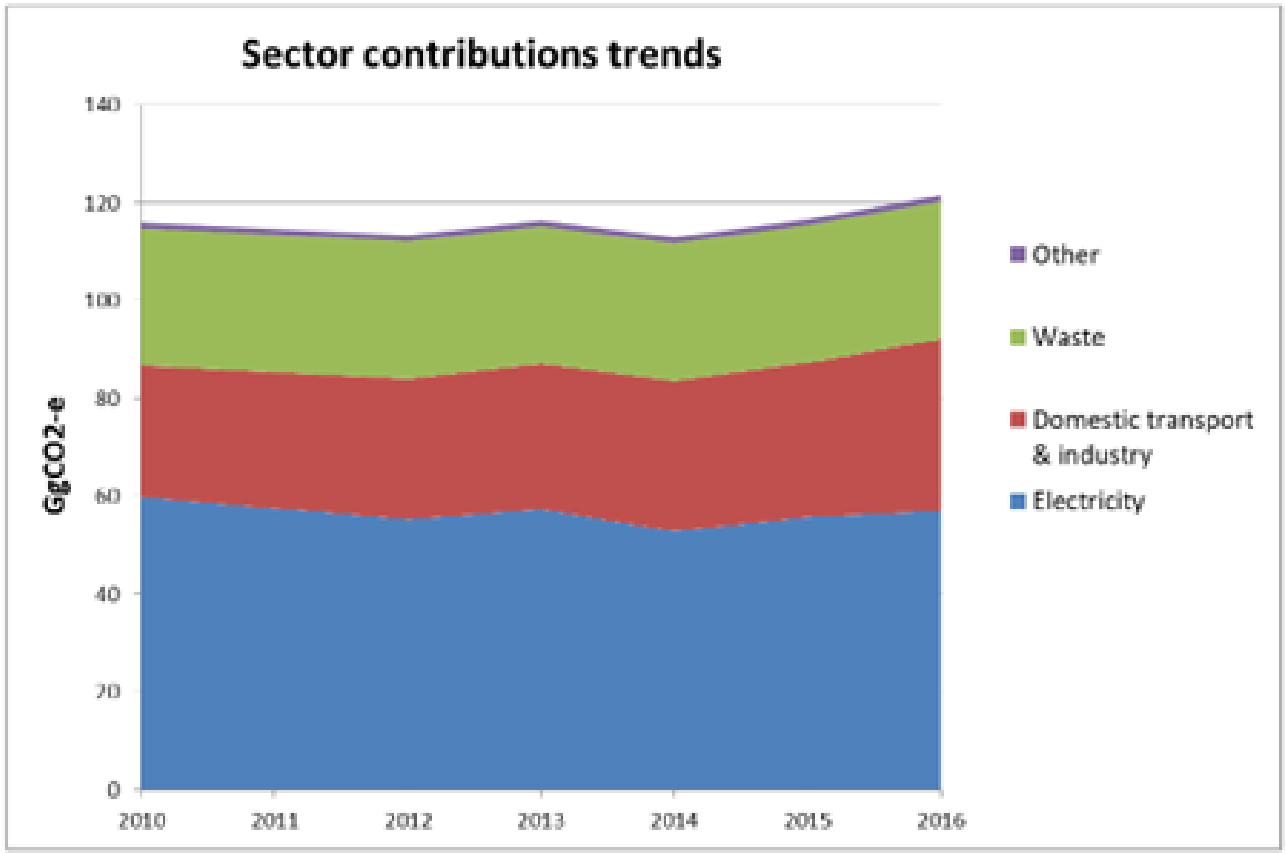


Figure 6: Assumed contributions of sectors to RMI GHG emissions over time (no data available for 2011 – 2013)

A basic estimation of GHG emission reductions carried out for the outcomes of the MiBEE GEF 7 PIF is based on the methodology for Calculating Greenhouse Gas Benefits of the Global Environment Facility Energy Efficiency Projects.

In line with the calculation guidelines the proposed project components were aligned to the four (4) methodology components 1.Standards and Labelling 2.Building Codes 3. Demonstration and Diffusion and 4.Financial Instrument. This assisted in identifying the required data and the algorithms to allow estimation of the GHG reductions from the activities within each component as exemplified in Table 1:

Table 1: Activities within methodology components

Activity	Indirect / Direct	Methodology Module	Typical Data Requirements	Typical project-specific data sources	Algorithms	Baseline approach
Outcome 1.1. Policies and regulations for energy efficiency are in-place and enforced by relevant government officials						

Outcome 1.1. Policies and regulations for energy efficiency are in place and enforced by relevant government officials						
Output 1.1.1. Energy efficiency and conservation measures addressed through government processes and regulations.						
Establish a minimum energy performance and labelling scheme for government offices	Indirect	Standards and Labelling	Targeted and displaced technologies; either technology power and activity or unit energy consumption; year standard enters into force; percent of new sales compliant with standard	Surveys and audits; national statistics; available scenario analyses; manufacturer data	Stock model based on technology sales and penetration rates	Annual sales and growth rate for technology/equipment Annual improvement in relative efficiency of baseline technology (1%/year) Annual increase in improved technology penetration (5%)
Ban on incandescent lightbulbs	Indirect	Standards and Labelling	Targeted and displaced technologies; either technology power and activity or unit energy consumption; year standard enters into force; percent of new sales compliant with standard	Surveys and audits; national statistics; available scenario analyses; manufacturer data	Stock model based on technology sales and penetration rates	Annual sales and growth rate for technology/equipment Annual improvement in relative efficiency of baseline technology (1%/year) Annual increase in improved technology penetration (5%)
Outcome 2.2. Demonstrating improved energy efficiency of government buildings through technology and practices						
Output 2.2.1. Reduced energy use in government buildings						
Installation of Energy Efficient Air-Conditioners	Direct + Indirect	Demonstration and Diffusion	MWh or GJ savings per "unit" (e.g., per building, foundry, optimization completed, etc.); acti	Energy audits; surveys; national statistics	Savings per unit multiplied by number of units deployed	Percent of activities implemented in the baseline (i.e., that would have occurred anyway in absence of the project) (10%)

