Project End Technical Report
EU-GIZ ACSE – Sustainable Energy Hybrid Power Project
Fiji
FA No: 81202106
PN 16.2129.1-008.00

Budget: €720,000

Date: 30th October 2020

Nakoro Village (Left) and Yasawa High School (Right)

October 2020

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Introduction

This report is the final report for the project 'Sustainable Energy Hybrid Power Project, Fiji – *81202106',* implemented in Fiji*,* and funded by the European Union (EU) under the EU-GIZ Adapting to Climate Change and Sustainable Energy (ACSE) Programme. The reporting period covered is **22nd June 2016 to 30th September 2020.**

The report is structured to align to the GIZ "Capacity Works" Development Model and its five Success Factors for capacity development.

These Success Factors as applied under EU-GIZ ACSE are:

- **Strategy:** Summary of project context, objectives, planned activities and outcomes – As embodied in the Project Design Document (PDDs); *(where applicable: Results model; Capacity Development strategy; major variations)*
- **Cooperation systems:** Key, primary and secondary actors;
- **Steering:** Stakeholder participation in implementing and steering the project; attaining project results based on operational planning and monitoring;
- **Learning and Innovation:** Evaluations, knowledge attainment, distillation and sharing of knowledge at programme and project level.

1. Strategy

Table 1: Summary of project start up documents

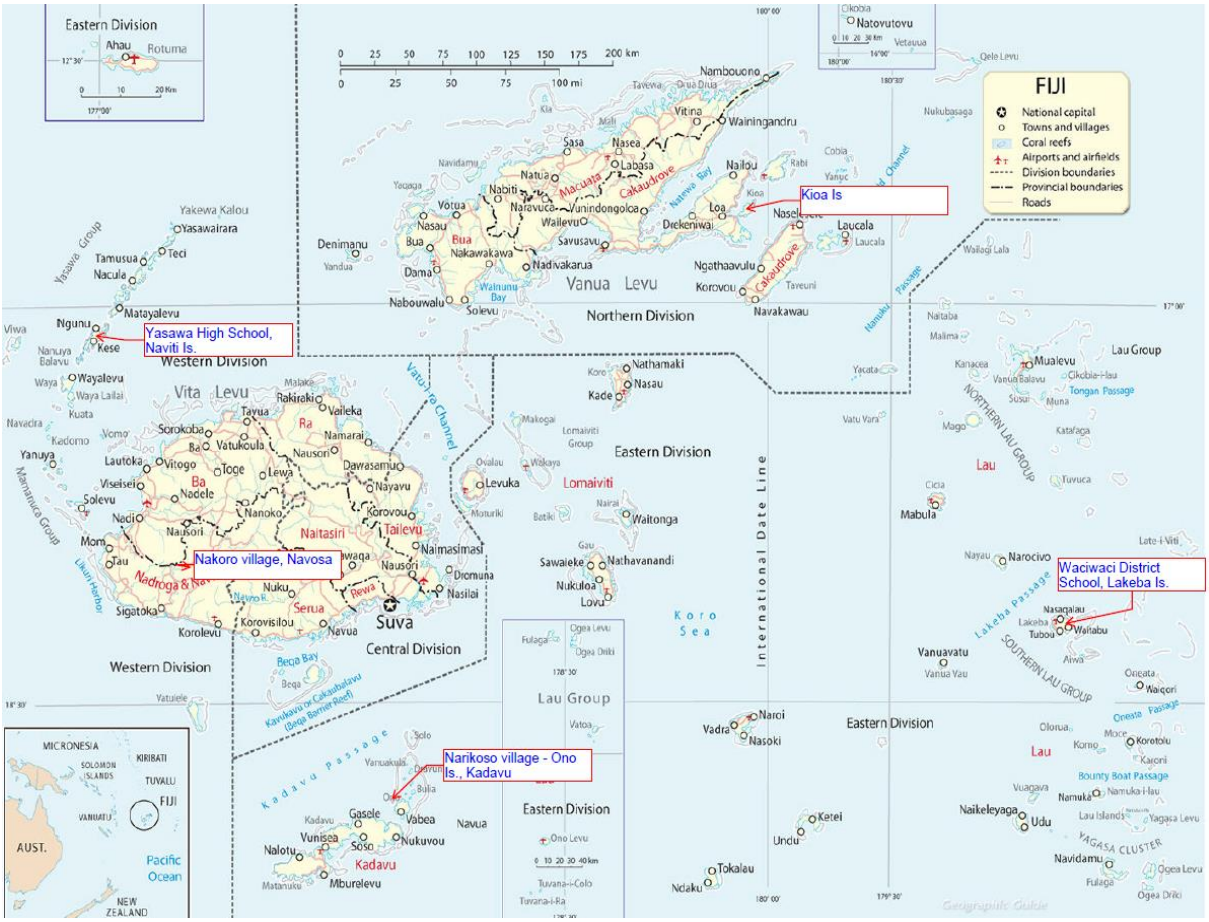
Annex	Project Start Up and Management
1	140730_FJ3 Concept Note
2	140826_FJ3_Concept Note Evaluation
3	150401_GIZ CCCPIR_+Fiji-MoU
4	150401_GIZ CCCPIR +Fiji-MoU-Addendum
5	160622_FJ3_Project Design Document-FA81202106
6	160622_FJ3-FA81202106_EngVersion
7	160622_FJ3-FA81202106_GermanVersion
8	160622_FJ3-SA_FA81202106
9	170103_FJ3_FA81202106_Addendum 1
10	190308 FJ3 FA 81202106 _Addendum 2
11	200121 FJ3 FA 81202106 - Addendum 3
12	200130 EU-GIZ ACSE _FIJI Projects Location Map_FJ3&FJ4
13	200629 FJ03 - Fiji Govt Request for Reallocation of Funds
14	200909 FJ03 - Fiji Request for Top-Up
15	200921 FJ03 - VE(4)_Proposal for Amendment of Contract - FA 81202106
16	20xxx FJ03 FA 81202106 - Addendum 4

