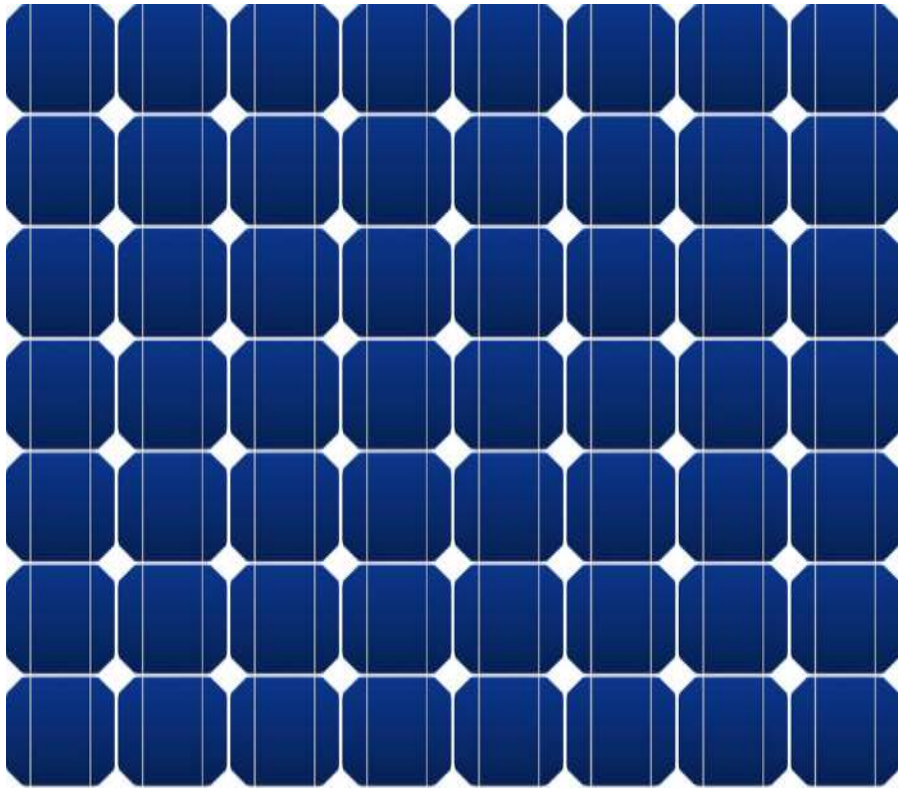


TA-6680 REG

Preparing Floating Solar Plus Projects under the Pacific Renewable Energy Investment Facility

FPV Plus PIC-11 Project

TABLE OF CONTENTS

THE PIC-11 SITUATION

Kiribati
Tuvalu
Tonga

Nauru,
Marshall Islands,
Samoa,
Federated States of Micronesia,
Solomon Islands,
Palau,
Cook Islands
Vanuatu