			vity levels (number of "units" replicated each year			
Outcome 2.3. Nature-based solutions for energy efficiency in government buildings demonstrated Output 2.3.1. Reduced energy use in buildings from NbS						
Demonstration of landscaping in and around government buildings for energy efficiency NbS	Direct	Demonstration and Diffusion	MWh or GJ savings per "unit" (e.g., per building, foundry, optimization completed, etc.); activity levels (number of "units" replicated each year	Energy audits; surveys; national statistics	Savings per unit multiplied by number of units deployed	Percent of activities implemented in the baseline (i.e., that would have occurred anyway in absence of the project) (10%)
Outcome 2.5 Selected private sector entities have specific and articulated plans for increasing energy efficiency in their buildings						
Private sector entities in Majuro and Ebeye develop costed plans for improving the energy efficiency of their buildings	Indirect	Demonstration and Diffusion	MWh or GJ savings per "unit" (e.g., per building, foundry, optimization completed, etc.); activity levels (number of "units" replicated each year	Energy audits; surveys; national statistics	Savings per unit multiplied by number of units deployed	Percent of activities implemented in the baseline (i.e., that would have occurred anyway in absence of the project) (10%)

Additionally, the guidelines provides step-by-step instructions for using the Excel spreadsheet tool to calculate avoided GHG emissions from GEF energy efficiency projects. In the absence of the Excel spreadsheet tool, rough estimations of Green House Gas reduction benefits were carried to demonstrate analysis used to arrive at the GEB within this PIF. GHG reductions estimation was carried out for:

1. Standards and Labelling Module
    a) Ban on incandescent lightbulbs
    b) Minimum energy performance and labelling scheme for government offices

2. Demonstration and Diffusion Module
   c) Procurement and installation of demonstration appliances in select government buildings on Majuro. In this case the demonstration appliance is Energy Efficient split type air-conditioner (AC) for government buildings in Majuro
   d) Demonstrate NbS for EE in key government buildings.
   e) Private sector entities in Majuro and Ebeye to develop costed plans for improving the energy efficiency of their buildings

The grid emission factor used is an average of emission factors used in 2 audit reports published in the RMI ~ 0.85671 tCO2/MWh

1. Standards and Labelling Module - Ban on incandescent lightbulbs [Indirect GEB]

Component 1: Enabling activities and policy for energy efficient buildings in RMI
Output 1.1.1. Government processes and regulations address energy efficiency and conservation measures.

The aim of this activity is to enhance promotion and implementation of utilization of energy CFLs / LEDs through the transformation of the local lighting products market and the phasing-out of incandescent lamp (ILs) imports and sales.

Table 2: Direct GHG Emissions Reduction due to Ban on Incandescent Bulbs

	Unit	Value
Overall reduction in power generation due to use of efficient lights[1]	%	0.7
Overall generation per annum	MWh	56,000
Overall reduction in power generation	MWh	392
Overall reduction in GHG emissions	tCO2	336
Overall reduction in GHG emissions (20 yrs)	**tCO2**	**6,720**

2. Standards and Labelling - Establish a minimum energy performance and labelling scheme for government offices [Indirect GEB]

Component 1: Enabling activities and policy for energy efficient buildings in RMI
Output 1.1.1. Government processes and regulations address energy efficiency and conservation measures

The aim of this activity is to set a legally enforceable minimum level of energy efficiency of appliances for sale in the RMI market which removes the less efficient ones from the market and forces suppliers to introduce more energy efficient products.

According to the RMI Electricity Roadmap (2018, introducing MEPS and labelling to appliances in the RMI could result in demand reduction nationwide of around up to 7%.

Table 9: Indirect GHG Emissions Reduction from MEPs and Labelling

	Unit	Value
Overall reduction in power generation due to MEPs[1]	%	7
Overall generation per annum	MWh	56,000
Overall reduction in power generation per yr	MWh	3,920
Total market potential (Reduction in GHG emissions per yr	tCO2	3,358
Overall reduction in GHG emissions (20 yrs)	**tCO3**	**67,160**

3. Demonstration and Diffusion Module 1 - Installation of Energy Efficient Air-Conditioners (AC) [Direct + Indirect GEB]

Component 2: Government and private sector building energy efficiency improvements

Output 2.2.1: Reduce energy use in key government buildings and demonstrate energy efficiency conversions in Majuro

Assumptions:

- ACs to be replaced are split types of the same capacity or close. In this case 9000 BTU – 12,000 BTU
- Inventory and replacement plan for air conditioning and other appliances in government buildings is carried out in 2023
- Replacement plan is effected in 2024
- Purchase and installation cost per split type AC ~ $1000.00
- ACs with proper maintenance can last 10 years

Step 1: Calculating Government Buildings Energy Use Reduction due to Installation of New Split-type Air-con

Table 3: AC Energy Consumption per year in each Government Building

Government Building	2014 - 2016 mean annual consumption (MWh)	Assumed % AC	AC (MWh use)	35% Energy use reduction (MWh)
Majuro Hospital (combined with new Hospital meter)	2340	68	1,591	1,034
Combined Ministry of Education facilities	1248	53	661	430
Capitol Building Complex	995	35	348	226
College of Marshall Islands	690	53	366	238
Subtotal	5273		2967	1,928

Old Aircon		
Parameter	Unit	Value
Power rating	W	1465
Cooling capacity	BTU/hr	9000
SEER	BTU/W.hr	13
Daily usage	hrs	8
Days used each year	days/yr	365
Annual cooling season	hrs	2920
Daily usage BTU	BTU/day	72000
Yearly usage BTU	BTU/yr	26280000
Annual Electrical Energy Usage	kWh/yr	2021.54
	MWh/yr	2.02

