

# PROJECT BRIEF

May 2018

## EU-GIZ ACSE

ADAPTING TO CLIMATE CHANGE AND SUSTAINABLE ENERGY



PACIFIC ISLANDS  
FORUM SECRETARIAT



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## Cook Islands: Northern Water Project—Phase 2

### Background

The Cook Islands has a population of approximately 15,000 people and is comprised of 15 islands located in the southern Pacific Ocean. The country is separated into the Northern Islands (7 islands) which are atoll islands and the Southern Islands (8 islands) which are of volcanic origin. The Northern Island Group of the Cook Islands (Pukapuka, Nassau, Penrhyn, Manihiki Rakahanga and Palmerston) is home to 1,110 residents spread out over the low lying atolls.

These low lying atolls are highly vulnerable to the impacts of natural disasters including cyclones, prolonged dry spell and sea level rise. These are all threats to local water security on the atolls.

In 2010 and 2012, the Cook Islands experienced long dry spells which triggered the implementation of a national program aimed at preparing the islands for drought management and response. Recent decades have also seen the northern islands exposed to strong cyclones that impacted communities and their infrastructure, including damages to households and community water supply assets.

### Project Objective

The project will improve water security and the resilience of the communities on *Nassau*, *Palmerston* and *Penrhyn* to natural disasters (including drought) by increasing their capacity to collect, store and manage their precious water resources.

### Project Summary

**Location:** Nassau, Palmerston and Penrhyn Islands, Cook Islands

**Objective:** To improve water security and resilience of the communities on Nassau, Palmerston and Penrhyn to natural disasters including drought

**Implementing Agency:** Office of the Prime Minister (OPM) - Climate Change Cook Islands (CCCI)

**Budget:** € 400,000

**Duration:** 2016—2018

### Current situation

The islands in the Northern group are low atolls with no running streams. For this reason, the people of these islands are critically dependent on rainwater for their day-to-day living. Rainwater is collected from the roofs of most community buildings, residential houses and also from purpose-built rainwater collection roofs locally known as “Fare Vai” or “Wale Wai” constructed by Government in the 1950s. Rainwater is mainly used for potable (drinking) purposes.

Groundwater is extracted from shallow lenses at wells (brackish and fresh water) built in or near the village areas and is used as a supplementary source of non-potable water. During droughts, when community and household rainwater supplies are low, the groundwater has been used as a potable water supply but it is not commonly used for this purpose as the ground water is subject to pollution from sanitation systems and other sources (e.g. saline intrusion).

## What Is EU-GIZ ACSE Doing?

The EU-GIZ ACSE programme helps the people of fifteen Pacific island countries address two common challenges: adapting to climate change and reducing their dependence on fossil fuels.

GIZ is supporting the Government of Cook Islands to increase the capacity for rainwater harvesting and storage in the Northern Group through the repair of community water tanks and associated infrastructure. The project also assists Island Governments and communities through the development and implementation of water use/demand management plans and drought management systems.

This will be achieved through:

### **1. Increased capacity for rainwater harvesting and storage**

Repairing the existing damaged community water tanks and catchment buildings accompanied by the installation of guttering systems to feed the repaired tanks.

### **2. Enhanced resilience to natural disasters and climate change (including drought proofing)**

Having the community water tanks and building operating efficiently in catching and storing rainwater.

### **3. Improved awareness within communities of the need for reduced water use and wastage; including effective management and maintenance of water supply assets on the islands**

This will be achieved through the implementation of a community water awareness program including the promotion of community knowledge and understanding of the water and supply system, wise water use and conservation as well as implementing safety practices to minimise problems arising from water contamination.



## Organisational Context

The Ministry of Financial and Economic Management (MFEM) is leading the project, which is implemented by the Office of the Prime Minister (OPM) - Climate Change Cook Islands (CCCI) in close partnership with the Pa Enua Division - Office of the Prime Minister (OPM) and the three Pa Enua Island Governments on Penrhyn, Pukapuka / Nassau and Palmerston.

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## Fiji: Sustainable Energy Hybrid Power Project

### Background

Fiji is a South Pacific archipelago comprising over 330 islands, of which 110 are permanently inhabited.

Energy Fiji Limited (EFL) is the main provider and sole distributor of grid-connected electricity to around ninety percent of the population on the main islands of Viti Levu, Vanua Levu, Taveuni and Ovalau. Rural and remote communities, accounting for the remaining ten percent of the population, do not have reliable or affordable access to electricity.

The country is reliant on fossil fuels to meet less than half of its energy demand, which is increasing due to population- and industrial growth. In Fiji, renewable energy sources are predominantly hydro, with additional generation from biomass, wind and solar. Diesel fuel powered generators are more predominant in rural and remote communities to supply electricity at the village and household levels.

By the year 2020, the Fijian Government aims at providing all Fijians with access to modern energy services that are also affordable, clean and reliable. At present, the main challenge still remains to provide remote and rural communities with electricity.

The Fiji SE4All: Rapid Assessment and Gap Analysis study estimates that approximately 15-18% of the rural population lack basic electricity services and amongst such communities are the villages of Nakoro (59 households) located on Viti Levu, Kioa island (89 households) located near Vanua Levu, and Yasawa High School (135 students) located on Naviti in the Yasawa island group northeast of Viti Levu.

### Project Summary

**Location:** Fiji

**Objective:** Improving access to reliable and affordable electricity for remote and rural communities through renewable energy systems.

**Implementing Agency:** Ministry of Infrastructure and Transport (MoIT), Department of Energy

**Budget:** € 500,000 + 450,000 national contribution/co-financing

**Duration:** 2016—2018

### Project Objective

The project aims to:

- Establish solar-/diesel hybrid power systems for electricity production and end-use;
- Increase the use of renewable energy sources to reduce the financial burden from the high cost of fossil fuels.
- Contribute to the rural electrification program target of 100% coverage by 2020.

### Current situation

The people on Kioa and Yasawa islands depend solely on diesel generators for limited hours of electricity supply, usually 2 - 4 hours per night. Kerosene and benzene lamps are used to supplement their basic lighting needs thereafter.

In Nakoro most households operate their own generators using unleaded fuel, running 3 hours per night, with kerosene lamps used for basic lighting.

The short operating hours (3-4 hours per night) of the diesel and unleaded generators, costly repair and maintenance schedules, lack of technical maintenance expertise and irregular shipping services and transportation all contribute to a limiting enabling environment for small businesses. This also limits income generating activities on the island.

Moreover, due to the unavailability of reliable electricity supply, the communities have limited access to proper health facilities, telecommunication networks and essential recreational services and leisure activities which are available in urban areas.

School children at Yasawa High School have limited access to proper lighting, internet services, and technologies to broaden their knowledge and provide them an opportunity to explore and be in touch with the outside world.

## What Is EU-GIZ ACSE Doing?

The EU-GIZ ACSE programme helps the people of fifteen Pacific island countries address two common challenges: adapting to climate change and reducing their dependence on fossil fuels.

GIZ is supporting the Government of Fiji to increase the use of renewable energy sources in remote and rural communities to improve the reliability of electricity supply and reduce the financial burden from the high cost of fossil fuels through a number of different components:

- Feasibility and gender inclusion studies and design of Solar Photovoltaic (PV)-diesel hybrid systems for Nakoro, Kioa and Yasawa High School;
- Supply and installation of PV-diesel hybrid systems to Nakoro, Kioa and Yasawa High School;
- Operation and maintenance, financial management, end-user and income generation training delivered in Nakoro, Kioa and Yasawa High School.

The project lessons will be documented to inform replication of the project in other remote and rural communities.

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## Organisational Context

Ministry of Infrastructure and Transport (MoIT) through the Department of Energy will implement the project.

The project implementation will be supported by the Climate Change Division (CCD) under the Ministry of Economy.

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## What is a solar hybrid power system?

A solar hybrid power system uses solar photovoltaic panels to charge batteries and power standard lights and electrical appliances. The system has a back-up diesel generator that can be used to charge the batteries when the sun does not shine or if additional power is needed. Using solar photovoltaic panels to generate electricity instead of a diesel generator means reduced fuel use and fuel costs and fewer greenhouse gas emissions are produced.

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## Fiji: Relocating Vulnerable Communities

### Background

Fiji is a South Pacific archipelago comprising over 330 islands, of which 110 are permanently inhabited. Communities living in low-lying areas and small outer islands are extremely vulnerable to the impacts of climate change such as sea level rise. Satellite data indicates that sea levels have risen in Fiji by approximately 6 mm per year since 1993. This figure is higher than the global average of 2.8–3.6 mm per year. Fiji is also exposed to other climate-related impacts including soil degradation and soil erosion as a result of prolonged dry seasons and more intense rainfall events. A predicted increase in extreme temperatures will impact on agricultural productivity and livelihoods.

Further, shorelines of some communities -especially in the outer islands- have eroded significantly in the last decades, causing reduced yields and increasing the vulnerability of the ecosystems and communities.

The project seeks to assist communities in two locations:

- Narikoso village, a community of 27 homes in the southern island of Ono which is located close to Kadavu island, 88 kilometres south of Fiji's national capital city, Suva.
- Waciwaci District School on Lakeba Island which is located in the Lau Island Group, 290 kilometres west of Suva. The school has 65 students and 4 teachers, and serves the villages, Waciwaci and Waitabu in Lakeba.

### Project Summary

**Location:** Fiji

**Objective:** To reduce vulnerability of Fiji communities currently experiencing climate change impacts

**Implementing Agency:** Fiji National Disaster Management Office (NDMO)

**Budget:** € 700,000

**Duration:** 2016—2018

### Project Objective

The project aims to support the relocation of vulnerable households and schools in Fiji that are currently being impacted by sea level rise and flooding from inundation and heavy rainfall events. The project is aligned with the National Climate Change Policy (2012) and the Green Growth Framework for Fiji (2014) which both include provisions to reduce the vulnerability and enhance the resilience of Fiji's communities.

### Current situation

The coastal communities of Narikoso on Kadavu and Waciwaci District School on Lakeba, Lau Group have been identified to be highly vulnerable to the impacts of coastal erosion and inundation.

The shoreline at Narikoso has receded inland by about 15 metres over the past 30 years. Tidal flooding and more frequent storm surges have reduced crop yields, and caused shoreline-fringing coconut palms to fall. Increased sedimentation in the bay from an existing excavation site has also adversely affect-

ed the protective coral-reef which in turn further perpetuates the cycle of shoreline erosion. Immediate action is required to secure the safety of the community.

The receding shoreline around Waciwaci District School exposes the schools classrooms and the playground to flooding after heavy rain and during king tides (4-6 times a year). The sea currently reaches the staff quarters at each high tide; three quarters are not safe to live in and staff have been forced to relocate and travel to school each day. The school has been recommended for closure by the Fijian health authorities.

### What Is EU-GIZ ACSE Doing?

GIZ in partnership with the Government of Fiji is working towards building resilience in Waciwaci District School and Narikoso village to climate change impacts through a number different actions:

**Relocation of the Waciwaci school, kindergarten, playground and staff quarters.** Improved drainage around Waciwaci village. Relocation of seven vulnerable households in Narikoso village. Relocation has been identified as the last feasible option for both communities as their homes and school are fast deteriorating as a result of constant inundation.

**Installation of renewable energy systems** (solar panels) on homes and school buildings at the new relocation sites.

**Revegetation** around Narikoso to reduce coastal erosion.

**Enhanced community and household livelihoods** for Narikoso through support for livestock farming and home vegetable gardening.

**Refinement of the existing draft National Relocation Guideline** through the incorporation of lessons learnt from both relocation projects.



### Organisational Context

The Ministry of National Disaster Management and Meteorological Services, National Disaster Management Office (NDMO) will implement the project. The project implementation will be supported by the Climate Change Division (CCD) under the Ministry of Economy.

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## Kiribati: Solar Energy Systems in Remote Schools

### Background

The Republic of Kiribati is made up of 33 mostly low-lying coral atolls and reef islands scattered over 3.5 million km<sup>2</sup> of the Pacific Ocean near the equator. Approximately half of Kiribati's 110,000 population now reside in urban centres that are serviced by a central electricity grid. The remaining population commonly live in small villages on remote outer islands where access to electricity is unreliable and infrequent.

The Government of Kiribati spends annually 25% (or USD 90 million) of its national import expenditure on purchasing fossil fuels, mainly diesel, for electricity generation and transportation. The Government aims to reduce expenditure on fuel imports and improve the affordability of power supply in local communities through the increased use of renewable energy.