1.1 Project Background, Objective and Outcomes

Background

The Fiji Sustainable Energy Hybrid Power Project was initially designed with co-finance from the Fiji Government; and intended to supply and install Solar PV-diesel hybrid power systems for the communities of Nakoro, Yasawa High School and Kioa, if there were sufficient funds remaining after the completion of the first two sites. However, the contracted price for supply and installation of SolarPV-diesel hybrid systems at the 2 sites Nakoro and Yasawa High School had overwhelmed the project budget and hence Kioa could no longer be financed under the EU-GIZ ACSE project. Nonetheless, the project had developed the system designs and TOR for Kioa site and for the Fiji Government to feed into its future rural electrification implementation program. The dwellings in each of these communities in Nakoro and Yasawa are connected to the hybrid power system via a mini-grid.

The change from 3 sites to 2 sites necessitated changes to the initial project logframe from 2016. The revised logframe of 2020 is detailed in a later section of this report.



Map showing the project locations – Nakoro, Navosa, Yasawa High School, Naviti and Kioa Island.

Objective

The objective of the project was to: contribute towards environmentally sound and sustainable power systems for energy production for rural communities with use of indigenous energy sources to reduce GHG emissions, financial burden and dependency on high cost of fossil fuels.

1.2. Outcomes

The planned outcomes were:

1. The communities of Nakoro have access to clean, affordable, consistent and sustainable energy supply.

2. Yasawa High School has access to clean affordable, consistent and sustainable energy supply

2. Cooperation System

2.1 Stakeholders

Table 1 below lists key project stakeholders responsible for decisions and activities related to the implementation of the project, which are positively or negatively affected by the project, and with indirect or temporary involvement with the project.

Table 1: Stakeholders

Key Stakeholders

Stakeholder	Organization	Role
Makareta Konrote	Ministry of Economy (Lead National Agency)	Permanent Secretary, Ministry of Economy - National Authorising Office (NAO)
Nilesh Prakash	Climate Change Division	Head of Division (Former)
Irene Prasad	MOE/GIZ	In-Country Coordinator
Rakesh Raju	Climate Change Division	Senior Finance Analyst
Kris Singh	Climate Change Division	Senior Development Finance Analyst
David Kolitagane	Ministry of Infrastructure	Permanent Secretary (Former)
Taitusi Vakadravuyaca	Ministry of Infrastructure	Permanent Secretary
Mikaele Belena	Dept. of Energy	Director of Energy
Deepak Chand	Dept. of Energy	Assistant Director of Energy
Inia Saula	Dept. of Energy	Project Manager
Frank Rokowaqa	Dept. of Energy	Manager Rural Electrification Unit
Waisale Vulagi	Dept. of Energy	Actg. Principal Scientific Officer
Waisea Tabualevu	Dept. of Energy	Technical Assistant - Electrical
Iliesa Sigavou	Dept. of Energy	Technical Assistant
Iliesa Nalawa	Dept. of Energy	Driver
Semi Toko	Dept. of Energy	Driver
Anil Kant	Dept. of Energy	Driver
Iliesa Nalawa	Dept. of Energy	Driver
Semi Toko	Dept. of Energy	Driver