New EEff Aircon		
Parameter	Unit	Value
Power rating	W	
Cooling capacity	BTU/hr	9000
SEER	BTU/W.hr	20
Daily usage	hrs	8
Days used each year	days/yr	365
Annual cooling season	hrs	2920
Daily usage BTU	BTU/day	72000
Yearly usage BTU	BTU/yr	26280000
Annual Electrical Energy Usage	kWh/yr	1314.00
	MWh/yr	1.31

Step 2: Equivalent # on New Split-type AC Installed

Table 4: Required equivalent # of new ACs

Government Building	2014 - 2016 mean annual consumption (MWh)	Assumed % AC	AC (MWh use)	35% Energy use reduction (MWh)	Avoided Energy Use (MWh)	Avoided GHG emmissions (tCO2)	Required equivalent # of New AC
Majuro Hospital (combined with new Hospital meter)	2340	68	1,591	1,034	557	477	787
Combined Ministry of Education facilities	1248	53	661	430	232	198	327
Capitol Building Complex	995	35	348	226	122	104	172
College of Marshall Islands	690	53	366	238	128	110	181
Subtotal			2967	1,928	1,038	890	1467

The equivalent # of new AC to be installed is based on the performance of the new ACs in achieving the new reduced AC energy consumption for the same amount of cooling required. This in turn allows determination of average GHG reduction achievable per new AC.

Step 3: Equivalent GHG Reduction from Installation of 650 New AC

Table 5: Equivalent GHG Reduction via Installation of 650 new ACs

Government Building	AC (MWh use)	% of Use from Bldg	Proposed # of New AC installation	Costs (USD)	Ave. GHG reduction per new AC (tCO2/AC)	Equivalent GHG reduction (tCO2)/yr
Majuro Hospital (combined with new Hospital meter)	1,591.20	54	349	349,000	0.606157288	211
Combined Ministry of Education facilities	661.44	22	145	145,000		88
Capitol Building Complex	348.25	12	76	76,000		46
College of Marshall Islands	365.70	12	80	80,000		49
Total	2,966.59	100	650	650,000		394
4 years reduction accounting						1576

A GEF project funding of US$650,000 for this component will allow a minimum number of 650 new ACs to be installed in various government buildings as per table 4. This will allow GHG reduction of .394 ktCO2/yr at 0.61 tCO2 reduction per unit installed.

Assuming installed ACs with proper maintenance can last 10 years, post project direct emissions can be realised as per table 6 below.

With complimentary funding to enable continuity in installation of new energy efficient air conditioners at a rate of 10% per year, an accumulative emission reduction of over 5,831 tons CO2 equivalent can be achieved.

Table 6: Emission Reduction from Replacement of Air-Conditioners

	Unit	Value
Maximum Technology / Measure Lifetime	years	10
Target Technology		Eeff AC
Displaced Technology		Old AC
Seasonal Energy Efficiency Ratio (SEER) of Eeff AC	BTU/W.hr	20
Seasonal Energy Efficiency Ratio (SEER) of Old AC	BTU/W.hr	13
Daily Usage	Hr/day	8
Days Used Each Year	day	365
Annual Energy Consumption (Eeff AC)	kWh/year	1314
Annual Energy Consumption (Old AC)	kWh/year	2021
Installation in Year 2023	units	650
Installation Rate per yr (Indirect GEB)	%	10
Ave. GHG reduction per new AC installed	tCO2	0.606157288
Project Direct GHG emissions reduction	tCO2	788
Post Project Direct GHG emissions reduction	tCO2	3,940
In-Direct post-project GHG emissions reduction	tCO2	1,103
Accumulative reduction in GHG emissions over 10 yrs (Direct + Indirect)	**tCO2**	**5,831**

4. Demonstration and Diffusion Module 2 – Demonstrate NbS for EE in key government buildings [Post Project Direct GEB]Component 2: Government and private sector building energy efficiency improvementsOutput 2.3.1. Nature-based Solutions for reducing energy use in government buildings.

An additional calculation for this module is demonstrated for GEB from landscaping in and around government buildings for NbS based energy efficiency. Estimation is based on tree planting around government buildings to further reduce energy required for cooling.

According to Akbari, Bretz, Hanford, Rosenfeld, Sailor, Taha, and Bos (1993) the impact of tree locations on heating and cooling energy use was simulated and savings was found to vary from 2% to over 7%. Abdel-Aziz, Al Shboul and Al-Kurdi (2015) also deduced a reduction of energy requirements for cooling of 5.5% when planting trees on sunny sides of buildings.

According to table 3 there is potential to reduce from the remaining 2967 MWh of energy use required for cooling in government buildings. Native trees best suited for this demonstration is the Artocarpus altilis (breadfruit) which can grow at a rate of 0.5 to 1.5 meters per year.

Table 7: Direct GHG Emissions Reduction from NbS (Tree planting around government buildings)

	Unit	Value
Maximum Technology / Measure Lifetime	Yrs	20
Target Technology (Planting of Trees for Shading)		NbS
Area of reduction (AC - active cooling)	MWh/yr	2967
Annual Reduction in Energy Consumption (AC)	%	6
Overall reduction in Energy use	MWh/yr	178
Overall reduction in GHG emissions (20 yrs)	**tCO2**	**3,560**
Year Shading in effect	Yr	3rd

Noting GHG emissions reduction quantification for the NbS approach is an area where this project can contribute to new knowledge and lessons, and bring about innovation.

5. Demonstration and Diffusion Module 3 – Private sector entities in Majuro and Ebeye to develop costed plans for improving the energy efficiency of their buildings [Indirect GEB]Component 2: Government and private sector building energy efficiency improvementsOutcome 2.5: Private sector entities in Majuro and Ebeye to develop costed plans for improving the energy efficiency of their buildings

Refrigeration is the second largest use of energy and may be expected to increase on Majuro with the addition of large numbers of refrigerated containers for the export of fish. The energy efficiency of large commercial and industrial refrigeration systems depends on the design, operation, and maintenance of the systems, as well as on leaks and insulation in refrigerated areas.