Eight of Kiribati's 10 outlying boarding schools have already benefited from past investments to upgrade or install solar hybrid power systems. The EU-GIZ ACSE project in Kiribati will work and support the following schools:

**Alfred Sadd Memorial College (ASMC)** boarding school is owned and operated by the Kiribati Uniting Church (KUC) and located on Abemama Island in the western Gilbert Group of islands, a 20-minute flight from the country's capital, Tarawa.

**The Junior Secondary Schools (JSS) and Island Council offices on both Tabuaeran Island and Teraina Island** are up to an one and a half hour flight from the regional centre of Kiritimati Island in the Line Group of islands. Teraina and Tabuaeran Islands are among Kiribati's most remote places and thus difficult to service with infrastructure upgrades. The JSS's in those islands

### Project Summary

**Location:** Abemama and Tabuaeran Islands, Kiribati

**Objective:** Improving access to reliable and affordable electricity for two outer island rural boarding schools in Kiribati through the installation of Solar Hybrid Power Systems.

**Implementing Agency:** Ministry of Public Works and Utilities (MPWU)

**Budget:** € 475,000

**Duration:** 2017—2018

rely extensively on services provided by the island councils to support their operation.

### Project Objective

This project will **improve access to reliable and affordable electricity** at the Alfred Sadd Memorial College, as well as Teraina and Tabuaeran islands' Junior Secondary Schools and Island Council offices, through the installation of a solar hybrid power systems.

### Current situation

The **ASMC** and teacher's homes are powered by an old and unreliable 7 kilowatt (kW) diesel generator which runs between 6.30 pm and 9.30 pm each evening and sometimes during the day for special events. The generator is at the end of its operational life and spare parts are difficult to purchase when the generator breaks down. A few existing stand-alone 12-volt

solar PV systems are used to power some school equipment, such as the CB radio and lighting.

**Teraina and Tabuaeran Island Junior Secondary Schools and Island Council offices** have access to small diesel generators that operate on an as needs basis at the island council offices.

The cost of fuel to power the diesel generators is high for schools and council offices and generator use is rationed on the islands to save money, or fuel, when supplies are short.

There is insufficient supply of electricity to meet current or future demand at schools or to improve services at council offices.

Kiribati's remote islands rely on ships to deliver fuel to run generators. Shipments sometimes only come three or four times per year from other islands that can be 300 kilometres or 3000 kilometres away. A school, for example, may only have enough fuel to provide 25 days of electricity, if at all. Any delay to the infrequent fuel deliveries further reduces the ability to generate electricity, which reduces the quality of education services provided to students at the schools, or community services provided by island councils.

## What Is EU-GIZ ACSE Doing?

In Kiribati, the project helps the Government reduce its reliance on imported fossil fuels by using solar power systems instead.

At the school level, the solar power systems will ensure that all three schools and two island council offices have access to electricity 24 hours a day whilst reducing their fossil fuel use and fuel expenditure. Fuel cost savings will be invested into maintenance funds to support future system repairs or part replacements.

Key results from this work include:

- Four solar power systems installed and working to provide electricity 24 hours a day to the schools, school communities, island councils and island communities;
- Technicians in the schools and island councils trained in the maintenance of solar power systems;
- Governance arrangements to schedule and fund future maintenance of the solar systems upgraded; and,

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- Knowledge and skill of students, staff and families in energy conservation and energy demand management enhanced.

## Organisational Context

The Ministry of Public Infrastructure and Sustainable Energy (MISE) and the Pacific Community (SPC) are leading the implementation of the project, with the support of the Office of the President (OB), Ministry of Education (MoE) and GIZ.

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## What is a solar hybrid power system?

A solar hybrid power system uses solar photovoltaic panels to charge batteries and power standard lights and electrical appliances. The system has a back-up diesel generator that can be used to charge the batteries when the sun does not shine or if additional power is needed. Using solar photovoltaic panels to generate electricity instead of a diesel generator means reduced fuel use and fuel costs and fewer greenhouse gas emissions are produced.

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## Kiribati: Land Use and Coastal Vulnerability Assessments

### Background

The Republic of Kiribati is made up of 33 mostly low-lying coral atolls and reef islands scattered over 3.5 million km<sup>2</sup> of the Pacific Ocean near the equator. Kiribati's islands are aligned in three groupings, the Gilbert, Phoenix and the Line Island groups. They have an average width of less than one kilometre, their length ranges anywhere between one and 50 kilometres, and they rise no more than 2-3 metres above sea level.

By virtue of the islands' small size, virtually all infrastructure on Kiribati's islands is close to the coast. This makes infrastructure vulnerable to coastal erosion and inundation, and associated impacts of long-term sea level rise. Most land in Kiribati is also under private tenure, creating considerable pressure on government to stabilise land and protect infrastructure from threat. Kiribati's economy is small and the government understands that it cannot afford to address all threats, so it must understand and prioritise its climate change adaptation actions.

This project works specifically on Tabiteuea Island, in the Gilbert Group, which comprises little more than a series of small islets, connected by narrow, sandy land bridges or watery channels. The project will also target other islands to be decided by the government.

### Project Objective

The project will strengthen the capacity of government and select island communities to carry out land use mapping and coastal vulnerability assessments.

### Project Summary

**Location:** Kiribati

**Objective:** Strengthening the capacity of government and island communities to carry out land use mapping and coastal vulnerability assessments.

**Implementing Agency:** Office of Te Beretitenti (OB); Department of Lands (DoL) within the Ministry of Environment, Lands, and Agricultural Development (MELAD) and The Pacific Community (SPC).

**Budget:** € 148,700

**Duration:** 2017—2019

### Current situation

The Government of Kiribati does not have a central storage for digital mapping data and outputs. Such information is currently stored on computer hard drives in different government agencies as well as at The Pacific Community (SPC). The Ministry of Environment, Lands and Agriculture Development (MELAD) has been tasked to centralise data to facilitate its use.

Geographical Information Systems (GIS) mapping officers in government, within MELAD, Ministry of Fisheries and Marine Resource Development (MFRD) and Ministry of Infrastructure and Sustainable Energy (MISE), have varying responsibilities and degrees of experience with GIS, land use mapping and undertaking coastal vulnerability assessments. GIS officers provide essential services to government decision makers, but need to periodically enhance their skills and increasingly systematise their mapping and assessment work.

The officers have formed the GIS Users Group to share data and experiences and to progress the future application of GIS in Kiribati.

The GIS Users Group has identified many benefits, including cost savings, from moving their GIS work from an expensive commercial software platform onto a free, 'open source' platform. The group has worked with SPC to identify a suitable platform and now needs to migrate existing data onto this new platform and receive training in the use and management of the new system.

The GIS User Group has also recognised that the wider Kiribati population has limited understanding of GIS mapping and coastal areas analysis, and that it is essential to engage local communities affected by decisions made using mapping data and its analysis.

### What Is EU-GIZ ACSE Doing?

The EU-GIZ ACSE programme helps people in 15 Pacific Island countries address two common challenges, adapting to climate change and reducing their dependence on fossil fuels.

In Kiribati, the programme is assisting a government-led project team to:

- Collate existing mapping data sets within the Department of Lands (DoL) and provide the hardware and software to store and analysis this information;
- Train government GIS offers in the latest techniques in land use and coastal mapping and presentation as well as techniques in analysing this information;
- Map whole islands and individual communities with Tabiteuea Island being the first focus;
- Work with local communities to ground truth maps and to develop coastal form models and vulnerability assessments; and
- Set future priorities for systematic coastal mapping and assessment in Kiribati.



### Organisational Context

The Ministry of Environment, Lands, and Agricultural Development (MELAD) is leading the project with support from the Office of the President (OB), The Pacific Community (SPC) and GIZ.

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## Federated States of Micronesia: Protecting Islands through Learning and Leading in Adaptation and Renewable Energy (PILLAR-Ed)

### Background

The Federated States of Micronesia (FSM) comprises 607 islands grouped in four States (Chuuk, Pohnpei, Yap and Kosrae). FSM has a total population of 103,000 people.

FSM faces dual challenges of energy security and the threats posed from climate change impacts. Approximately 86% of FSM's electricity comes from fossil fuels, and only 60% of the population has access to electricity. FSM's communities face worsening cyclonic winds, droughts and flooding as a result of climate change.

FSM has a land area of 702 square kilometres (km<sup>2</sup>) and is situated northeast of Papua New Guinea. The 607 islands vary geologically from high and mountainous to low coral atolls, with the majority being low-lying and resource poor. These geographic challenges make it difficult to coordinate large scale responses to sustainable energy and climate change adaptation measures, which means that community empowerment is essential.

Students in all four FSM states will benefit from the proposed addition of climate change into the curriculum. Four schools, one from each state will also be selected based on selection criteria guided by the project steering committee. These four schools will benefit from energy efficiency measures and additional WASH infrastructure. Government buildings that will benefit from the project are located in FSM's capital city Palikir, Pohnpei.

### Project Summary

**Location:** States of Pohnpei, Kosrae, Chuuk and Yap

**Objective:** Increase community awareness of climate change adaptation and sustainable energy measures through installations on schools and public buildings, and through development of school curriculum.

**Implementing Agency:** Pacific Community (SPC)

**Budget:** € 450,000

**Duration:** 2017—2018

### Project Objective

The PILLAR-Ed project will **increase community awareness of climate change adaptation and sustainable energy measures through installations and energy efficiency measures in schools and public buildings, and through development of school curriculum.** The project responds to key recommendations made in a 2012 climate change impact assessment report in FSM. It is aligned to the FSM Strategic Development Plan 2004 – 2023 and the FSM National Integrated Disaster Risk Management and Climate Change Policy (2013).

### Current situation

Despite the risks associated with climate change, there is a general lack of community awareness and preparedness for climate change. Research conducted in 2012 identified the need for a nation-wide climate change education program and the promotion of community-based climate change adaptation that is consistent with traditional community values.

The burdens of typhoons (such as Maysak in 2015) and the

effects of El-Nino droughts on water supply in 2016 have underlined the need for improved resilience measures and community preparedness of climate change impacts. Climate change projections mean that the impacts of natural weather events such as droughts are likely to be amplified.

FSM's high dependence on fossil fuels comes at an annual cost of US\$50 million. Improving energy efficiency and increasing the use of renewable energy will reduce the financial impacts and the exposure of FSM to fluctuating fuel costs.

Approximately 60% of schools in FSM lack access to electricity and many do not have access to running water. The quality of water at schools is often very poor which contributes towards water-borne disease and reduced learning outcomes for students.

### What Is EU-GIZ ACSE Doing?

The EU-GIZ ACSE programme helps the people of fifteen Pacific island countries address two common challenges: adapting to climate change and reducing their dependence on fossil fuels.

GIZ is supporting the Government of FSM by broadening community knowledge of how FSM can address climate change challenges, and demonstrating the application of sustainable energy through three components:

#### Component 1. Increasing community knowledge of climate change adaptation and sustainable energy

This component will be achieved through development of school curriculum to educate students on these issues and spread community awareness at the grassroots level.

#### Component 2. Increasing implementation of sustainable energy measures in FSM schools and public buildings

This component involves the installation of energy efficiency measures that respond to recommendations from energy efficiency audits to reduce electricity bills and fossil fuel combustion for electricity generation.

#### Component 3. Increasing implementation of climate change adaptation in FSM schools

This component involves the installation of rain-water tanks, bore-holes and improved guttering at four FSM schools, as well as implementation of other Water, Sanitation and Hygiene (WASH) measures. These installations serve to demonstrate ap-



propriate technologies at the community level to showcase viable solutions to water shortage and sanitation issues.

### Organisational Context

The FSM Department of Resources and Development is leading the project, which is implemented by the Pacific Community (SPC) in close partnership with the FSM State Power Utilities, the FSM State Governments and the FSM Development Bank.

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## Federated States of Micronesia: Improving the regulatory and financial environment to enhance investments in small-scale renewable energy technologies

### Background

The Federated States of Micronesia (FSM) comprises 607 islands grouped in four States (Chuuk, Pohnpei, Yap and Kosrae). FSM has a total population of 103,000 people.

Approximately 86% of FSM's electricity comes from fossil fuels (primarily diesel). Fuel prices in the outer islands can be twice the price on the main islands. Only 60% of the population has access to electricity, and outer islands sometimes run out of diesel fuel. People in FSM pay some of the world's highest electricity prices. Renewable energy systems can reduce electricity costs for domestic users and businesses, but requires establishment of policies and loan programs to make it accessible. Solar energy provided only 1% of energy generation in 2012. FSM has set a target of 50% renewable energy by 2023.