Saviri Qalica	Dept. of Energy	Technical Officer
Jimione	Dept. of Energy	Technical Officer
Jotish Prakash	Dept. of Energy	Senior Accounts Officer
Mesake Ledua	Min. Rural & Maritime Development	Commissioner Western
Bill Kava	Commissioner Western's Office	Principle Scientific officer (PSO)
Joshua Latilevu	Min. Rural & Maritime Development	District Officer
Ravinesh Nand	German International Cooperation Agency- GIZ	Technical Advisor
Gavin Pereira		Technical Advisor
Gabor Sasvari		Technical Advisor
Lusiana Nasegai		Project Officer
Bruce Clay	Clay Engineering	Managing Director
Dennis Kumar	Clay Engineering	Project Engineer
Jerry Kumar	Clay Engineering	Graduate Engineer
Amit Singh	CBS Power Solutions	Managing Director
Shelvin Chand	CBS Power Solutions	Assistant Manager Engineering
Jason Valentine	CBS Power Solutions	System Installer
Vatiliai Natavalawe	Energy Fiji Limited	Electrical Installation Inspector
Thomas Scott	Energy Fiji Limited	Electrical Installation Inspector
Temo Sorovaki	Mineral Resources Dept.	Technical Assistant -Geologist
Keresi Tuimanono	Mineral Resources Dept.	Technical Assistant -Geologist
Sefanaia Seva	Mineral Resources Dept.	Technical Assistant -Geologist
Sandip Chand	Mineral Resources Dept.	Scientific Officer -Geologist
Viliame Vuiyasawa	Mineral Resources Dept.	Technical Officer -Geologist
Temo Sorovaki	Mineral Resources Dept.	Technical Assistant -Geologist

3. Project Steering

3.1. Steering Structure

Fiji Department of Energy was the main government agency implementing and overseeing the project. At the operational level, a Project Manager was tasked with implementing the activities in close collaboration with the rural electrification unit within the DoE and with the climate change division at Ministry of Economy. This steering structure, consisted of representatives from various agencies as summarised in the table below.

Table below shows participants of the steering structure that participate in the decision making process and have a formal direct responsibility for decisions in the steering of the project.

Table 2. Project Steering Group Composition and Representation

Ministry of Infrastructure, Department of Energy	Project Management & Implementing Agency
Ministry of Economy, Climate Change Division	Steering Group member
Ministry of Rural and Maritime Development; - Commissioner Western Office (Yasawa & Nakoro) and - Commissioner Northern Office (Kioa)	Steering Group member

3.2. Plan of Operations

Table 4: Work Plan Implemented

PROJECT TITLE: Fiji Sustainable Energy Hybrid Power Project (FSEHPP)

Prepared on Date: 10/06/2020 Version: 12.0

			2016						2017												2018												2019												2020									Comments
Ref	Outputs / Activities	Responsibili	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
	Preparartions for Project management																																																				
	committee	DoE, ICC																																																			Done
	Hire ACSE PM and technical staff	DoE, ICC																																																			Done
	Send formal invitation to stakeholders to form steering committee	DoE, ICC																																																			Done
	Host initial steering committee meeting	DoE, ICC																																																			Done
	Preparation of hybrid installations																																																				
	Conduct on site load survey (includes a needs assessment) assessment for the hybrid system	DoE, ICC																																																			Completed
	Negotiate MoU between ACSE project and communities	DoE, ICC																																																				Not needed, Commissioner Western's Office was involved.
	Prepare tender documentation and specification for hybrid systems	DoE, MoF																																																			Completed

Table 4 continued: Work Plan Implemented

PROJECT TITLE: Fiji Sustainable Energy Hybrid Power Project (FSEHPP)