This activity targets energy audits of significant commercial premises in both Majuro and Ebeye as well as implementation of energy efficient design when it comes time to replace.

Table 8: Indirect GHG Emissions Reduction from Energy Efficiency in Private Sector Buildings

	Unit	Value
Overall reduction in power generation due to intervention[1]	%	3.8
Overall generation per annum (Ebeye + Majuro)	MWh	72,000
Overall reduction in power generation per yr	MWh	5,040
Total Market Potential (Reduction in GHG emissions per yr)	tCO2	4,318
Overall reduction in GHG emissions (10 yrs)	**tCO3**	**43,178**

Table 10: Summary of GEBs for selected activities

Activity	Direct / Indirect	GEB (tCO2)	Years
Minimum energy performance and labeling scheme	Indirect	67,160	20
Ban on incandescent lightbulbs	Indirect	6,720	20
Installation of demonstration Energy Efficient split type air-conditioner (AC) for buildings in Majuro	Direct	788	2
Installation of demonstration Energy Efficient split type air-conditioner (AC) for government buildings in Majuro	Post-project Direct	3,940	8
Installation of demonstration Energy Efficient split type air-conditioner (AC) for government buildings in Majuro	Post-project Indirect	1,103	10
NbS (tree planting) for EE in government buildings.	Post-project Direct	1,525	10
Private sector entities in Majuro and Ebeye to develop costed plans for improving the energy efficiency of their buildings	Post-project Indirect	43,178	10
Total		**124,414**	

Direct GHG reductions	6,253
Indirect GHG reductions	118,161

7) innovation, sustainability and potential for scaling up

Innovation:

MIBEE will have several innovative aspects, including the use of NbS for EE and showcasing government efficiency efforts to build awareness for EE across multiple sectors, regulatory aspects and finance aspects. There have been very few attempts at using NbS and landscaping for EE in the Pacific SIDS. This project will develop guidelines and examples for how other countries may use this technique to reduce energy costs. It will also need to innovate methods for how to calculate the GHG emission savings from this aspect of the project. These innovations will be useful for SIDS across the Pacific region, but particularly for atoll states of Micronesia and Polynesia. Within RMI, the establishment of energy audit guidelines and databases will be innovative because previous audits (2013, 2021) have been conducted piecemeal and with differing methods making them hard to track and compare. The showcasing of government EE efforts for awareness of EE benefits for private sector businesses and households will build confidence among energy users in Majuro and Ebeye that EE is worthwhile to work towards.

The project will use innovate regulatory mechanisms to help achieve building energy efficiency. The establishment of building energy efficiency focal points and competition measures for the most efficient buildings will help to achieve the project goals through push and pull incentive mechanisms. These have not been attempted in RMI and will be developed in culturally appropriate and sensitive manners.

RMI has attempted to develop and market reduced rate loans for homeowners to invest in energy efficient appliances. There was limited uptake of the offer, possibly due to low awareness and marketing of the opportunity. The project will learn lessons from this and develop innovative financing mechanism with the RMI Development Bank and other banks to make financing of building energy efficiency more attractive. This may be tied to regulatory mechanisms that will build on RMI's existing tax exemption for EE appliances.

Sustainability:

MIBEE is directly linked to RMI's national Electricity Roadmap and is delivering on components of the EE sections of the Roadmap. This will be monitored and reported on by the National Energy Office (NEO) on a regular basis and aspects of the project relating to enabling environment will be maintained through the NEO's implementation of the Roadmap. The project's component on enabling activities includes several government regulations that will be institutionalized to continue well after the project's completion. This includes the revised building code that will address energy efficiency, the appointment of energy managers in government offices and buildings, and energy audit guidelines and databases to help ensure that auditing will be an on-going process. The capacity built for conducting audits, along with the guidelines and database will help ensure that energy audits continue in government buildings. This can also be extended to private sector buildings, particularly for the tourism sector that will be audited during the project. The procurement rules changes for the project, considering whole-of-life costs of appliances will also continue past the duration of the project. As RMI continues its process to achieve net zero emissions, the lessons and processes from MIBEE will continue to plan an important part of the NDC commitment. As the NbS aspects of the project mature and trees grow and mature, they will continue to offer low-cost EE benefits for many years after the project. The knowledge management component of the project will be critical for ensuring that processes, lessons and documents are maintained and available to continue the progress and achievements that the project will make.

Potential for Scaling Up:

MIBEE will demonstrate EE retrofitting in key government buildings in Majuro. With the experience of conducting key audits, costing retrofit operations, and installing efficient appliances and building upgrades, the RMI government will have the capacity to continue the EE retrofitting across all government buildings in Majuro and Ebeye. The project will provide a plan and costing for other government buildings in both sites. As such the demonstration buildings can then be replicated as the government's process of implementing the Roadmap continues. The lessons and GHG emissions calculations for NbS and landscaping for EE can be shared with other government offices in RMI, with private sector and households to encourage more use of these methods. These can also be shared across the region, particularly with other atoll states in Micronesia and Polynesia. The knowledge management component of the project will allow for lessons and documents to be shared easily with other stakeholders and partners within RMI and beyond. This will be shared with energy projects around the Pacific, including the Pacific Energy and Gender Network.

1b. Project Map and Coordinates

Please provide geo-referenced information and map where the project interventions will take place.

The project will focus on Majuro and Ebeye as the two major population centres in RMI. Majuro is at 7.06°N 171.26°E. Ebeye is at 8.78°N 167.72°E.