FSM is situated northeast of Papua New Guinea, and extends east to west over 2,400 kilometres (km), and north to south over 965 km. The land area is 702 square kilometres (km<sup>2</sup>) with an exclusive economic zone exceeding 2.59 million km<sup>2</sup>. The islands vary geologically from high and mountainous to low coral atolls, with the majority being low-lying and resource poor. These geographic challenges make it difficult to coordinate large scale responses to sustainable energy. The project will benefit people in all four FSM states.

### Project Objective

The project will **enhance investments in small-scale Renewable Energy (RE)** in FSM through providing legislation to guide the connection of RE systems to the main power grid. The project will also provide small-scale users with access to loans through

### Project Summary

**Location:** States of Pohnpei, Kosrae, Chuuk and Yap

**Objective:** Enhancing investments in small-scale renewable energy in FSM through providing legislation to guide the connection of renewable energy systems to the main power grid and access to loans.

**Implementing Agency:** Pacific Community (SPC)

**Budget:** € 325,000

**Duration:** 2017—2018

the FSM Development Bank. The project aligns with the focus on contributing to the national energy policy target for renewable energy and the reduction of fossil fuel use for power generation.

### Current situation

FSM's high dependence on fossil fuels comes at an annual cost of US\$50 million.

Increasing the use of grid-connected renewable energy (per kWh) will reduce the financial impacts and the exposure of FSM to fluctuating fuel costs. Electricity prices across the four States of FSM are over US\$0.50 per kWh, which make them some of the highest in the world. The high cost of energy puts a strain on household budgets and constrains business activities.

Electricity grids are managed at the State-level. The lower number of users has made it difficult for the utilities and State infrastructure managers to develop the legislation and policies

to support the RE industry. Currently, none of the State utilities have policies to allow connection of small scale RE systems to the grid, which prevents households and business owners from connecting these cost saving systems. Further there are no financial incentives or low-cost loans that make RE systems accessible for low-income households and businesses that have competing financial requirements that prevent a once-off investment in RE.

## What Is EU-GIZ ACSE Doing?

The EU-GIZ ACSE programme helps the people of fifteen Pacific island countries address two common challenges: adapting to climate change and reducing their dependence on fossil fuels.

GIZ is supporting the Government of FSM by providing net-metering legislation to allow connection of RE systems to the State utility grids, as well as setting up a low-cost loan program with FSM Development Bank to finance RE systems. The project contains the following components:

### Component 1. Increasing uptake of small-scale grid-connected renewable energy

This component will be achieved through development of a low-cost loan program with FSM Development Bank which will provide accessible finance to households and businesses to fund RE systems.

The project will also work with the College of Micronesia to establish programs to train electricians across the four states in the installation of grid-connected Photovoltaic systems, including net-meters.

### Component 2. Providing the regulatory environment to promote investment in RE systems

This component will be achieved through the development of net-metering legislation for the four states of FSM, as well as supporting the utilities to introduce connection protocols for small-scale grid-connected RE systems.



## Organisational Context

The FSM Department of Resources and Development is leading the project, which is implemented by the Pacific Community (SPC) in close partnership with the FSM State Power Utilities, the FSM State Governments and the FSM Development Bank.

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May 2018

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ADAPTING TO CLIMATE CHANGE AND SUSTAINABLE ENERGY



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## A Pwiyeiy bwio - light up my land

### Nauru Energy Road Map 2018 to 2020

### Agency Action Plans

## Nauru: Enabling the Implementation of the Nauru Energy Road Map

### Background

Nauru is a small raised coral equatorial island in Micronesia of 21 km<sup>2</sup> with a population of approximately 10,200.

The country is 100% electrified. During the years of high phosphate production, industrial use dominated Nauru's energy consumption. That use has reduced and the domestic sector is now the dominant consumer of electricity. Decades of very low, or no, electricity costs for energy consumers has resulted in a much higher per-capita energy usage than is seen in most Pacific Island Countries (PICs). The current electricity demand is estimated at around 3.3 MW, with an average household electricity consumption of about 400 kWh/month. Nauru Utilities Corporation is the only electricity provider.

The Nauru Energy Sector Road Map 2014-2020 was developed and endorsed by Government of Nauru in 2014 and now serves as an implementation plan for Nauru's Energy Policy Framework developed in 2009.

### Project Objective

The project will establish an enabling environment for the implementation of the Nauru Energy Sector Road Map.

This will contribute towards Nauru achieving the sustainable energy component of the National Sustainable Development Strategy 2005-2025 (NSDS, revised 2009); 'Provide a reliable, affordable, secure and sustainable energy supply to meet the socio-economic development needs of Nauru'.

### Project Summary

**Location:** Nauru

**Objective:** Establish an enabling environment for the implementation of the Nauru Energy Sector Road Map

**Implementing Agency:** United Nations Development Programme (UNDP), Suva, Fiji together with Nauru Department of Commerce, Industry and Environment, Climate Change and Energy Division

**Budget:** € 200, 000

**Duration:** 2017—2018

### Current situation

Imported petroleum products are the main energy source in Nauru. Fuel demand is about 10 million litres per year and Nauru has a relatively high fuel supply security of (estimated) 73 days.

Since 2005, a number of policies and legislation impacting the development of the energy sector on the island have been introduced through the economic reform programme. However, these predominantly focus on the supply of electricity and lack attention to the fuel source.

The institutional roles and responsibilities of the various players in the energy sector have not been well defined and coordination mechanisms have not been operationalised. There is a lack of formal mandate for the Government Department carrying out national policy and planning functions. Processes and procedures are in some cases unclear and require further

development. In addition, limited financial resources and staff capacity constrain the functioning of institutions.

A legislative framework is required which provides for an appropriate governance regime including consideration of an overarching energy legislation.

## What Is EU-GIZ ACSE Doing?

The EU-GIZ ACSE programme supports fifteen Pacific island countries in addressing the challenges of adapting to climate change and reducing their dependence on fossil fuels.

GIZ is supporting the Government of Nauru to develop an overarching energy legislation that will strengthen the legislative framework for energy sector planning, governance and coordination. It will also clarify roles and responsibilities of related parties. The project will consist of institutional, legislative and regulatory, technical and awareness and capacity development components.

The expected outputs are:

- Energy Unit in the Department of Commerce, Industry and Environment is established and operational;
- Energy sector-wide legislation and regulations for solar photovoltaic systems are established;
- Technical standards developed or adopted for solar photovoltaic systems;
- Capacity of staff and contractors developed on new energy legislation, regulation, and technical standards for residential solar photovoltaic systems

## Organisational Context

The Department of Commerce, Industry and Environment, Climate Change and Energy Division is leading the project with the support of its implementing partner, United Nations Development Programme. Other project partners include Nauru Utilities Corporation, Department of Justice and Boarder Control and Planning and Aid Division, Department of Finance. The project management unit is under the Climate Change and Energy Division.

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## Niue: Alofi Wastewater Management Project

### Background

Niue is an island country in the South Pacific, located 2,400 kilometres northeast of New Zealand, east of Tonga, south of Samoa, and west of the Cook Islands. It has a land area of 261km<sup>2</sup> and a population of about 1,600. Niue is a raised atoll with no surface water supplies. The only source of municipal water is a large freshwater lens. However, it is already under threat of salt water intrusion due to sea level rise. Discharge of untreated wastewater from septic systems directly into the ground also poses a threat and increases the risk of contamination of the freshwater lens and coastal waters.

The project is located in Niue's capital, Alofi, which comprises of the villages Alofi North and Alofi South on the western side of Niue. A survey identified houses in both villages with the greatest need for either septic tank repair or new installation. Hence, the Government of Niue prioritised the two villages as project sites.

### Project Objective

The project will **reduce the risk of pollution to Niue's freshwater lens and coastal waters** in two villages through improved wastewater management and treatment. The project is aligned to the Niue National Strategic Plan and Integrated Water Resource Plan.

### Current situation

The Government of Niue is committed to providing a quality potable water supply to all residents. Currently, municipal drinking water extracted from the freshwater lens does not

### Project Summary

**Location:** Niue island

**Objective:** Reducing the risk of pollution of Niue's freshwater lens and coastal waters through improved wastewater management and treatment

**Implementing Agency:** Department of Environment in collaboration with the Project Management & Coordination Unit (PMCU)

**Budget:** € 400,000

**Duration:** 2016—2018

require any form of treatment. Keeping the freshwater lens free from contaminants is of critical importance to:

- manage potential health risks, as there are limited health care resources on the island, and
- prevent high costs of implementing water treatment.

There is no wastewater treatment facility in Niue, and all homes and businesses have on-site septic tanks. The presence of damaged and poorly maintained septic systems increases the risk of contamination of the freshwater lens and coastal waters. Recent surveys have already detected low levels of contaminants in more than 80% of freshwater bores and reservoirs, with total coliform counts failing drinking water standard limits from the World Health Organisation (WHO). Near-shore coastal waters also indicate localised nutrient enrichment from household wastewater and agriculture. Climate change impacts will likely exasperate the freshwater lens and coastal water quality issues.

## What Is EU-GIZ ACSE Doing?

The EU-GIZ ACSE programme helps the people of fifteen Pacific island countries address two common challenges: adapting to climate change and reducing their dependence on fossil fuels.

GIZ is supporting the Government of Niue to improve wastewater management and treatment to minimise exacerbation of climate change impacts on the environment and to protect the health and livelihood of Niue’s population through:

### Designing septic tanks and conducting technical feasibility

The project will carry out a technical feasibility assessment in order to 1) define the septic tank designs and select the most appropriate and cost-effective option; 2) assess any environmental impact that may occur through construction and installation; and 3) identify target households.

### Raising household awareness and understanding of environmentally sound wastewater management practices

The project will conduct public education and awareness campaigns on the risks of wastewater discharge and the benefits of properly managed wastewater treatment systems to each homeowner receiving the septic tank upgrade, at village council meetings and public workshops.

### Constructing and installing/ repairing septic tanks

The project will construct 50 septic tanks on the island, install the tanks at target households.

### Reviewing wastewater treatment options

The project will evaluate and select appropriate wastewater treatment options for septage (septic tank solids) and septic tank effluent that will inform the wastewater management plan.

### Establishing septic tank long-term monitoring and maintenance plan

The project will establish a robust monitoring and maintenance system to ensure the longevity of the septic tank systems. This will also help to determine the effectiveness of the septic tank systems and enable early detection of any issues.



## Organisational Context

The Department of Environment is leading and implementing the project in close partnership with the Ministry of Natural Resources, Ministry of Infrastructure, Ministry of Social Services, Alofi South Village Council, and Alofi North Village Council. The Project Management and Coordination Unit is supervising the project.

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## Palau: Enhancing Sustainable Livelihoods through Demonstration of Environmentally Friendly Integrated Food Production Systems in Palau

### Background

The Republic of Palau is an island country located in the western Pacific Ocean. The country contains approximately 340 islands, forming the western chain of the Caroline Islands in Micronesia, and has an area of 466 square kilometres (180 [square miles](#) ).

Palau is exposed to many climate change impacts including sea level rise, higher temperatures, more intense rainfall, and increased frequency and intensity of extreme weather events (such as category 4 and 5 typhoons). These impacts pose some of the greatest threats to food security in Palau. Food security is also threatened by the spread of crop and livestock diseases and new invasive species.

The project seeks to assist farmers in areas that are geographically equally distributed around the main island of Babeldaob to ensure high visibility among those farming communities who need assistance to increase crop and livestock production. The Bureau of Agriculture has stations on both the east and west coasts of Babeldaob allowing continuous monitoring and support to the selected farmers and their communities.

### Project Objective

This project will enhance sustainable livelihoods and strengthen capacities to adapt to the adverse effects of climate change through the piloting of **integrated farming systems and marketing of goods**.

The project is closely aligned to many of Palau's policies, strategies and plans including the Palau's National Food Security Policy, and the Non-communicable Disease Prevention and Control Strategic Plan of Action 2015-2020.

### Project Summary

**Location:** Palau

**Objective:** Adoption of an operating and viable integrated farming system that will enhance sustainable livelihoods and strengthen capacities to adapt to the adverse effects of climate change

**Implementing Agency:** Bureau of Agriculture, Ministry of Natural Resource, Environmental and Tourism (MNRET)

**Budget:** € 390,500 (+ € 80,000 emergency response budget)

**Duration:** 2016—2018

### Current situation

Farming in Palau is declining and recent typhoons have crippled agricultural production resulting in decreased access to high quality local food sources and increased dependency on imported food with low nutritional value. Today, 80-90% of the food consumed in Palau is imported and this leaves Palau exposed to high food security risks. Increased consumption of imported foods has also been linked to increased incidence of non-communicable diseases (NCDs) such as diabetes and heart disease. In response to these risks, Palau has declared a medical "State of Emergency".