VULNERABILITIES

CLIMATE CHANGE

SHORTAGE OF LAND

WATER SCARCITY

ECONOMIC SITUATION

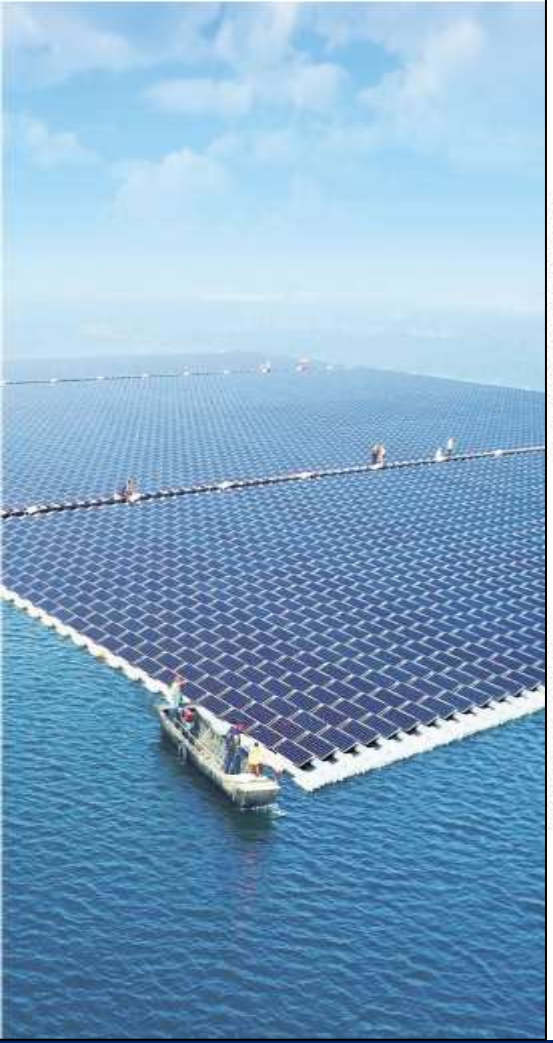
FOOD NEEDS

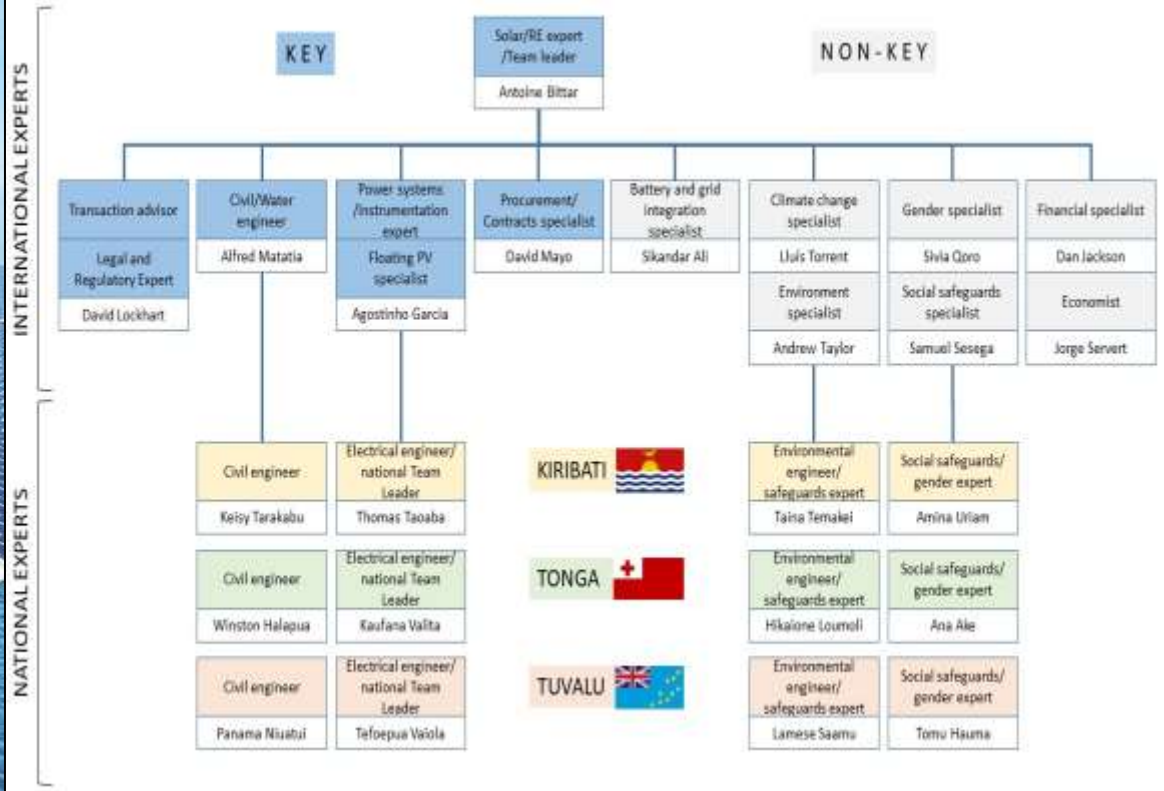
Over 20% of populations live in hardship, cannot meet basic food and non-food needs
Aggravated by considerable economic and environmental risks*