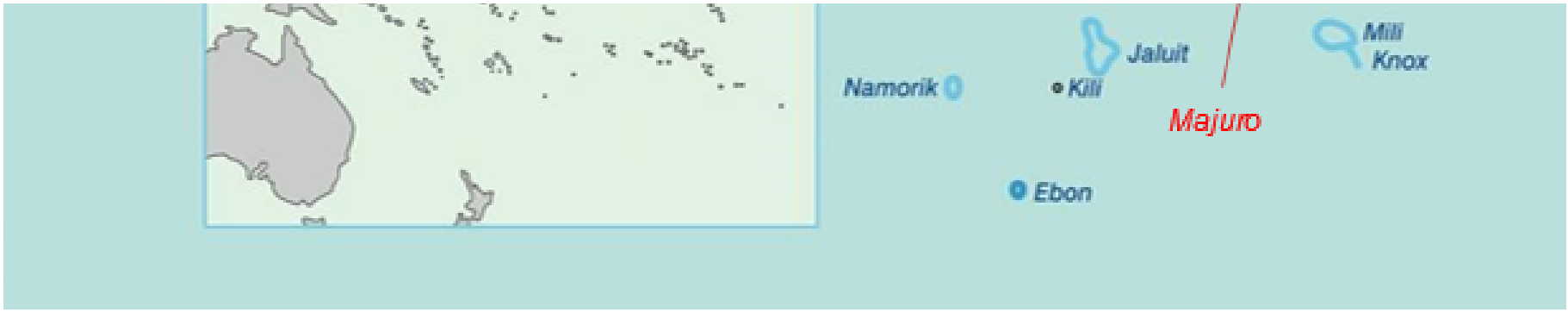


Figure 5: Map of Marshall Islands indicating Majuro and Ebeye (modified from SPC)

2. Stakeholders

Select the stakeholders that have participated in consultations during the project identification phase:

Indigenous Peoples and Local Communities

Civil Society Organizations No

Private Sector Entities No

If none of the above, please explain why: Yes

The main stakeholder for this project is the National Energy Office of the newly formed Ministry of Environment, Climate Change and Economy. A preliminary list of stakeholders and their roles is presented below. This list will be validated and amended during the PPG phase of the project. The Marshall Islands 2050 Climate Strategy, Tile Til Eo, and the Marshall Islands Electricity Roadmap were developed through intensive stakeholder consultation processes.

In late 2020 and early 2021 the National Climate Change Directorate conducted a series of meetings and consultations with government departments to programme the remaining RMI STAR allocation. The National Energy Office prepared a concept for the Government Building Energy Efficiency Project. The project concept was approved by the Tile Til Eo Committee which is chaired by the Ministier-in-Assistance to the President and Environment Minister.

Because the Energy Roadmap was built on extensive consultations and the project concept (as originally developed) included only primarily government agencies as stakeholders, no further consultations with private sector, CSOs or indigenous peoples groups were conducted. With the expanded scope of the project, there will be a need for consultations during the PPG phase of the project. These will include business associations (Chamber of Commerce, Rotary, etc), key businesses with buildings in Majuro and Ebeye, banks and other financial institutions, and NGOs.

In addition, provide indicative information on how stakeholders, including civil society and indigenous peoples, will be engaged in the project preparation, and their respective roles and means of engagement

Stakeholder	Roles and Responsibilities in Project Preparation
National Energy Office (NEO)	The NEO will be the Executing Agency for the project and responsible for hosting the Project Management Unit and overseeing project development and implementation. The NEO is responsible for RMI energy planning and coordination, policy review and implementation, promotion of energy-related public-private partnerships, standards for RE and EE, and national databases for energy. The NEO will be the focal point for the PPG phase and all consultations will be conducted through the NEO.
Climate Change Directorate	The Climate Change Directorate, also within the Ministry of Environment, is responsible for environmental aspects of energy. The CCD will be part of the steering committee of the project and included in the NbS considerations, and disposal of appliances.

	CCD, also serving as GEF OFP, will be part of the PPG development process and included in all communications and drafts of the ProDoc.
Ministry of Finance, Banking and Postal Services	The Ministry of Finance is responsible for funding allocation, financing, and fiscal administration, including taxation issues for energy efficiency appliances. Ministry of Finance will be consulted on all aspects of financing and providing economic incentives for EE during the PPG phase.
Marshall's Energy Company (MEC)	The MEC is responsible for electricity generation and distribution, petroleum fuel purchasing and storage, RE installation, operation and maintenance, and oversight of the Kwajalein Atoll Joint Utilities Resources (KAJUR) for energy on Ebeye. MEC and KAJUR will be consulted on EE aspects of the project during PPG, particularly for technical aspects of retrofitting for appliances.
Ministry of Public Works	The Ministry of Public Works is responsible for the National Building Code and will be engaged with ensuring that the Building Code accounts for energy efficiency regulations. Ministry of Public Works will be consulted during PPG for technical aspects of retrofitting and building code aspects of EE.
Local NGOs	Several local NGOs in Majuro, including the Marshall Islands Consortium of NGOs (MICNGOs) have been involved in climate change awareness activities and energy auditing of NGO buildings and government buildings.
Banking and finance sector	The National Development Bank is the primary financial institution that has been offering incentives for household EE loans. They will be the key stakeholder for financing EE projects. Private banks, regional development banks, and international finance agencies will also be important for working with the government and the project to scale up building EE. These banks will be consulted, through the Ministry of Finance and the NEO, during the PPG phase to gather and validate ideas on financing EE in RMI.
Private Sector	The largest uses of energy in RMI's private sector are refrigeration containers for fish. Air conditioning and lighting are the secondary uses of electricity in the private sector. The private sector will be engaged through the Marshall Islands Chamber of Commerce, Lion's Club, and individually to determine interest and willingness to participate in the project and assess their buildings for possible EE projects and savings. During the PPG phase the private sector will be approached and consulted via the NEO and MEC connections and the RMI Chamber of Commerce.

3. Gender Equality and Women's Empowerment

Briefly include below any gender dimensions relevant to the project, and any plans to address gender in project design (e.g. gender analysis).