Land degradation issues coupled with food safety and water concerns are serious constraints to the integration of livestock into existing agricultural systems to improve livelihoods. The conventional system of raising livestock, particularly pigs, involved cleaning pens of animal waste which requires large volumes of water. This practice leads to unsustainable water usage; and the untreated water that runs off farms creates environmen-



tal and health safety risks. Such farming practices are not climate change 'smart,' and render soil completely vulnerable to stressful events such as an El Nino or a flood.

## What Is EU-GIZ ACSE Doing?

The EU-GIZ ACSE programme helps the people of fifteen Pacific island countries address two common challenges: adapting to climate change and reducing their dependence on fossil fuels.

GIZ is supporting the Republic of Palau to increase local agriculture production through the introduction of integrated farming systems that are a prerequisite to reduce NCDs and improve food security. The project will be complemented with the robust promotion and marketing of local foods and cuisine through a multi-sectoral partnership.

Through the above measures five farming families, (40 people) and their communities on Babeldaob, with approximately 500 farmers, will directly benefit from the project results. The impact of the measure is countrywide though, as it aims to develop standards for animal husbandry and farming practices in Palau.

The project will focus on 3 (three) broad strategic activities including:

- 1) Establishing demonstration farms and disaster resilient nurseries,
- 2) Providing training on integrated farming practices, typhoon resilience, climate smart agriculture, El Niño mitigation and ecosystem-based agro-management, and
- 3) Promoting organics through a pig-breeding program, cultured seedlings, and composting (supported by the dry-litter system of raising livestock).

## Organisational Context

The project is implemented by the Bureau of Agriculture, Ministry of Natural Resource, Environment and Tourism (MNRET).

As part of the multi-sectoral arrangement, the following partners and agencies will support the project implementation and inclusion of results into sector planning and discussion: Belau Tourism Association, Palau Livestock Association, Palau Community College, Small Business Development Centre, US Department of Agriculture, Taiwan Technical Mission, National Development Bank of Palau Palau Organic Growers' Association, Palau Community Action Agency, Pacific Organic and Ethical Trade Community



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## Papua New Guinea: Integrated Water and Sustainable Energy (IWASE) Project

### Background

Papua New Guinea (PNG) occupies the eastern half of the rugged tropical island of New Guinea and has a population of 7.3 million. The central part of the island is characterised by dense forests and a wide ridge of mountains known as Highlands. PNG's main electricity supplies are fossil fuels (70%) and hydro (30%). However, only larger urban areas have access to a centralised power supply systems and access to clean water and sanitation facilities.

Predicted climate change impacts such as the increase in extreme weather conditions amplify the vulnerability of communities already living in very poor conditions. Improved infrastructure is required to protect access to safe and reliable water supply and provide access to electricity for the refrigeration of food to overcome periods of food shortages caused by extreme events such as droughts and floods.

The project will be implemented in three rural communities in Rigo District: Imuagoro, Kalo and Keapara villages.

### Project Objective

The objective of the project is to **support the development and resilience to climate change effects of three rural communities in the Rigo District**: Imuagoro, Kalo and Keapara villages through the provision of reliable, integrated water and sustainable energy.

### Project Summary

**Location:** Communities of Imuagoro, Kalo and Keapara in Rigo District, Central Province

**Objective:** To support the development and resilience to climate change effects in three rural communities in the Rigo District, Papua New Guinea

**Implementing Agency:** Climate Change and Development Authority (CCDA) with implementing partners Central Provincial Government, Rigo District Administration and Water PNG Limited

**Budget:** € 1,200,000

**Duration:** 2017—2019

### Current situation

The country's topography has hindered the basic development of remote rural communities. There is a lack of basic infrastructure such as power and water supply and basic health care systems. Eighty five percent of the total population have no access to electricity, and therefore no conveniences such as lighting and refrigeration. Furthermore, 61% of the population have no access to safe drinking water. Unfortunately, the Government of PNG lacks the required resources to supply basic infrastructure to remote communities.

The impacts of climate change are likely to make this situation worse. Surface temperatures in PNG have increased by about half a degree Celsius since the mid-70s, while rainfall has reduced in some areas by as much as 15%.



The communities of Imuagoro, Kalo and Keapara in Rigo District, Central Province were selected as they met the following criteria:

- Represent the different kind of village structure (highland, shoreline-coastal and hill village) to reflect Papua New Guineas villages,
- Are easily accessible to ensure that project partners can visit the sites, and
- Have interest and capacity to implement the project.

## What Is EU-GIZ ACSE Doing?

The EU-GIZ ACSE programme helps the people of fifteen Pacific island countries address two common challenges: adapting to climate change and reducing their dependence on fossil fuels.

The project is supporting the Government of PNG to improve the development and resilience of rural communities through

- Establishing improved water supply and treatment infrastructure – including protected water sources, solar powered pumps, reservoir and rainwater harvesting systems,
- Providing health care centres in Imuagoro and Kalo with a sustainable energy source, medical coolers and water supply, impacting approximately 4500 users of these health centres,
- Providing stand-alone solar powered street-lighting that will help increase the safety around the water sources, and
- Increasing the capacity and awareness of stakeholders regarding sustainable energy and water supply infrastructure.

## Organisational Context

The Climate Change Development Authority (CCDA) is leading the project, which is implemented in partnership with the implementing partners, Central Provincial Government, Rigo District Administration and Water PNG Limited.

The design and implementation is carried out in close collaboration with the Local Level Governments and the village themselves in accordance with Ward Development Plans.



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## Republic of the Marshall Islands: Improving Water Supply Resilience for three Outer Islands High Schools

### Background

In 2016, the North Pacific was affected by extreme drought conditions and the Republic of the Marshall Islands (RMI) declared a State of Disaster. The drought was primarily impacting the Water, Sanitation and Hygiene (WASH) sector.

The initial drought response mostly focused on temporary solutions. Nonetheless, larger high schools still do not have sufficient potable water available for their students and staff.

Further assessments determined the need to adopt a long-term solution to improve water supply resilience on the particularly affected atolls Kwajalein, Wotje and Jaluit.

Due to their larger scale of collection area, and clear land ownerships with the Government, one high school in each atoll was selected as project site. Apart from the schools, the water project will also benefit the surrounding communities.

Kwajalein Atoll has a population of approximately 11.410 with a majority residing on the island of Ebeye (second largest urban center in RMI). **Kwajalein Atoll High School (KAHS)** has around 340 students and is located on the island of Gugegwe which has a village community located adjacent to the school with a population of approximately 240.

**Northern Island High School (NIHS)** is located on Wotje Atoll which has a population of approximately 860. NIHS is boarding school with approximately 410 students, including those from nearby atolls.

Jaluit Atoll has a population of approximately 1.800. **Jaluit Atoll High School (JAHS)** is located in the village of Jabor with around 450 students being enrolled at the school.

### Project Summary

**Location:** Kwajalein, Wotje and Jaluit Atolls, Republic of the Marshall Islands

**Objective:** Improving rainwater harvesting and storage capacity of three outer island high schools on Kwajalein Atoll, Wotje Atoll and Jaluit Atoll

**Implementing Agency:** National Disaster Management and Joint National Action Plan Office

**Budget:** € 113,000

**Duration:** 2017—2018

None of the three high schools have reticulated water supply system in place and the main source of drinking water is provided by rainwater harvesting tanks. During droughts, the rainwater tanks are supplemented by Reverse Osmosis units.

The toilet facilities are either supplied by seawater or well water, through a pressure pump adjacent to each of the buildings. At NIHS and JAHS, rainwater tanks provide water primarily for drinking and food preparation.

### Project Objective

The project is focusing on **improving the rainwater harvesting and storage capacity.**

The project aligns with the country's Joint National Action Plan for Climate Change and Disaster Risk Management as well as the Drought Response Plan.

It will contribute to a long-term climate change adaptation strategy for the three schools and neighboring communities.

## Current situation

Previous assessments at KAHS and NIHS have shown that the existing roof area is not used to its maximum as a rainwater catchment surface and not all rainwater storage tanks are connected to roof catchments. There is also insufficient storage capacity to provide water security in times of extended periods of low rainfall. Therefore, existing rainwater reserves only provide staff and students between 11 and 20 days of water supply at KAHS and NIHS respectively. This is insufficient to provide water security during times of prolonged drought.

Local groundwater is generally unsuitable for human consumption due to salinity and bacterial contamination. The lack of reliable potable water results in the prevalence of waterborne diseases which lead to absenteeism from school; other health impacts due to insufficient water availability for cooking, drinking and personal hygiene.

## What Is EU-GIZ ACSE Doing?

The EU-GIZ ACSE programme helps the people of fifteen Pacific island countries address two common challenges: adapting to climate change and reducing their dependence on fossil fuels.

GIZ is supporting the Government of the Marshall Islands to improve the rainwater harvesting and storage capacity of three outer island high schools through

### 1. Increasing potable water supply for students, staff and neighboring communities during times of drought and low rainfall.

The project will install 18 new rainwater storage tanks and repair existing tanks where required at KAHS and NIHS. Staff will be trained in tanks maintenance and repair. The respective schools will be equipped with required tools and materials.

At JAHS, the project is funding the purchase of first flush diverters to support the installation of a new concrete water tank.

### 2. Improving water resource management

The project will develop a Water Asset Management Plan which outlines clear Standard Operating Procedures to manage and maintain water assets. It is anticipated to link the plan to the respective schools' Disaster Management Plan in order to identify actions to secure water supplies in case of drought.



## Organisational Context

The project is led by the Office of the Chief Secretary. It is implemented by the National Disaster Management and Joint National Action Plan Office in close partnership with the Public School System, Ministry of Education, Ministry of Public Works, and the Project Management Unit under the Ministry of Finance.

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## Samoa: Energy Bill and Sustainable Bioenergy

### Background

Samoa is a Polynesian island nation located in the southern Pacific Ocean, south of the equator between New Zealand and Hawaii. Approximately 99% of the estimated 192,000 population have access to electricity. Renewable energy sources currently generate approximately 30% of the Samoa's electricity with the largest contributions from hydropower. Other renewable energy resources such as wind and solar are also being used but biomass has not yet been adopted as a means of electricity generation.

Samoa is exposed to natural disasters such as droughts and cyclones, which can reduce generation capacity or cause damage to hydropower infrastructure. The risk of prolonged drought and damaging cyclones pose a threat to Samoa's national energy security and there is a need to diversify the nation's renewable energy sources.

Within this context, the project will target the Samoa Trust Estate Corporation's (STEC) plantation (6000 acres) at Mulifanua, which is located near Faleolo International Airport on the island of Upolu. The plantation was once a productive agricultural land growing coconuts and other crops, but over time has become covered with invasive species, which will be also harvested as fuel wood for the power plant. Improvements to energy sector policy and legislative frameworks will benefit the broader population of Samoa. This project is aligned with the Strategy for Development of Samoa, the National Energy Sector Plan, as well as several national policies and projects, aimed at reinvigorating agriculture and mitigating climate change impacts. It will also contribute to the Government's renewable energy target and encourages the use of sustainable energy.

### Project Summary

**Location:** Mulifanua , Upolu, Samoa

**Objective:** To enhance energy security in Samoa through development of a biomass supply chain for biomass gasification to support electricity generation

**Implementing Agency:** Ministry of Finance, Energy Policy, Coordination and Management Division

**Budget:** € 624, 000

**Duration:** 2015—2019

### Project Objective

The project will enhance energy security in Samoa through the development of a biomass supply chain to feed biomass gasification plant and generate electricity.

### Current situation

There are significant biomass resources available in Samoa, which could be harvested and used to generate electricity. The encroachment of biomass (e.g. weeds, non-productive trees) into coconut plantations is an issue faced by plantation owners. These encroachments make harvesting and replanting of coconuts and other crops more difficult, negatively impacting on Samoa's coconut oil export potential, and the ability to accommodate the traditional intercropping (bananas, taro, cassava) and livestock production in coconut plantations.

There is a current lack of accurate quantitative data on the size and stratification of the waste biomass and this has constrained efforts to use these biomass resources as a feedstock to generate electricity whilst at the same time helping to increase coconut plantation productivity.