* World Bank 2014, Hardship and vulnerability in PIC

ABOUT THE TA 6680 REG PROJECT

- INVESTIGATE RENEWABLE ENERGY RESPONSE TO CLIMATE RISKS
- DEVELOP ROAD MAP FOR RENEWABLE ENERGY
- FLESH OUT ENERGY / WATER / FOOD NEXUS
- ENABLE RENEWABLES, PRODUCTIVE GROWTH AND FRAMEWORK FOR PRIVATE SECTOR PARTICIPATION





14 international and 12 local experts

Why FPV?

- Cost of water surface is lower than land
- Land has alternative uses
- Reduces evaporation rates, algae growth
- Lower visual impact
- Higher energy yield (site specific)
- Costs balance (Land vs moorings & output)
- It can be used with/without water (depending on bottoms)
- Optimal for Pacific Island nations

OCA GLOBAL

FPV TECHNOLOGY

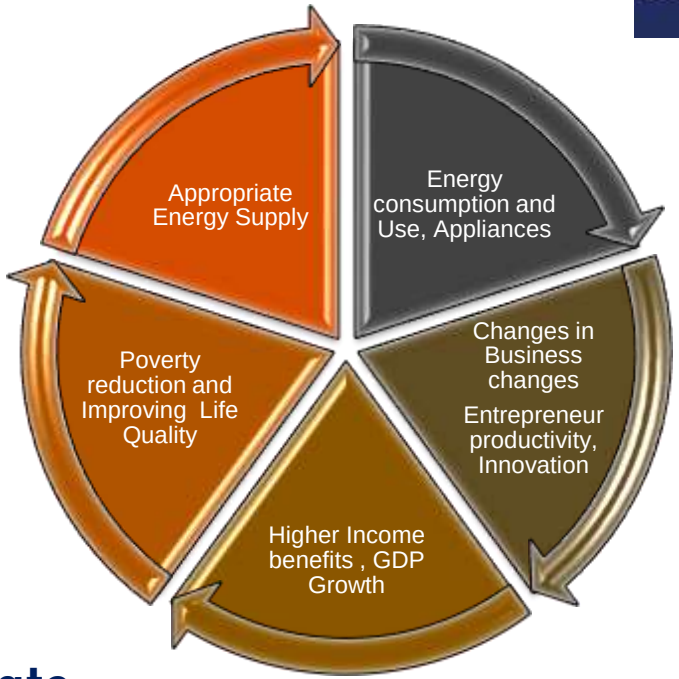
Simplified installation procedure