IUCN, through its Gender Equality and Women's Empowerment Policy is committed to realizing gender equality and women's rights and empowerment and embeds gender-responsive approaches into its entire portfolio. It does this by proactively and publically championing gender equality and women's rights and empowerment and by facilitating active and meaningful engagement of women. This aligns with Section 6 of RMI's Climate Strategy (Tile Te Eo) on Gender and Human Rights. The Tile Te Eo commits the RMI government to (among others):

- Mainstream and safeguard human rights and gender, including in relation to developing, adopting, reviewing and implementing laws, policies and projects related to climate change;
- Establish an enabling environment for an equitable participation in, and benefits from, economic development;
- Ensure equitable participation of women and men in decision making through equal opportunities for women and men in all fields of employment, including decision making and support for women's entrepreneurship; and
- Build the knowledge and capacity of women, men, and youth to address gender inequalities across sectors.

RMI's 2015 Gender Mainstreaming Policy has a goal of "progress(ing) gender equality and the empowerment of women in the RMI with the meaningful involvement and contributions of all development sectors and civil society, and women and men from all spheres, and at all levels of development and decision-making, from the Council of Iroij, the Nitijela, and in local governments in the outer islands." This includes Priority Outcome 4 of "Enabling environment for equitable participation in, and benefit from, economic development." Priority Outcome 4 recognises the challenges of women in the RMI workplace by stating:

"In the overall context of the economic development of RMI, the creation of new employment opportunities is limited. Women's economic empowerment remains a key challenge, as women continue to face limited job opportunities and remain under-represented in management positions. Legislative mechanisms to protect the employment and labor rights of workers have not yet been established, and there are no anti-discrimination provisions, no maternity leave provisions, no protections for dismissal because of pregnancy, no sexual harassment protections, and no breaks for mothers working in the private sector to enable them to nurse young children during work hours.

Nevertheless, a majority of women are involved in income-generating activities, in the cultural industry or in food production and processing. In many outer island families facing scarce job opportunities, income earned by women is necessary for the survival of families.
In order to support an enabling environment for an equitable participation in and benefit from economic development we need to ensure equal employment opportunities by improving working conditions. This includes creating a good balance between family and work-related responsibilities for both women and men, adopting measures to protect women's rights and encourage integrity in the workplace, expanding choices for women and girls in accessing technical and vocational education and training and higher education, and supporting women's entrepreneurship, especially by valuing opportunities within the cultural industry."

The 2020 ADB "Marshall Islands Gender Equality Overview: Key Statistics for Informed Decision-Making In Celebration Of Beijing+25" presents the most recent gender-disaggregated statistics for women in the RMI workplace. In 2011 58% of men were employed compared to 21% of women. Women had lower rates of employment in the private and public sectors than men. There is no analysis of women in the energy sector in RMI.

A 2020 analysis of the inactive Pacific Energy and Gender Network for SPC found that gender issues within Pacific departments, an overall lack of staff makes focussing on gender issues challenging. However most departments expressed an interest in nominating a gender focal point to engage with the Pacific Energy and Gender Network if it were to be re-invigorated. This included an interest to develop gender guidelines. The same analysis found a significant gender gap within Pacific energy utility companies with none of the assessed utilities (including RMI) having a gender policy. It appears that there is also a gender gap within energy regulators in the Pacific. "The information collected through the interviews shows there is not much knowledge of gender-mainstreaming at the level of regulators. The information collected also shows these institutions encounter difficulties when trying to recruit women, as there are few of them joining careers that are relevant to the energy sector."

During the PPG phase, MIBEE will take a Gender Equity and Social Inclusion approach for the project implementation. The consultants' team will include a GESI specialist who will work with the National Energy Office, the Ministry of Culture, utilities and women's groups in Majuro and Ebeye to develop a gender plan for the project. This will be supported by the full ESS screening and plans to fulfil gender equality principles of IUCN and RMI. These may include, inter alia,

- ensuring that women's businesses are included in all procurement opportunities,
- designing capacity building and awareness campaigns to be gender inclusive and sensitive, and
- ensuring balanced gender representation on project steering and advisory structures.

The project will also work to participate in the Pacific Energy and Gender Network if it is re-invigorated. The project design and implementation will also identify and mitigate for barriers that women may face in participating in the project decision making and implementation.

Does the project expect to include any gender-responsive measures to address gender gaps or promote gender equality and women empowerment? Yes

closing gender gaps in access to and control over natural resources;

improving women's participation and decision-making; and/or Yes

generating socio-economic benefits or services for women. Yes

Will the project's results framework or logical framework include gender-sensitive indicators?

Yes

4. Private sector engagement

Will there be private sector engagement in the project?

Yes

Please briefly explain the rationale behind your answer.

There will be several entry points for private sector engagement in the MIBEE.

Component 1 includes an output of building capacity of lending institutions, including private banks, to be aware of and to develop lending products that will help businesses and homeowners to purchase energy efficient appliances. The ability to get loans to cover the up-front costs of the appliances will be critical for businesses and homeowners in Majuro and Ebeye. Previous attempts to market such loans have not been as successful as hoped. Lessons from these experiences will be developed and assessed. The project will work with the Marshall Islands Development Bank and electricity companies to crate lending products for priate sector energy efficiency. Building capacity of lenders will help to build support for such lending products. The project will also conduct preliminary energy audits in key tourism sector buildings and resorts around Majuro. Component 1 will encourage private sector buildings to replicate government energy efficiency monitoring and enforcement and incentive mechanisms.

In Component 2 government offices will be demonstrating the procuring and installation of energy efficient appliances. This will be done through private sector contracts and contractors. The project will use the opportunity to build capacity among these private sector entities in RMI that do not often get a chance to engage with energy efficiency. Component 2 also includes an outcome of private sector entities in RMI developing building energy efficiency plans and financing to replicate and expand the lessons learned from the government buildings. In Component 1, the awareness-raising campaigns will target private sector businesses and households to generate greater interest in converting to energy efficiency and capacity to make the decisions based on sound cost-benefit analyses.