Private sector participation in the energy sector has been constrained by the lack of a legislated enabling framework to procure private sector investments in the energy sector. There is also a lack of minimum performance standards for the private sector participation in the energy sector that has acted as a barrier to taking advantage of this excess biomass as a feedstock for electricity generation. This has caused delays in realising biomass gasification renewable energy power projects.

### What Is EU-GIZ ACSE Doing?

The EU-GIZ ACSE programme helps the people of fifteen Pacific island countries address two common challenges: adapting to climate change and reducing their dependence on fossil fuels.

GIZ is supporting the Government of Samoa to assess the biomass resource potential of the STEC plantation at Mulifanua. The project will provide support in planning the biomass supply chain up until its use as feedstock for a proposed future gasification power plant. Additionally, the project is supporting the development of overarching energy legislation to help facilitate private sector investment into the energy sector. These objectives will be achieved through two complementary components:

#### Component 1. Development of an Overarching Energy Legislation

The project will fill legislative gaps in the energy sector by supporting the process of developing a comprehensive energy bill for the country. The bill will outline a legal framework for energy sector operations and should provide greater clarity to investors in the energy sector. The overall objective for the energy bill is to minimise the risks and therefore promote investment in the energy sector by providing greater clarity and certainty to private sector investors.

#### Component 2. Biomass Supply Chain Assessment and Planning

The project will establish a GIS-based forest inventory, Biomass Harvest and Management plan, design and construct a drying shed, procure machineries for biomass harvest and transport, and conduct harvest and feedstock production trials for a gasification power plant. The cleared plantation will be replanted in coconuts and other crops. A smaller part of the plantation area will be used to grow short rotation wood species such as *Leucaena leucocephala* in order to render biomass gasification sustainable on the long run. The project will also assess the market potential for coconut timber as a significant part of the palms are likely to be removed because of senility.

### Organisational Context

The Ministry of Finance is leading the project, which is implemented by the Energy Policy Coordination and Management Division in close partnership with the Office of Attorney General, Samoa Trust Estate Corporation, Electric Power Corporation, Scientific and Research Organisation of Samoa, The Pacific Community - Geoscience and Land Resource Divisions, Ministry of Natural Resources and Environment, Ministry of Women, Community and Social Development and the project management unit under the Energy Policy Coordination and Management Division.

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Images: Samoa Trust Estate Corporation

# PROJECT BRIEF

May 2018

## EU-GIZ ACSE

ADAPTING TO CLIMATE CHANGE AND SUSTAINABLE ENERGY



PACIFIC ISLANDS  
FORUM SECRETARIAT



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## Solomon Islands: Solar Hybrid Power in Boarding Schools

### Background

Approximately 80% of the Solomon Islands population live in rural locations that lack access to a reliable and affordable electricity supply. The lack of secure electricity impacts on the provision of quality education, health, water and other essential services. Electricity, where available, is mostly supplied by diesel generators that operate during selective hours, and often unreliably. Fuel costs, fuel supply logistics, and inefficient and aging generators, also constrain the reliability of diesel power systems in these rural and dispersed communities. Solar Photovoltaic (PV) systems have rapidly reduced in cost in the last 10 years and now provide a reliable and cost-effective alternative to diesel generation.

Selwyn College is a large boarding school located 60km from Honiara at the northwest end of Guadalcanal island near Veranaaso Village. The college, run by the Anglican Church of Melanesia (ACoM), is home to approximately 750 students, and 100 staff and their families. Selwyn's relatively close proximity to Honiara will help facilitate monitoring and support for the solar hybrid system, which in term of scale, is the first of its kind in the Solomon Islands.

### Project Objective

This project will **improve access to reliable and affordable electricity** at Selwyn College. The lessons from this pilot project will **inform opportunities to replicate solar hybrid systems in other schools and institutions in rural Solomon Islands**. The project will **develop** a sustainable business model to operate and maintain the new electricity supply system. The project is aligned with the Solomon Islands National Development Strategy 2011-

### Project Summary

**Location:** Solomon Islands

**Objective:** Improving access to reliable and affordable electricity in a large rural boarding school

**Implementing Agency:** Ministry of Environment, Climate Change, Disaster Management and Meteorology

**Budget:** € 797,818

**Duration:** 2017—2018

2020, and will contribute towards achieving the Solomon Islands National Energy Policy renewable energy target of 50% by 2020.

### Current situation

Selwyn College is not connected to the electricity grid. A diesel generator connected to a campus mini-grid supplies electricity to classrooms, dormitories, staff housing, street lights, and water pumps. The high cost of diesel fuel and the age and inefficiency of generators limits generator run times to short periods during the morning, afternoon and evening. Limited electricity access impacts on the college in a number of ways including:

- Health, hygiene and sanitation: Without electricity to power the water pump, the header tank pressure is limited, which impacts on water supply for drinking, cooking, washing and toilet flushing sanitation. This has an effect on hygiene and sanitation. Intermittent refrigeration also limits what perishable food can be stored on campus.
- Education outcomes are impacted by reduced hours of lighting to support night-time study; limited access to



computer laboratories and private laptops use; and limited ability to use electronic teaching aids such as TVs and projectors. A prolonged generator outage results in the closing of the school.

- Safety of staff and students is compromised by a lack of lighting at night.

## What Is EU-GIZ ACSE Doing?

The EU-GIZ ACSE programme assists the people of fifteen Pacific island countries to address two common challenges: adapting to climate change and reducing their dependence on fossil fuels.

GIZ is supporting the Government of Solomon Islands to improve access to reliable and affordable electricity in rural areas through :

### Installing a solar hybrid system with battery bank

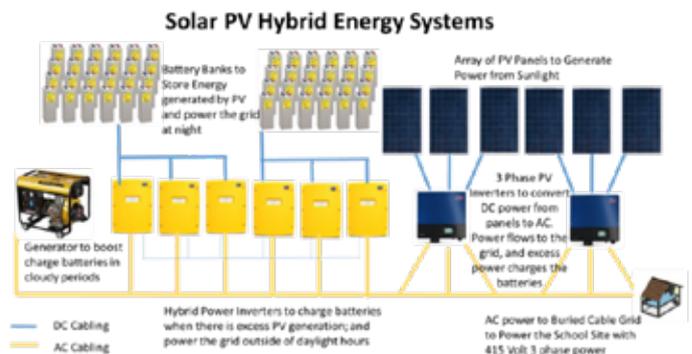
The project will install a solar hybrid power system at Selwyn College. The solar hybrid block-diagram shows the different major components of a solar hybrid system, and the role that each component plays. The system combines solar panels with a diesel generator and battery storage to deliver continuous and reliable power supply to the school. Such systems have been successfully deployed across communities, school groups and resorts throughout the Pacific Islands..

Staff will be trained to maintain the system and a maintenance fund will be established to pay for the future replacement of batteries and maintenance of the system components.

Many energy stakeholders in Solomon Islands (Ministries, utilities and service providers) see this type of system as an all-in-one solution for providing reliable and secure grid-level power to rural communities and therefore this project is an important test case to inform country-wide replication.

### Water and energy efficiency measures

Improving energy efficiency of the existing infrastructure is a prerequisite for an appropriate design of the new system. The project will fix water leaks and install water efficient appliances to reduce water usage, which in turn reduces the energy requirements for pumping water. Energy efficient lighting will be installed, and energy efficiency will be promoted to staff and students through awareness and behaviour change strategies to reduce existing energy consumption.



## Organisational Context

The project is implemented by Ministry of Environment, Climate Change, Disaster Management and Meteorology in cooperation with the Ministry of Mines, Energy and Rural Electrification, the Anglican Church of Melanesia, and Solomon Power.

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Images: Gavin Pereira/ GIZ

# PROJECT BRIEF

May 2018

## EU-GIZ ACSE

ADAPTING TO CLIMATE CHANGE AND SUSTAINABLE ENERGY



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## Solomon Islands: Increasing Capacity to Support Solar Electricity

### Background

The Solomon Islands are located in the South Pacific Ocean and have a population of approximately 516,000 spread over 350 populated islands. The country depends almost entirely on imported fossil fuels for electricity generation, and electricity prices are amongst the highest in the world. This creates significant barriers to economic growth.

The Solomon Islands receive an average daily insolation of 5kWh/m<sup>2</sup>, making solar power a feasible energy source. Solar energy systems continue to grow in popularity across the world and can generate electricity at much lower prices than the diesel-run generators used at present in the country.

The project will focus on the education sector with specific investment in the Solomon Islands National University (SINU) located in Honiara, Guadalcanal Province. The project outcomes will benefit all the people of the Solomon Islands.

### Project Objective

The project aims to increase the capacity and capability of the Solomon Islands labour market to design, install and maintain solar electric systems by December 2018. The project is aligned with the Solomon Islands National Energy Policy (2014) and will contribute towards achieving a target of 50% of electricity generation from renewable sources by 2020.

### Current situation

Approximately 16% of the population has access to grid-connected electricity. Most of the grid access is provided in Honiara and a small number of other population centres. The

### Project Summary

**Location:** Solomon Islands

**Objective:** To support the development of the solar energy industry through accredited training and licensing program

**Implementing Agency:** Ministry of Mines, Energy & Rural Electrification (MMERE), Solomon Islands Government

**Budget:** € 173,600

**Duration:** 2017—2018

majority of remote households relies on small-scale solar battery systems that power a small number of lights, or on kerosene lamps. Some sites use diesel generators, but fuel costs and the age of generators result in costly and unreliable electricity generation.

Solar power systems have a large role to play in lowering fossil fuel dependence for the existing grid, and for providing energy services to the country's large rural population. The comparable cost of solar generation with battery storage (US\$0.41/kWh) is now cheaper than diesel generation (US\$0.50/kWh). Small scale solar power systems have been used across the Solomon Islands to power remote schools and homes, but larger grid-connected and hybrid systems (solar with battery systems and diesel back-up) are being used to power larger sites. A one-megawatt grid-connected solar facility was recently constructed outside of Honiara to provide up to four percent of the country's electricity requirements.

One of the factors preventing the expansion of solar power systems in Solomon Islands is a trained and skilled work force. The absence of national training programs, or recognised qual-



ifications for solar technicians are preventing the growth of the solar market in tackling the country's electrification and electricity-cost problems.

## What Is EU-GIZ ACSE Doing?

The EU-GIZ ACSE programme helps the people of fifteen Pacific island countries to address two common challenges: adapting to climate change and reducing their dependence on fossil fuels.

GIZ is supporting the Government of Solomon Islands to increase its capacity to support the solar energy industry in the Solomon Islands. This will be achieved through:

### Development of a Diploma course in solar energy within the Solomon Islands

The project will develop and register the solar energy Diploma course through the Solomon Islands Qualification Framework. The course development will tie in regional best-practice and will be modelled on the requirements of Australia's Clean Energy Council's solar installer and designer accreditation program.

### Capacity development support to Solomon Islands National University (SINU)

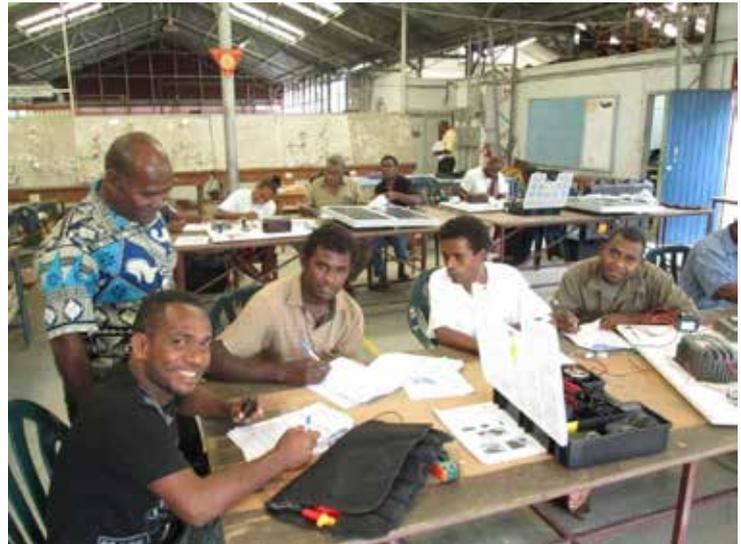
The project will support SINU to deliver the new solar energy Diploma by training instructors in course delivery and providing relevant equipment, which will allow SINU to conduct competency based skills training.

### Develop a Solar Installer Licensing Program with Solomon Islands Electricity Authority

Solomon Power regulates and manages the generation of electricity within Solomon Islands. The project will work with Solomon Power to create a formal licensing program for SINU solar energy Diploma graduates, which Solomon Power will administer.