Prepared on Date: 10/06/2020 **Version: 12.0**

Ref	Outputs / Activities	Responsibility	2016						2017												2018												2019												2020									Comments
			Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
	Construction of Hybrid systems																																																		
	Tendering process	DoE, MoF																																																	Completed
	Consultation on energy tariff costs with stakeholders	DoE, MoF																																																Completed
	Contract awarding	DoE, MoF																																																Completed
	Construction of Hybrid systems in 3 communities	DoE, PMU																																																Completed 2 sites.
	System tests for newly established hybrid systems	DoE, PMU																																																Completed
	Community trainings																																																		
	Host roundtable meeting to discuss community training needs.	DoE, PMU																																																Completed
	Host roundtable meeting to discuss community business opportunities.	DoE, PMU																																																Completed
	Design training docuemnts and delivery plan based on the community needs	DoE, PMU																																																Completed
	Training documents tested with the comminties	DoE, PMU, MoEdu																																																Completed

Table 4 continued: Work Plan Implemented

PROJECT TITLE: Fiji Sustainable Energy Hybrid Power Project (FSEHPP)

Prepared on Date: 10/06/2020 — Version: 12.0

			2016						2017												2018												2019												2020									Comments
Ref	Outputs / Activities	Responsibility	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
	Community engagement																																																				
	Set up community solar committees	DoE, PMU																																																			Done
	Trainings for community solar committees	DoE, PMU																																																			Done
	Identify tariff collection systems	DoE, PMU																																																			Done
	Training on tariff contribution and involvement for rural women and men	DoE, PMU																																																			Done
	Run training and capacity building for rural communities	DoE, PMU																																																			Done
	Run training and capacity building for Fiji Gov members - knowledge sharing	DoE, PMU																																																			Done
	Communication and visibility																																																			
	Develop communication and engagement plan	DoE, PMU																																																			
	Develop communication tools (e.g advertising)	DoE, PMU																																																			Followed DoE
	Implement communication and awareness plan	DoE, PMU																																																			existing plan

Table 4 continued: Work Plan Implemented

PROJECT TITLE: Fiji Sustainable Energy Hybrid Power Project (FSEHPP)

Prepared on Date: 10/06/2020 Version: 12.0

			2016						2017												2018												2019												2020									Comments
Ref	Outputs / Activities	Responsibility	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
	Project Management																																																					Done
	Hold Steering committee meetings	DoE, PMU																																																				Done
	Keep other stakeholders informed of progress	DoE, PMU																																																				Done
	Set up online file storage system & ofice	DoE, PMU																																																				Done
	Send GIZ project report update & M&E data	DoE, PMU																																																				Done
	Send GIZ finance reports and finance data	DoE, PMU																																																				Done
	Project evaluation																																																					
	Mid-point audit (May be requried)	DoE, MoF																																																				Not needed/ not done.
	Final audit	DoE, PMU																																																				Completed
	End-of-project evaluation (also links to activity 1.4.6)	DoE, PMU																																																				Done
	Knowledge Products																																																					
	Lessons Learned document	DoE, PMU																																																				
	User manual for operation and maintanence (itaukei language)	DoE, PMU																																																				Not needed anymore. English version is sufficient.
	Case study (costing)	DoE, PMU																																																				Project cost is part of DoE records.
	Case study (maintenace)	DoE, PMU																																																				To early as project offcilaly commissioned in end of August 2020.

3.3. Results

The table below lists all project outputs.

Table 5: Project outputs

Report Title
170323_ FJ3&FJ4 Technical Report 1
170323_ FJ3&FJ4 Technical Report 1
171210 FJ03 - Feasibility Study Report Nakoro
180101_FJ3 Technical Report 2
180821 FJ3_Dept.of Energy - EIA Letter_Nakoro
180824 FJ3_Nakoro Hybrid Project -TOR_Tender Doc
180912 FJ03 - Report of Ground Leveling Nakoro
181025 FJ3 Gender Assessment Report_Nakoro
181026 FJ3 Gender Assessment Report _Yasawa High School
181116 FJ03 - Geotechnical Report Nakoro
190226 FJ3 -Yasawa High School -TOR _Tender Doc.
190226 FJ3 Yasawa Village REticulation
190226 FJ3_ Yasawa PV DEsign
190405 FJ03 - Supply & Install Contract Nakoro
190408 FJ3_Kioa PV Design
190408 FJ3_Kioa REticulation
190408 FJ3_Nakoro PV Design
190408 FJ3_Nakoro REticulation
190409 FJ03 Nakoro Village _RE Design
190603_FJ3 Technical Report 3
190131 FJ03 - Technical report # 4
190604 FJ3_Matababani Registration Certificate _Nakoro
190801 FJ3 Gender Assessment_ Kioa
191128 FJ03 - Supply & Install Contract Yasawa
200311 FJ03 - Technical Progress Report # 5 Yasawa
200320 FJ03 - Technical report # 6 Nakoro
200529 FJ03 - Technical Report # 7 Nakoro