Suitable for significant water level variations

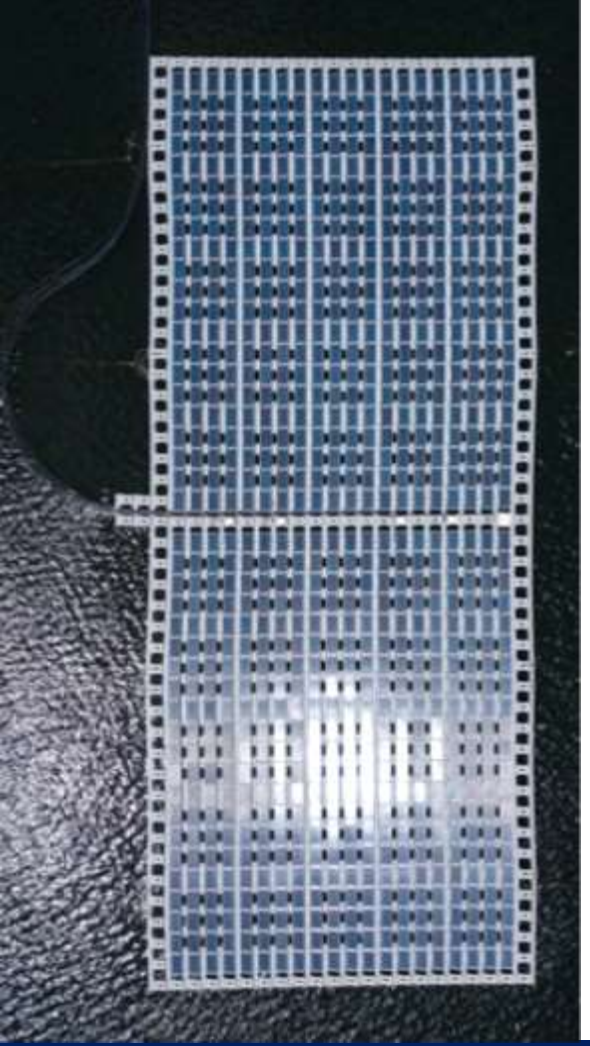
Compact installation potential

Productive uses of Energy

"Agricultural, commercial and industrial activities involving energy services …leading to increase in income or productivity"



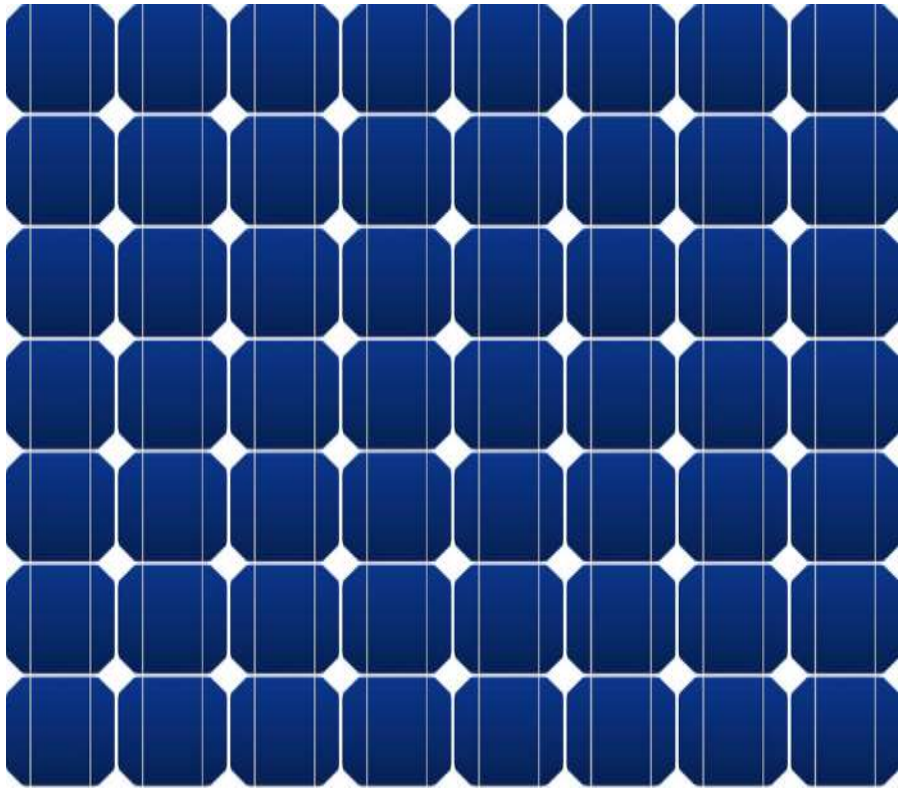
NEXUS: Energy-Water-Food-Transport-Climate
Is the connective tissue between these disparate activities



CONCLUSION

FLOATING PV IS A TRANSFORMATIONAL TECHNOLOGY AND A GAME CHANGER FOR PIC-11

- Addresses climate vulnerabilities, achieves resilience
- Positions PIC-11 at the forefront of Renewable Energy Green Economy
- Delivers benefits of energy/water/food/transport nexus
- Enables flourishing local socio-economic growth, employment and wellbeing