Course graduates will obtain a license from Solomon Power that gives them legal right to install grid-connected solar energy systems. This creates a market value for the SINU diploma and provides assurances to private and public sector investors that the solar power systems are designed and installed to Internationally recognised standards.

All these actions will help ensure there is a sufficient supply of skilled solar technicians to maintain existing and future solar



assets so that the benefits of investments in solar energy are sustained.

## Organisational Context

The Ministry of Mines, Energy & Rural Electrification (MMERE), Solomon Islands Government is leading the project, which is implemented by the Solomon Islands National University and Solomon Power.

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# PROJECT BRIEF

May 2018

## EU-GIZ ACSE

ADAPTING TO CLIMATE CHANGE AND SUSTAINABLE ENERGY



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## Democratic Republic of Timor-Leste: Securing Clean Water for a Climate Resilient Future (SCWCRF) Project

### Background

The Republic Democratic of Timor-Leste (RDTL) is comprised of one main land area that lies on the eastern half of Timor Island. Timor Island is situated on the southernmost edge of the Indonesian archipelago of Nusatenggara, northwest of Australia. The total area of Timor-Leste is 14,874 km<sup>2</sup> (5,742 sq. mi.). It has mountainous terrain with tropical climate of hot, semi-arid, rainy and dry seasons. The total population of Timor Leste in 2015 was approximately 1.2 million.

In Timor-Leste more than half of the total rural population (57.1%) are accessing spring water to fulfil their daily drinking water needs due to the lack of other clean and safe water sources. The National Adaptation Program of Action (NAPA) found that many communities in Timor-Leste are vulnerable to climate change impact. The adverse effects include higher air and sea temperatures, increased wet season rainfall, decreased dry season rainfall, increased frequency of extremely hot and rainy days, increased sea-level rise, and increased ocean acidification. Most of these changes have already negatively impacted the availability of clean water in the country. The NAPA has identified water security as one of the main priority sectors for immediate action.

The three-community (sucu) water supply systems selected for the project are located on the coast in the northern lowlands, and in the northern slopes and northern highlands. Those three locations are under administration of Postu Vemasse, Municipiu Baucau. The communities are:

- Vemasse Tasi- population of 3,000 (650 households),

### Project Summary

**Location:** Postu Adimistrasion of Vemasse, Timor-Leste

**Objective:** To assist national and local authorities, water management groups and water users in vulnerable communities in Timor-Leste to achieve sustainable access to clean water taking into account projected climate change impacts.

**Implementing Agency:** National Directorate for Climate Change

**Budget:** € 465,372

**Duration:** 2017—2019

- Sucos Ostiko - population 1,723 (313 households), and
- Uatolari - population 1,234 (276 households)

The three sites were selected based on a number of criteria's, including agro-climatic zone, poor water security, low yields from the natural aquifers, opportunity to maximise water availability through development of untapped natural springs, and potential to benefit schools and neighbouring communities.

### Project Objective

The overall objective of the project is **to assist national and local authorities, water management groups and water users to achieve sustainable access to clean water** taking into account projected climate change impacts. The proposed solutions focuses on the enabling environment such as national and local legislation, and awareness-raising as well as repair, upgrade and construction of water supply infrastructure.

## Current situation

Analysis has shown that low rainfall is one of the factors contributing to the low availability of water in these Sucos. In addition, the water bores drilled to access the natural aquifers have proven to yield a limited supply of water.

The lack of access to clean water was a common findings from participatory stakeholder consultations conducted. Access to clean water is predicted to deteriorate with projected climate change impacts. The consultations have also identified that the lack of access to clean water has resulted in increased incidence of diarrhoea, typhoid, cholera and skin diseases.

## What Is EU-GIZ ACSE Doing?

The EU-GIZ ACSE programme helps the people of fifteen Pacific island countries address two common challenges: adapting to climate change and reducing their dependence on fossil fuels.

The project is supporting the Government of Timor-Leste to improve three community water supply systems, increase water conservation awareness, including financial and management skills, and improve capacity to mainstream climate change consideration to achieve water security for 3 local communities within the Vemasse Administration.

This project outcomes will be achieved through the following 4 complementary components:

### Component 1. Improve access to clean water for 3 local communities in Vemasse administration

Repair of existing water supply systems, construct a new 40,000L water reservoir, install a rainwater harvesting system at the school in Vemassi Tasi and provision of a new water supply to the communities in Betulale subvillage.

In Ostico and Uatolari, two spring water intakes will be constructed along with a pumping system connected to four water storage tanks (35,000L).

The project will protect spring water sources in Ostico and Uatolari villages through vetiver grass and tree planting.

### Component 2. Increased awareness of the importance of water conservation techniques in the face of projected longer dry seasons

Tailored interactive workshops combined with posters and brochures will promote water security as a means of adapting to climate change. Communities will be encouraged to identify pos-

sible solutions which will be documented in their Village Development Plans.

### Component 3. Improved financial and management skills of local Water Management Committees (GMF – Grupu Maneja Facilidade)

The project will undertake training for the GMF to improve the capacity of the GMF members to manage water tariffs in a transparent and accountable manner. Technical training on the operation and maintenance of the water supply infrastructure will also be delivered.

### Component 4. Increased knowledge and capacity to mainstream climate change considerations in efforts to achieve water security.

To promote learning and sharing, a Best Practice Handbook and Case Study Report will be developed, documenting how target households became more resilient and water secure by implementing climate change adaptation measures.

## Organisational Context

The Ministry of Finance is leading the project, which is implemented by the National Directorate for Climate Change in close partnership with National Directorate for Water Supply and National Directorate for Water Resources Management.

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Images: Clinton Chapman/ GIZ

# PROJECT BRIEF

May 2018

## EU-GIZ ACSE ADAPTING TO CLIMATE CHANGE AND SUSTAINABLE ENERGY



## Democratic Republic of Timor-Leste: Integrated Action for Resilience and Adaptation (IA4RA) to climate change in the Raumoco Watershed Project

### Background

The Democratic Republic of Timor-Leste is a sovereign state in Southeast Asia occupying half the island of Timor and the nearby islands of Atauro and Jaco. Timor-Leste is vulnerable to droughts, floods, landslides and soil erosion resulting from a combination of heavy monsoon rain, steep topography and widespread deforestation. The increasing impact of these disasters has contributed to low cereal yields and overall food insecurity. More extreme El Niño and La Niña phenomena, which are associated to climate change, are expected to become more frequent and result in serious disasters and consequent damage to the socio-economic sectors of the country.

The project seeks to assist vulnerable households in the Raumoco Watershed, located in the western part of the Lautem Municipality, the eastern-most municipality of Timor-Leste. A total of 500 households from 12 aldeia (sub-villages) of six suco (villages) under two Postu Administrativu of Lautem and Luro of Lautem municipality have been selected to participate in this project. These sites were selected based on a number of criteria including geographic location (inside Raumoco watershed), exposure to climate risks and natural disasters, and prevalence of subsistence agriculture among community members.

### Project Objective

This project will **contribute to the sustained adoption and scaling out of sustainable food, water and energy efficient technologies in the Raumoco Watershed**. This will increase the resilience against the adverse impact of climate change and variability for the target 500 vulnerable households.

### Project Summary

**Location:** Raumoco Watershed, Municipality of Lautem, Democratic Republic of Timor-Leste

**Objective:** To contribute to the sustained adoption and scaling out of sustainable food, water and energy-efficient technologies for 500 vulnerable households in six villages in the Raumoco watershed

**Implementing Agency:** Ministry of Agriculture and Fisheries (MAF) and Hivos Stichting, Dili

**Budget:** € 492,168; co-financed by HIVOS Stichting € 24,700

**Duration:** 2016—2018

### Current situation

The focal problem that the Integrated Action for Resilience and Adaptation (IA4RA) seeks to address is the high levels of vulnerability to climate variability and change by households, communities and the Raumoco watershed as shown by:

- Low crop yields and low household income contributing to food insecurity,
- Destructive farming practices (slash and burn agriculture),
- Soil compaction, run off/erosion which exacerbates flooding,
- Water shortages resulting in farmers not planting rice,
- Use of wood fueled stoves for cooking, contributing to deforestation, and further causing indoor air pollution,
- Lack of education about climate change impacts and adaptation responses, and

- Inappropriate land use through the planting of teak along steep slopes also contributes to forest degradation.



## What Is EU-GIZ ACSE Doing?

The EU-GIZ ACSE programme helps the people of fifteen Pacific island countries address two common challenges: adapting to climate change and reducing their dependence on fossil fuels.

The project is supporting the Government of Timor Leste to help the communities in the Raumoco Watershed to increase their resilience by scaling out sustainable food, water and energy efficient technologies. This will be achieved, through:

### 1. Increased adoption of climate-resilient and sustainable food production systems by 350 vulnerable households in six villages:

Sustainable, low-carbon food production technologies will be implemented by vulnerable farming households,

15 households use of solar-powered drip irrigation systems for cash crop production, and

Lead Farmers trial diversified crop production and low-carbon, agro-ecological farming technologies to identify cropping systems that are a) appropriate to a specific farming ecosystem in the Watershed, b) contribute to soil, water and nutrient enhancement, c) promote drought-resistance and flood-tolerance.

### 2. Increased adoption of water and energy-efficient technologies for vegetable/cash crop production and cooking by 400 vulnerable households in six villages

Low-cost rainwater drip irrigation systems implemented by vulnerable groups of women, men and young people. Includes construction of 12 ferro-cement tanks (10,000 L),

Fuelwood tree species (*G. sepium* or Gamal) planting established, as living fence, contour hedgerows and windbreaks for farmlands under cultivation, and

400 improved cooking stoves (ICS) distributed to vulnerable women, men and young people. The main recipients of this trial are women who are mainly responsible for cooking the family meal.

### 3. Increased involvement of 150 young people in climate-resilient and sustainable livelihood systems

Experiences and lessons learned on climate-change adaptation actions will be documented and shared with a larger stakeholder base.



## Organisational Context

The General Directorate for Forestry, Coffee and Industrial Plantation is leading the project, through its National Directorate for Forestry and Watersheds. This project has been contracted to Hivos, an international humanist organization in the Netherlands, through its regional office for Southeast Asia in Jakarta, Indonesia. The IA4RA is implemented in the field in close collaboration with the Raumoco Watershed Management Council and local authorities of Lautem municipality.

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Images: Clinton Chapman/ GIZ and Raul de la Rosa of Hivos

# PROJECT BRIEF

May 2018

## EU-GIZ ACSE

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## Kingdom of Tonga: Climate Finance and JNAP II

### Background

The Kingdom of Tonga is a large tropical archipelago of 169 islands spread over 700,000 square kilometres of the western South Pacific Ocean. Tonga is vulnerable to natural disasters such as tropical cyclones. Climate change impacts in Tonga will result in more extreme cyclone events, less dry season rainfall causing more extreme drought, and increased wet season rainfall resulting in increased erosion and flooding. Rising sea levels also pose a threat to people and buildings located in low lying coastal areas.

Tonga needs robust policies, frameworks to plan for and adapt to climate change and disaster risks. A sustainable source of funding is also needed to ensure that plans are adequately resourced to support their implementation.

This project will target its efforts at improving governance and capacity at the national government level. People from all of Tonga's key island groups will benefit from the outcomes achieved by this project.

### Project Objective

The project will improve governance for the effective management, coordination, implementation and financing of climate change adaptation and disaster risk reduction initiatives in Tonga. The project is aligned to the Tonga Strategic Development Framework, the Tonga Climate Change Policy, and the Tonga National Climate Change Fund Act (2014).

### Project Summary

**Location:** Tonga

**Objective:** To improve governance of climate change adaptation and disaster risk reduction initiatives in Tonga

**Implementing Agency:** Ministry of Environment, Energy, Climate Change, Disaster Management, Information and Communications (MEIDECC)

**Budget:** € 85,340

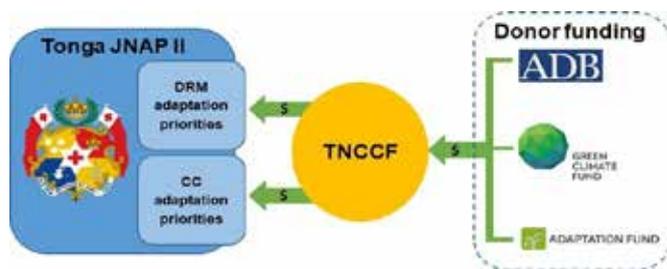
**Duration:** 2017—2018

### Current situation

In 2010 the Government of Tonga developed its first Joint National Action Plan (JNAP I) on Climate Change Adaptation and Disaster Risk Management (2010-2015). Tonga was the first Pacific Small Island State to develop a JNAP. The JNAP has been used to guide all climate change (CC) and disaster risk management (DRM) related activities in Tonga.