5. Risks to Achieving Project Objectives

Indicate risks, including climate change, potential social and environmental risks that might prevent the Project objectives from being achieved, and, if possible, propose measures that address these risks to be further developed during the Project design (table format acceptable)

Risk	Level of Risk	Mitigation Actions
Commitment risks - Approval and enforcement of recommended policies/regulations are delayed by agencies	Medium	During PPG phases detailed consultations will be conducted with various government agencies, including those to be retrofitted, to build support for the project. This project will also include a public awareness campaign to build awareness on energy efficiency. This campaign will help to serve as an incentive for the government to take the necessary actions. It will also be included in reporting on the National 2050 Climate Strategy and Electricity Roadmap.
Operational risks - Newly established energy auditing and monitoring not supported by government building occupants	Medium	As this may be seen as an additional task or activity, the project includes positive incentives for buildings that implement successfully. Project reports will be submitted to the Minister of Environment and reported to the President.
Operational risks - Selected buildings are not able to make retrofit changes due to technical or structural issues	Medium	Several buildings will be selected during the PPG phase and assessed for suitability based on interest, physical capacity, and structural capacity. If during the project, these buildings become unavailable, new buildings will be selected from a list of buildings to be newly audited during the project
Commitment risks - Reduced support for the project from RMI government agencies and private sector	Low	This project is fully aligned to, and included in, the Electricity Roadmap and integral to RMI's NDC commitments. The project will be included in energy reporting of the Tile Til Eo working groups and steering committee. Energy costs are a major components of private sector operations in RMI. It is expected that key private sector operations, including hospitality and fishing operations will be engaged. Their participation will be increased through awareness campaigns, consultations through business groups, and existing connections with government

		regulators.
Operational risks - Changes in costs of goods and fuel change the outcomes of the project	Medium	If fuel costs are lowered during the project, there may be reduced interest in energy efficiency. This is unlikely because EE is integral to the net zero emissions commitment regardless of fuel prices. Post-COVID-19 supplies of appliances and inflation may impact the number of appliance units that can be sourced and imported. Costs are currently based on pre- COVID-19 data. If costs change significantly, the project will revise the number of units that can be installed and seek maximum efficiency for a smaller number of buildings.
Covid-19 risks - COVID-19 prevents workers and/or imports into RMI	Medium	RMI implemented one of the earliest full lockdowns of its borders to keep COVID-19 from entering. As of August 2021, it has achieved more than 80% full vaccination rates on Majuro and Ebeye. It is expected that RMI will continue to be extremely cautious with COVID-19 regulations but may open as vaccines continue to benefit countries of the Pacific and reduce transmission. If borders close again, it is recognized that implementation may be delayed but RMI has good experience with continuing import of goods under pandemic conditions. RMI has not experienced any community transmission of Covid-19 and there have been no restrictions on meetings within RMI. Consultations and meetings during PPG and project implementation will follow all RMI government guidelines and may utilize virtual meeting considerations if necessary.
Operational risks – Poor installation and maintenance of installed equipment	Medium	There is a risk that equipment and retrofits are poorly installed or not maintained. This will be mitigated by oversight of all contractors through the Project Management Unit and legal contracts with contractors to be responsible for proper installation. Installation will follow all manufacturer guidelines and advice. Maintenance contracts will be developed as part of the standard procedures and following government procurement processes.
Environmental risk – Disposal of waste and GHG emissions fro	Medium	Under the project ESS a waste disposal plan will be developed during the PPG phase. This will follow all RMI regulations and additional needs to ensure that waste is properly managed and that all was

d GHG emissions fro m disposal of air con ditioners		al needs to ensure that waste is properly managed and that all was te gasses are appropriately and safely captured and disposed of.

6. Coordination

Outline the institutional structure of the project including monitoring and evaluation coordination at the project level. Describe possible coordination with other relevant GEF-financed projects and other initiatives.

The executing agency for MIBEE will be the Marshall Islands National Energy Office (NEO). The project will integrate with all of RMI's energy projects and programmes through the NEO and its participation in the RMI Roadmap Working Group. The Roadmap Working Group reports to the Ministers of Environment, Public Works, and Finance and ultimately reports to the President and Cabinet. Coordination of energy and other RMI climate change activities is achieved through the Tile Til Eo Committee. A project management unit will sit within the NEO and report to the NEO Director. IUCN will provide implementation oversight from its Oceania Regional Office based in Suva, Fiji. A project steering committee will be comprised of members of the RMI Roadmap Working group, IUCN, and other donors as appropriate.

The project will develop links with the GEF6 Micronesia Public Sector Buildings Energy Efficiency (MPSBEE) project in neighbouring Federated States of Micronesia (FSM). Lessons learned from FSM and coordination on use of consultants and procurement may be able to save time and resources for both projects. MIBEE will share lessons from the NbS aspects of the project with FSM.

Coordination with the GEF7 Increasing Access to Renewable Energy in Tuvalu may be of interest as RMI pursues its renewable energy efforts to meet its NDC commitments. The Tuvalu project does not have aspects of energy efficiency included, but the lessons learned may be applicable to RMI and assist with some of the synergies that MIBEE may find with other RE projects in RMI.

7. Consistency with National Priorities

Is the Project consistent with the National Strategies and plans or reports and assesments under relevant conventions?

Yes

If yes, which ones and how: NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, INDCs, etc

The MIBEE project is fully aligned to RMI's 2018 Nationally Determined Contribution where RMI committed to its revised and more ambitious binding 2025 target and 2050 target. These targets were derived from the RMI Tile Til Eo 2050 Climate Strategy developed in 2018 and linked to the Marshall Islands Electricity Roadmap . These targets commit RMI to a quantified economy-wide target to reduce its emissions of GHG to at least 32% below 2010 levels by 2025 and to at least 45% below 2010 levels by 2030. It also committed to a gender-responsive and human rights-based approach in all NDC related planning, programming and implementation. The Tile Til Eo prioritizes the energy sector for achieving most of RMI's targets. Section 2b of the Tile Til Eo focuses on electricity and includes demand-side energy efficiency as a key strategy in addition to other grid improvements and shifts to renewable energy.