TA-6680 REG

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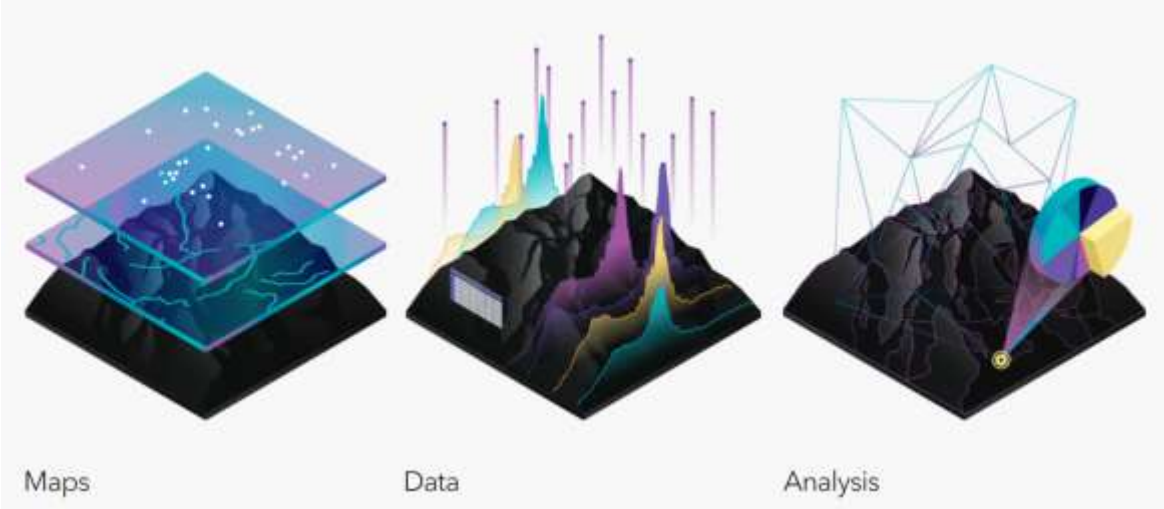
PIC-11 FPV

GIS and Roadmap

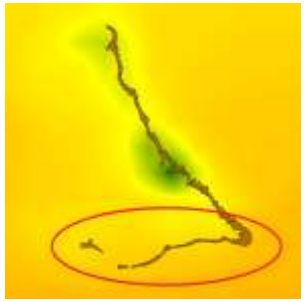
What is GIS?

A geographic information system (GIS) is a system that creates, manages, analyzes, and maps all types of data.

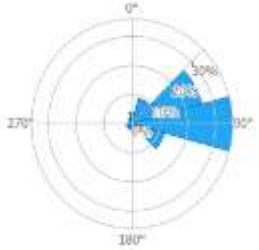


GIS connects data to a map, integrating location data (where things are) with all types of descriptive information (what things are like there).