The Ministry of Environment, Energy, Climate Change, Disaster Management, Information and Communications (MEIDECC), as lead agency for developing the JNAP, was active in applying JNAP principles and practices. Beyond MEIDECC however, there was limited 'mainstreaming' of CC and DRM considerations across other sectors and Ministries.

MEIDECC has recognised these limitations and is using the development of JNAP II to build on the JNAP I to provide a



Source: PREA ([www.prea.com.au](http://www.prea.com.au))

more integrated and useful framework and action plan for coordination, collaboration and action.

To support the implementation of the JNAP, Tonga began work on a Tonga Climate Change Trust Fund (TNCCF) in 2011. The TNCCF was an important component of the Asian Development Bank (ADB) - funded Climate Resilience Sector Project (CRSP), which targeted the achievement of specific sector goals for community resilience prioritised under Tonga’s JNAP I.

In 2013, cabinet ministers approved recommendations for the TNCCF and endorsed the further development of a TNCCF Bill.

The Government finally launched the TNCCF in February 2017. ADB has committed USD 5 million seed funding from which the government hopes to leverage further donor investments to establish a more reliable funding base for climate change adaptation activities. The TNCCF is now at a stage where robust effective and efficient operational procedures are needed to govern the fund.

## What Is EU-GIZ ACSE Doing?

The EU-GIZ ACSE programme helps people in 15 Pacific Island countries address two common challenges: adapting to climate change and reducing their dependence on fossil fuels.

In Tonga, the programme has two focal areas:

### Component 1. Develop JNAP II

JNAP II consultations have already been completed resulting in an initial draft JNAP II being produced. The Government is in the process of endorsing the final plan, and the EU-GIZ ACSE team is planning ‘road shows’ to explain the plan, and its relevance, to the people of Tonga before the plan is finalised.

### Component 2. Finalise the operational mechanisms of the TNCCF

EU-GIZ ACSE is resourcing a climate finance specialist to work with the Tongan project team to review the operational procedures for the TNCCF and to prepare a Mobilisation Plan to enable the funding of climate change adaptation activities from the fund. This includes measures that will enhance the readiness of the Government of Tonga to access and sustainably manage the TNCCF. Lessons from establishing the TNCCF will be relevant for other Pacific nations that follow Tonga’s lead to create CC trust funds.

## Organisational Context

The Climate Change Division within the Ministry of Environment, Energy, Climate Change, Disaster Management, Information and Communications (MEIDECC) is leading the implementation of the project in partnership with the Ministry of Finance and National Planning (MFNP).

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# PROJECT BRIEF

May 2018

## EU-GIZ ACSE

### ADAPTING TO CLIMATE CHANGE AND SUSTAINABLE ENERGY



PACIFIC ISLANDS  
FORUM SECRETARIAT



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## Kingdom of Tonga: Coastal Protection Trials in Western Tongatapu

### Background

The Kingdom of Tonga is a large tropical archipelago of 169 islands spread over 700,000 square kilometres of the western South Pacific Ocean. Tonga lies just west of the International Date Line, directly south of Samoa and north of New Zealand. Tongatapu is the main island and population centre.

Most of the population live in low-lying areas. In Western Tongatapu, parts of the communities lay less than two metres above sea level rendering properties vulnerable to flooding and coastal erosion caused by sea level rise, storm surge, heavy rain and catastrophic events such as tsunamis and cyclones. Households in this district tend to be of low economic means and tend to have limited ability to adapt or relocate.

### Project Objective

This project will **trial the effectiveness of selected coastal protection measures** in Western Tongatapu, Tonga. The project is aligned with Tonga's Joint National Action Plan for Climate Change Adaptation and Disaster Risk Management (2010-2015) and the Drought Response Plan. It also contributes to achieving the vision set out in Tonga's Strategic Development Framework (2011-2015).

### Current situation

Low-lying lands in some villages of western Tongatapu have been sub-divided for housing. Roads have also been built in these areas and mangroves cleared for firewood and cropping (now failed), unnecessarily exposing villagers further to storm surge impacts.

### Project Summary

**Location:** Western Tongatapu, Tonga

**Objective:** Trial the effectiveness of selected coastal protection measures

**Implementing Agency:** Ministry of Environment, Energy, Climate Change, Disaster Management, Information and Communications (MEIDECC)

**Budget:** € 530,000

**Duration:** 2016—2018

The construction of a road through Western Tongatapu, without including culverts or land reformation to allow for runoff after rain, exacerbates flooding in some properties, particularly those built in swales (low areas between hills). An inadequate seawall previously constructed adjacent to the community of A'hau offers only limited protection to low-lying properties against the threat of saltwater inundation.

Detailed household surveys carried out for this project reveal that impacts are highly varied depending on location. Major losses of mangrove forests in front of some villages, such as Kolovai and A'hau, have increased the exposure of households to flooding caused by storm surge.

The Government is now looking to rectify the situation. It is using the EU-GIZ ACSE project to implement practical measures to protect households from flooding and foster understanding and stewardship for the Hihifo coastline within the local community.



## What Is EU-GIZ ACSE Doing?

The EU-GIZ ACSE programme helps people in 15 Pacific Island countries address two common challenges: adapting to climate change and reducing their dependence on fossil fuels.

GIZ is supporting the Government of Tonga and its dedicated project team to implement coastal protection trials in selected areas of Western Tongatapu. The team is working in close partnership with the people of the Hihifo District.

Key results from this work include:

1. Refurbishment and/or construction of coastal protection measures such as barriers, drainage systems and mangrove forests at high priority locations;
2. Establishment of the basis for a national shoreline monitoring system for Tonga focusing on awareness raising and training of government technicians and key community members;
3. Completion of education and awareness actions to improve community knowledge of, and empowerment towards addressing coastal hazards, working closely with the six participating villages, local schools and youth groups; and,
4. Strengthened partnerships between government and communities to address coastal hazards in ways that are effective including the formation of a Hihifo District coastal committee and delivery of joint actions such as the planting, monitoring and protecting mangroves at important locations.

## Organisational Context

The Climate Change Division within the Ministry of Environment, Energy, Climate Change, Disaster Management, Information and Communications (MEIDECC) is leading the implementation of the project in partnership with the newly formed Hihifo Coastal Committee and the good people of the six-targeted villages.

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ADAPTING TO CLIMATE CHANGE AND SUSTAINABLE ENERGY



PACIFIC ISLANDS  
FORUM SECRETARIAT



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## Tuvalu: Community Based Biogas Systems for Domestic Energy and Improved Livelihoods

### Background

Tuvalu is a Polynesian island nation located in the southern Pacific Ocean, midway between Hawaii and Australia. It consists of six atolls and three reef islands. Its population is estimated at about 11,000, half of which reside on Funafuti. The nation is highly dependent on imported fossil fuels diesel and oil for its energy needs. On average, 83% of its total primary energy consumption is supplied by fossil fuels. Fuel costs are very high and are exacerbated by Tuvalu's geographical isolation. Biomass, including the burning of wood for cooking, makes up around 60% of domestic energy use on Funafuti and up to 90% on the outer islands. Tuvalu's environment is under pressure from climate change impacts including rising sea levels and drought which both impact the nation's food and energy security.

Considering that Nanumea and Nanumaga islands already have biogas digester systems installed, the Tuvalu Government selected target locations for this project on the other seven islands to ensure resources were fairly distributed to rural communities with low income: Funafuti (the main island, and capital of Tuvalu), Niulakita, Niutao, Nui, Nukufetau, Nukulaelae, Vaitupu (including the Motufoua Secondary School).

Criteria for selection of individual households that will benefit from the project have been developed and include factors such as their existing access to basic energy services and income status.

The project is aligned with the National Energy Policy and will contribute to Tuvalu's efforts to be 100% renewable by 2020; and is also closely aligned to National Strategy for Sustainable Development and the 'Malefatunga Declaration', where Tuvalu shall attain a prosperous living standard via the provision of

### Project Summary

**Location:** Funafuti, Vaitupu, Niutao, Nui, Nukufetau, Nukulaelae and Niulakita

**Objective:** To strengthen the capacity of Tuvalu's island and rural communities to adapt to the adverse effects of climate change through the use of appropriate biogas technologies

**Implementing Agency:** The Pacific Community (SPC) and Ministry of Public Utilities and Infrastructure, Department of Energy

**Budget:** € 383,124

**Duration:** 2016—2018

“socially, financially, economically, technically, politically and environmentally sustainable energy systems”.

### Project Objective

The project will improve sustainable livelihoods in the outer island communities of Tuvalu through achieving the following outcomes:

- Improved outer island energy security,
- Improved outer island food security,
- Reduced problems caused by organic waste disposal, and
- Enhance take-up of biogas technologies nationally and across the region.

## Current situation

Tuvalu's outer islands experience very low levels of energy security. The electricity supply is intermittent, expensive and unreliable, and supply often fails to meet demand. Diesel generators are the primary source of electricity, supplemented by some small-scale solar. The high costs and sometimes limited availability of LPG (cooking gas) and kerosene lead to biomass, particularly wood, being used as an alternative energy source for cooking.

The extensive use of mangroves and other tree species as fuelwood for cooking has led to environmental damage and a scarcity of trees. Additionally, the smoke created from burning firewood and kerosene is a health hazard which negatively impacts on the respiratory system.

The small-scale raising of pigs is a common practice in Tuvalu. Current pig housing and farming practices result in poor animal waste management, leading to contamination of lagoon water and the fresh water lens. This water contamination creates health and sanitation issues that impact upon the local environment and population. Opportunities exist to capture and transform pig waste into biogas and soil enriching products.

## What Is EU-GIZ ACSE Doing?

The EU-GIZ ACSE programme helps the people of fifteen Pacific island countries address two common challenges: adapting to climate change and reducing their dependence on fossil fuels.

The project is supporting the Government of Tuvalu to use biogas digesters that utilise pig waste and generate methane gas that can be used for cooking, and fertiliser that can help enrich the soil. Key results of this work include:

### Install 40 small-scale biogas digesters

The digesters will supply households with free methane gas as a fuel substitute for firewood, kerosene and LPG used in domestic cooking. This will reduce energy costs, reduce energy poverty and improve energy security. The substitution to methane gas as a cooking fuel reduces the burden on women by decreasing the need to collect firewood. The burning of methane instead of firewood also reduces exposure to damaging indoor smoke.

### Document and share information about biogas digesters

The project will develop a Biogas Toolkit and Biogas Best Practices report to facilitate the expansion of biogas digester rollout in Tuvalu and the broader Pacific region.

## Monitor methane production

The project will measure the effectiveness of the biogas digesters by monitoring how much methane gas they produce for use as an alternative fuel source in the local Tuvalu context.

The complementary EU funded Pacific Technical and Vocational Education and Training in Sustainable Energy and Climate Change Adaptation (PacTVET) project is developing biogas technician courses to help support the broader adoption and maintenance of biogas systems in Tuvalu.

## Organisational Context

The Ministry of Public Utilities and Infrastructure, Department of Energy is leading the project, which is implemented by The Pacific Community (SPC) in close partnership with Ministry of Finance, Ministry of Home Affairs, Department of Rural Development, Department of Agriculture, Department of Education, Department of Environment and the Island Councils (Kaupule).

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# PROJECT BRIEF

May 2018

## EU-GIZ ACSE

ADAPTING TO CLIMATE CHANGE AND SUSTAINABLE ENERGY



PACIFIC ISLANDS  
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## Vanuatu: Solar and Biogas based Rural Electrification with the implementation of a sector-specific Climate Early Warning System

### Background

The Republic of Vanuatu is an archipelagic nation of 83 islands in the south Pacific, 65 of which are inhabited. Vanuatu, with a population of 287,000, is included in the UN list of Least Developed Countries (LDCs).

Similar to other Pacific Island States, Vanuatu has no fossil fuel resources and thus has to import all fuel for transport and stationary use. Eighty percent of electricity is generated from imported diesel fuel and seventy percent of Vanuatu's population lack access to electricity services.

Climate-linked risks (such as cyclones, floods and droughts) pose increasing disaster response and energy planning challenges for Vanuatu, as it activates its National Energy Roadmap (NERM) plans that seek to achieve 65% Renewable Energy (RE) generation by 2020.