8. Knowledge Management

Outline the knowledge management approach for the Project, including, if any, plans for the Project to learn from other relevant Projects and initiatives, to assess and document in a user-friendly form, and share these experiences and expertise with relevant stakeholders.

The project benefited from lessons learned from IUCN's 13 year engagement with the Energy, Ecosystems, and Sustainable Livelihoods (EESLI) project. EESLI has been engaging with Pacific countries on a variety of energy projects since 2009 and is currently undergoing an external review. Early results of the review show that the most successful projects are developed based on the desires and needs of the countries. Engagement with the Building Efficiency Accelerator was attempted but needs further engagement from the government and will be further explored during the PPG phase when resources are available. Further lessons have been explored from IRENA, the Pacific Community, and the Pacific Centre for Renewable Energy and Energy Efficiency. These channels, and the Pacific Energy and Gender Network will all be critical tools for maintaining and sharing lessons from the MIBEE project. Engagement with the Federated States of Micronesia GEF6 "Micronesia Public Sector Buildings Energy Efficiency (MPSBEE) Project" informed the concept of the project and will be maintained through existing coordination mechanisms between FSM and RMI.

As reports and knowledge products are developed, the project will share them through the above established channels in the Pacific and through IUCN and its membership base in the Pacific and beyond to ensure that the lessons are available to other SIDS in the Pacific and beyond.

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A detailed knowledge and learning strategy will be prepared during the PPG phase of the project. Some possible elements of the strategy are noted below:
i. Processes to capture, asses and document information, lessons, best practices, and guidelines generated during implementation. The Project Management Unit will be responsible for collecting and documenting lessons learned and knowledge generated through the project. These will be shared within RMI and within the Pacific through channels that include IUCN and its member network in the region, the International Renewable Energy Agency (IRENA), and the Building Efficiency Accelerator. Key lessons will come from energy audit methods adopted for atoll states, developing incentives for government buildings to manage energy use, and from applying Nature-based Solutions to energy efficiency in government buildings;
ii. The proposed energy efficiency awareness campaign will generate tools and methods for sharing information on energy efficiency across the Marshall Islands. This will include the development of a comprehensive communications plan for the project and the campaign itself. The campaign will generate knowledge products for the general population and private sector in Majuro and Ebeye that can be shared with other Pacific SIDS in the region as they strive for energy efficiency;
iii. Coordination with energy efficiency projects in the Pacific. IUCN's Oceania Regional Office has been running the Energy, Ecosystems, and Sustainable Livelihoods (EESLI) project since 2007. This project assists countries in the region with linking energy to sustainability and livelihoods through grants, coordination, and capacity building. Through the EESLI III project, IUCN will share information about energy projects across the region;
iv. The project includes an output to develop and maintain an energy audit database to keep information about government building energy use for the long-term.

9. Environmental and Social Safeguard (ESS) Risks

Provide information on the identified environmental and social risks and potential impacts associated with the project/program based on your organization's ESS systems and procedures

Overall Project/Program Risk Classification*

PIF	CEO Endorsement/Approval	MTR	TE
Low			

Measures to address identified risks and impacts

Provide preliminary information on the types and levels of risk classifications/ratings of any identified environmental and social risks and potential impacts associated with the project (considering the GEF ESS Minimum Standards) and describe measures to address these risks during the project design.

There are always some gender risks in any project but are considered to be relatively low in this project. Gender assessments and plans will be completed during the PPG phase. Risks for vulnerable groups are partly addressed in the capacity building measures, but the PPG should nevertheless provide a more in-depth assessment of risks, including the risk of disadvantaging poorer households when promoting EE appliance they may not be able to afford. Some induced health and safety risks have been identified but overall considered as low risks as they are expected to be appropriately addressed in the capacity building measures (to be specified by the PPG). The project might induce generation of waste from the disposal of old appliances. A waste plan to be included in the ESMP will be developed as part of the PPG phase.

Supporting Documents

Upload available ESS supporting documents.

Title	Submitted
esms preliminary screening_template MAIGEE GEF7 13092021	

Part III: Approval/Endorsement By GEF Operational Focal Point(S) And GEF Agency(ies)

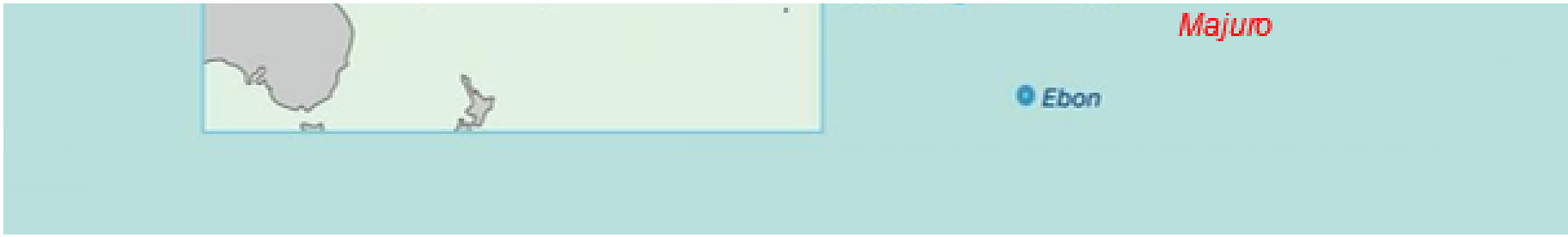
A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT (S) ON BEHALF OF THE GOVERNMENT(S): (Please attach the Operational Focal Point endorsement letter with this template).

Name	Position	Ministry	Date
Clarence Samuel	Director	Climate Change Division	10/18/2021

ANNEX A: Project Map and Geographic Coordinates

Please provide geo-referenced information and map where the project intervention takes place

The project will focus on Majuro and Ebeye as the two major population centres in RMI. Majuro is at 7.06°N 171.26°E. Ebeye is at 8.78°N 167.72°E.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