GIS Layers







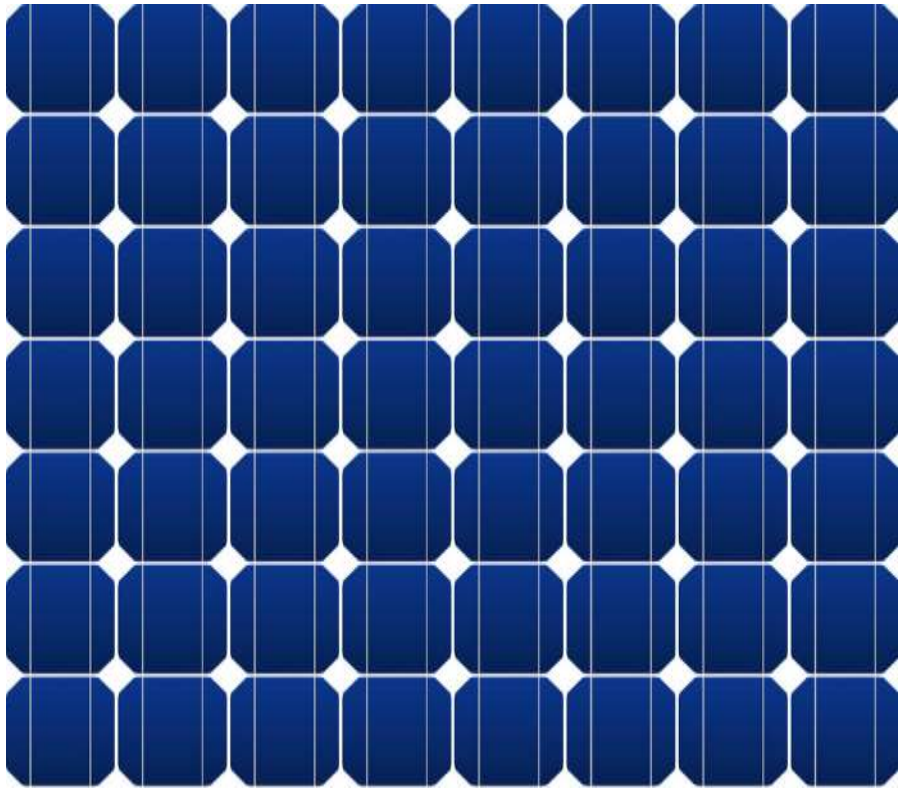

GHI | Population | Reserves | Wind speed | Wind direction | Bathymetry

Analysis based on GIS, Grid strength, upgrades, loads and energy uses

to identify three candidate zones A, B and C for each PIC



PIC-11 zones with movie.kmz



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PIC-11

PRODUCTIVE USES OF ENERGY

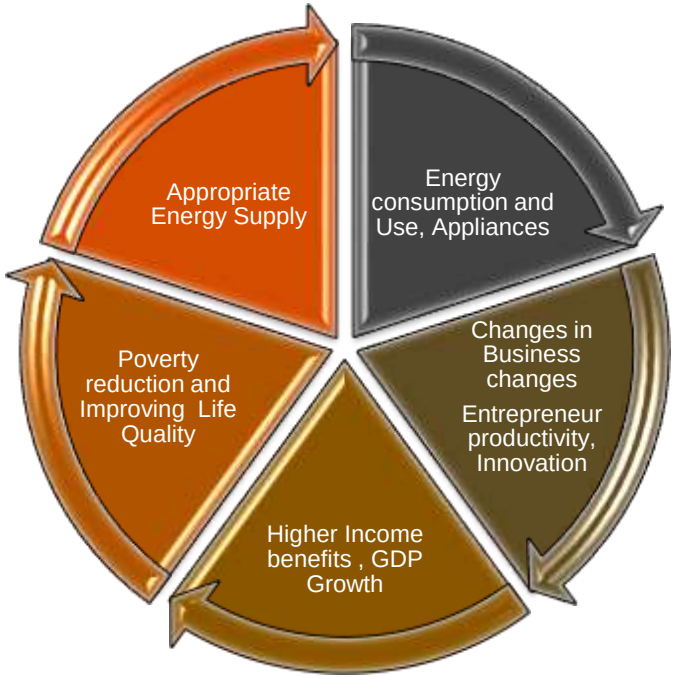
PIC-11 critical Vulnerabilities

Productive uses of Energy
Energy-Water-Food Nexus

What is a Productive use of energy?

"Agricultural, commercial and industrial activities involving energy services as a direct/indirect input to the production of goods or provision of services with increase in income or productivity"

Energy-water-food nexus is the connecting tissue between these seemingly disparate activities



Electricity - Water Nexus

The linkage between water and electricity is crucial.

This nexus approaches the relationship between water used for energy production or energy consumed in water related processes like heating/cooling, wastewater treatment, extraction, purification and desalination.