The project addresses the challenges of remote renewable electricity generation in the coastal community of Waisisi in Tanna. It will also address the supply of affordable and clean cooking fuel at two boarding schools: Onesua Presbyterian College (Efate) and Vanuatu Agricultural College (Santo); and through the installation of Automatic Weather Stations (AWS) as part of the Climate Early Warning System (CLEWS) component, the project will address the need to provide real time information available to the public on climate change events and risk factors.

### Project Summary

**Location:** Tanna, Santo and Efate Islands, Vanuatu

**Objective:** To contribute towards improved access to sustainable energy and reduced vulnerability to climate change through enhanced energy security and strengthened adaptive capacity

**Implementing Agency:** Ministry for Climate Change Adaptation, Meteorology, Geo-Hazards, Environment, Energy and Disaster Management

**Budget:** € 734,425

**Duration:** 2017-2018

### Project Objective

The project will contribute towards improved access to sustainable energy and reduced vulnerability to climate change through enhanced energy security and strengthened adaptive capacity.

### Current situation

The coastal community of Waisisi in Tanna is heavily dependent upon fishing for income generation. The community faces challenges in accessing markets and supplying quality produce because they do not have access to electricity for refrigeration.

The Onesua Presbyterian College (Efate) and Vanuatu Agricultural College (Santo) boarding schools each cater meals for around 400 people, which comes with a high Liquid Petroleum Gas (LPG) cost for cooking.

Vanuatu's dependence on fossil fuels is responsible for high energy costs across the country. The Vanuatu Department of Energy is tasked with achieving the nation's 65% RE target by 2020. Threats from natural disasters and climate-linked risks (cyclones, floods and droughts) constrains energy planning and has added new 'disaster response' requirements to the energy sector.

## What Is EU-GIZ ACSE Doing?

The EU-GIZ ACSE programme helps people in 15 Pacific Island countries address two common challenges: adapting to climate change and reducing their dependence on fossil fuels.

GIZ is supporting the Government of Vanuatu to improve energy access to rural communities and strengthen national energy planning and help the energy sector in disaster response. This will be achieved through completion of the following project components.

### Component 1. Increase Access to Sustainable Energy for Cooking and Thermal Energy Requirements

This component addresses the need for Vanuatu rural communities to find renewable energy alternatives to cooking and thermal energy needs. Biogas digesters will be installed in two boarding schools, which will showcase the ability of biogas digesters to convert agricultural wastes into cooking gas. Approximately 80% of Vanuatu's population lives rurally, and follow subsistence-agriculture based livelihoods. Biogas digesters can help reduce the fuel costs for rural people.

### Component 2. Increase Rural Access to Sustainable Energy for Electrification

This component addresses rural electrification needs of Vanuatu. It works directly with the fishing community of Waisisi to provide a solar-powered fish processing and storage facility. The facility features solar freezers and will help the community keep their fish fresh and improve the quality of the produce that reaches the market. The project will also provide a basic solar power system for the community primary school.

### Component 3. Improve Preparedness and Responses of Energy Stakeholders to Climate Linked Risks and Vulnerability

New Automated Weather Stations (AWS) will provide data for three Climate Early Warning Systems across Efate and Santo. The systems will provide vital weather data to assist the energy sec-



tor in planning and forecasting in order to meet energy targets as well as in deploying disaster management responses.

## Organisational Context

The Ministry for Climate Change Adaptation, Meteorology, Geo-Hazards, Environment, Energy and Disaster Management is leading the project with implementation support from the Ministry of Fisheries and Agriculture.

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# PROJECT BRIEF

May 2018

## EU-GIZ ACSE ADAPTING TO CLIMATE CHANGE AND SUSTAINABLE ENERGY



## Vanuatu: Improving small-scale community-based freshwater aquaculture and governance

### Background

The Republic of Vanuatu is an archipelagic nation of 83 islands in the south Pacific, 65 of which are inhabited. Vanuatu's society, environment and economy remain highly vulnerable to climate change and disaster risks. Because of the rugged and mountainous terrain, most of the population lives on the narrow coastal strip of the islands. Approximately 80 percent of the total 236,000 population live in rural areas and live a mostly subsistence lifestyle. In recent years, tourism has developed, enhancing the economic development of Vanuatu. Most Ni-Vanuatu however, still rely heavily on agriculture, forestry and fisheries for food staples and household income.

The predicted effects of climate change are likely to disproportionately affect people living a subsistence lifestyle.

This project is trialling aquaculture production at three sites on Vanuatu's main island of Efate. The sites are Mangaliliu, on Efate's west coast, Eton, on the east coast and the government-run Tabage Freshwater Aquaculture Centre (TFAC) found at the northern end of the country's capital city, Port Vila. These sites were selected for their accessibility: To enable cost-effective monitoring of project results and to make it easier to bring people together to learn and share knowledge about aquaculture practices.

### Project Objective

This project aims to improve small-scale, community-based freshwater aquaculture and governance through trialling economically and environmentally sustainable community-based aquaculture models. Successes are integrated into a robust

### Project Summary

**Location:** Efate, Vanuatu

**Objective:** Improving small-scale community-based freshwater aquaculture and governance in Vanuatu

**Implementing Agency:** Ministry of Climate Change and Natural Hazards in partnership with the Vanuatu Ministry of Agriculture, Livestock, Forestry, Fisheries and Bio-security and Queensland University of Technology (QUT), Australia.

**Budget:** € 254,000

**Duration:** 2017—2018

national aquaculture governance system and advance the performance of TFAC. The project designs specific strategies to advance the development of tilapia aquaculture in Vanuatu. The project is aligned with the Government of Vanuatu's policy direction "Priority and Action Agenda" (PAA). The project also actions the Government's National Sustainable Development Plan and National Climate Change Policy. These aim to build food security and resilience, in part, by helping Ni-Vanuatu people develop economically sustainable activities.

### Current situation

Over exploitation of Vanuatu's coastal fishery resources for food and income has led to concerns about food security and possible long term impacts on the productivity and health of coral reef and wild fisheries and ecosystems. Climate change-related coral bleaching, ocean acidification and increasing sea temperatures compound the challenges.

This phenomenon now affects many coastal fisheries in Vanuatu, with severe consequences in terms of resource unsustainability and food insecurity. According to reports, Vanuatu's population will continue to rise and place unsustainable demands on wild fisheries resources. Freshwater aquaculture could respond to the ever-increasing demand for fish for human consumption and income in Vanuatu. Freshwater aquaculture offers an additional means to improve food security, to help meet protein requirements, and improve economic development of local people.

At present, one privately-operated commercial tilapia cage culture farm imports tilapia fry, and grows these out to eating size. There are also many small, family-operated fish farms of varying sizes. The semi-commercial sector however, has yet to develop. The lack of quality fish fingerlings, high cost of imported feeds, complexity of establishing and operating semi-commercial farms, lack of skills and training for locals, and the need for closer relationships between government and farmers, remain significant challenges.

The Government of Vanuatu recently established TFAC along with a smaller aquaculture facility on the northern island of Espiritu Santo. These facilities maintain broodstock, supply tilapia fingerling to farms, promote and regulate aquaculture development and support skills development of fish farmers. These services are still in their infancy however, and much development is still needed. The hatcheries need further infrastructure upgrades and further training of aquaculture technicians in hatchery procedures and farmer extension services. Farmers themselves need training in pond establishment and maintenance, aquaculture operations, marketing and sales.

## What Is EU-GIZ ACSE Doing?

The EU-GIZ ACSE programme helps people in fifteen Pacific Island countries address two common challenges: Adapting to climate change and reducing their dependence on fossil fuels.

GIZ is supporting the Government of Vanuatu and Queensland University of Technology (QUT) to trial cost-effective ways of operating semi-commercial tilapia farms, including designing ponds, procuring equipment, establishing security and operational procedures and marketing and selling of fish. The project is also introducing concepts such as gender equality, farm planning and biosecurity.

The project is upgrading facilities at TFAC, training staff in hatchery techniques and is upgrading hatchery operational procedures. The project is testing affordable, farm-made feeds as al-



ternatives to imported feeds, and is identifying a robust strain of tilapia suitable for commercial production.

At a policy level, the project is reviewing the Vanuatu Aquaculture Development Plan 2008-2013, integrating past learnings and new approaches, including biosecurity and women's participation, as progressive and necessary innovations.

## Organisational Context

The Ministry of Climate Change and Natural Hazards (MCCNH) leads the project in partnership with Vanuatu Department of Fisheries (VDF) within the Ministry of Agriculture, Livestock, Forestry, Fisheries and Bio-security (MALFF). Queensland University of Technology (QUT), Australia is the project implementing partner.

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## Gender-sensitive Approaches in EU-GIZ ACSE

### Introduction

**Gender** refers to the social, behavioural, and cultural attributes, expectations, and norms associated with being male or female.

**Gender equality** is founded on the concept that all humans are free to develop their personal abilities and make choices without being limited by stereotypical, prejudiced and rigid gender roles. There should be no discrimination on the grounds of gender in the allocation of resources or benefits, or in the provision of access to and use of services.

Project activities are **gender-sensitive** when they recognise, and raise awareness and consideration of the different needs and constraints of individuals based on their gender. **Gender-responsive** activities seek to include remedial action beyond creating gender awareness, and to achieve equal project benefits to all social groups.

This fact sheet explores gender-sensitive and gender-responsive approaches and activities applied in EU-GIZ ACSE projects on the ground.

### A Gender-oriented Approach

In the planning phase, EU-GIZ ACSE projects engaged with a broad number of stakeholders. In many cases, separate community consultation sessions were held with women, elderly and youth. The feedback from these consultations contributed to the design and implementation of the projects. To further

strengthen the gender perspective, specific projects added gender analyses as an activity to their workplans.

### Specific Gender-sensitive Interventions

The 22 EU-GIZ ACSE projects work in a broad range of scenarios and contexts. They are implementing gender-sensitive interventions such as

- Providing improved and secure access to resources for all (electricity, water, agricultural infrastructure, stoves)
- Including the participation of men, women and youth
  - in project-related leadership committees and livelihood activities.
  - in project-related decision-making, design and implementation.
  - in training sessions and educational workshops.
  - in local development plans and policies.

### Common Challenges

The most common challenges that emerge when implementing gender-oriented approaches are:

- Including relevant results from consultations in designs and operational realisation of construction measures.
- Lack of awareness, personnel capacity and scope to carry gender-oriented activities forward.
- Remote locations of project sites may impede approaches for participatory gender action and monitoring.

### KEY MESSAGES

- EU-GIZ ACSE has employed a gender-oriented approach in the planning of all projects
- Gender-sensitive consultations are a best practice to ensure needs of both, women and men, are taken into account
- Additional gender-sensitive approaches are used for specific project goals
- Results from consultations must be included in the realisation of project activities and construction measures

## Papua New Guinea: Integrated Water and Sustainable Energy (IWASE) Project

- Provision of improved and secure access to water through more secure public water collection points.
- Participation of women in community education and awareness training on water and energy conservation.
- Inclusion and involvement of women in management committees, and the design and construction stages of the project.
- Training of women in the operation and maintenance of the renewable energy systems that will be installed.



## Fiji: Sustainable Energy Hybrid Power Project (FSEHPP)

- Conducting feasibility studies and consultations with all groups in the society, including women.
- Consultation of women regarding the design of the energy grids.
- Training of women as solar technicians and inclusion in the committees to manage the solar hybrid systems.

## Vanuatu: Freshwater Aquaculture Trials and Governance Project

- Including the Ministry of Women in the project as a stakeholder.
- Allocating 50% of the trial farms to Women's Groups.
- Involving women in extension work.
- Reviewing the Aquaculture Development Plan of Vanuatu, with emphasis on the inclusion of women in the industry.



## Timor-Leste: Integrated Action for Resilience and Adaptation (IA4RA) to Climate Change in Raumoco Watershed

- Encouraging equal participation of men and women in project activities including:
  - Adopting climate resilient food systems, and water and energy efficient technologies
  - Community driven vulnerability evaluations, and climate field school training.

## Useful Resources

- Pacific Gender and Climate Change Toolkit: <https://www.pacificclimatechange.net/document/pacific-gender-climate-change-toolkit-complete-toolkit>
- Toolkit to Mainstream Gender into Energy & Climate Change Community based Adaptation Projects in the Pacific: <http://comm.gendercc.net/mod/resource/view.php?id=204>
- Pacific Adaptation to Climate Change Experiences: Gender and climate change adaptation: <https://www.sprep.org/pacc/experiences/gender>
- Global Gender and Climate Alliance: <http://gender-climate.org>
- Gender and sustainable energy guide: <http://www.undp.org/content/undp/en/home/>

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