Productive Uses of Energy:

- Desalination, water supply, storage
- Pumped Storage for hydropower

Methodology used

PIC-11 Analysis

Current status of implementation

Costs and Infrastructure needs

Electricity- Food Nexus

- Aquaculture, Fish | Shellfish farming
- Aquafarming : Direct water-based systems And FPV | Aquaponics and FPV
- Vertical farming
- Reef growth

Methodology used

PIC-11 Analysis

Current status of implementation

Costs and Infrastructure needs

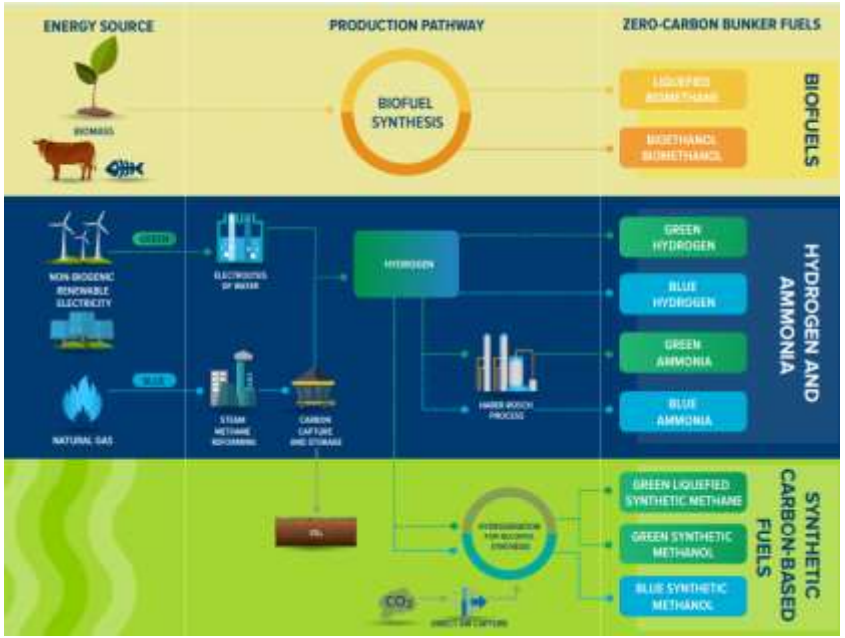
Electricity-Transportation Nexus

The transportation sector in the PIC-11 is heavily reliable of fossil fuels, using in a minor scale: biofuels.

CO2 emissions by transportation sector (source:SPC)

- Road
- Motorbikes, 3 wheelers
- Aviation
- Maritime

Aim for Zero-carbon economy



Electricity-Transportation Nexus

Electricity – Transport

- Alternative fuels
- Green hydrogen, fuel cell technologies

Methodology used

PIC-11 Analysis

Current status of implementation

Costs and Infrastructure needs

02

Electricity-Mobility Nexus

Boats, airplanes, two-and three wheelers, cars and other forms of mobility are used in the pacific islands region and the necessity to reach zero-carbon emissions implies the shift to electric mobility and the implementation of charging stations in the most useful locations.

Electricity – Mobility

- E-mobility | EV, E-scooters, e-bikes
- Charging stations
- Solar e-boats, island transport

Methodology used

PIC-11 Analysis

- Current status of implementation
- Costs and Infrastructure needs

Electricity-Growth Nexus

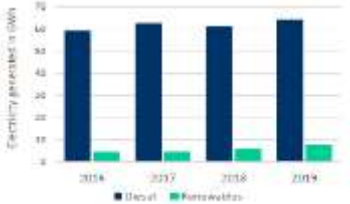
INTEGRATE ENERGY NEXUS WITH ECONOMIC CONDITIONS OF EACH PIC

Key economic conditions

Infrastructure Sector Programs

Agriculture, fisheries, and tourism

Diesel fuel imports



Climate resilience, Sanitation, health Social fabric

Electricity-Circular Economy Nexus

Electricity – Circular Economy

Methodology used

PIC-11 Analysis

- Current status of implementation
- Costs and Infrastructure needs

PIC-11 PUE Analysis

TA6680 PUE report will cover analysis for all PIC-11

For this we seek collaboration of each government to assess the most suitable technologies to adopt and prioritise.

LOOKING FORWARD TO WORKING WITH YOU

THANK YOU FOR YOUR TIME

Ko Rabwa Malo opito Fakafetai

Dr A. Bittar
Team leader TA – 6880 REG

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