200701 FJ03 - Technical Progress Report # 8 Yasawa
200805 FJ3_Yasawa High Ssch_EFL Compliance Cert.
200831 FJ03 brief - Fiji Sustainable Energy Hybrid Power Project
200831 FJ03_FINAL PRESS RELEASE
201026 FJ03 - Infrastructure Management Report
200915 FJ03 - DoE Letter to GIZ - Confirmation of deliverables Nakoro & Yasawa
200921 FJ03 - Installation and Commissioning Report Nakoro
200901 FJ03 - Nakoro Hybrid System O&M Manual
200810 FJ03 - Yasawa Installation and Commissioning Report
200811 FJ03 - Yasawa Commissioning Sheet
201021 FJ03 - Yasawa MiniGrid O&M Manual
201030 FJ03 - Beneficiary Assessment Report
201030 FJ03 - Project Final Evaluation Report

Nakoro Village Solar Project

- EIA screening

Under the Environment Management Regulations 2007, Environment Impact Assessment (EIA) is a requirement for all major projects in Fiji. The process involve EIA screening at project site to quantify the magnitude of work on the ground with reference to Terms of Reference. However during this visit EIA officer will determine full EIA or not.

In mid July 2018 an officer from Department of Environment visited Nakoro village project site for EIA screening. He was accompanied by a team from Department of Energy. As a result, after few weeks letter received, no need for full EIA.

- Registration of Cooperative

For the sustainability of the Solar project, the Department of Energy coordinated with Department of Cooperative for the registration of a company at Nakoro village. The objective of forming this company to manage the collection of solar tariff after the completion of the project.

In 2019 a consultation meeting was carried out at Nakoro village where villagers all agreed to form a company. During the same meeting Board Members were nominated for registration. The Department of Cooperative later registered the company as Matababani Cooperative Ltd.

- Geotechnical Assessments

The Mineral Resource Department conducted the Geotechnical Assessment at Nakoro village in September 2018. The objective of geotechnical assessment was to investigate the geological hazard present and the ground conditions present on the site and to provide recommendations and mitigations. The report assisted the bidders in formulating the solar and housing base structures at the project site.

- Ground clearance work

The ground clearance at the Nakoro project site was done on late August to early September, 2018. We had to level the ground, since the allocated site was uneven dried wet land, with tree stump and scattered guava trees.

Ground levelling at Nakoro project site

- Consultation with community on Vativa grass planting

After the levelling was done, the ground was lying idle for sometimes. During heavy rain part of the project site ground eroded, especially on the edges. The Project Manager then consulted the community to collect river sand from the near creek and bury the eroded areas of the ground. The vativa grass were the planted along these edges to protect the soil erosion.

Sand bags and Vativa grass planting on edges of levelled ground.

- Cooperative training and meeting , 17/06/19 – 21/06/19

The Department of Cooperative conducted the training for villages and Board members after the registration of Matababani Cooperative. The Boards members were trained on their roles and responsibilities.

- System Size and description – ground mounted

The Nakoro village Solar-diesel Hybrid and Mini Grid project has a 50KW capacity. It has a ground mounted PV Array with a building which house the batteries, inverters and generator. The system is providing electricity supply 24hours per day to 47 households in the village.

Aerial view of Nakoro Village solar project

- Official opening 24/08/20

On Tuesday 25th August the Hon. Prime Minister Mr. Voreqe Bainimarama commissioned the 50KW Nakoro Solar Mini Grid System. It was also attended by Mr Adrian Nicolae Acting Head of Cooperation, European Union in the Pacific

Official opening of the Nakoro Solar Mini Grid project

For details on the project implementation progress at Nakoro, refer to the report *200921 FJ03 - Installation and Commissioning Report Nakoro.*

Project Highlights – Photo snapshots of project journey at Nakoro

	Construction of Building for Generator, Batteries and Inverters
	Energy Fiji Limited inspectors at Nakoro village project site
	Nakoro Solar project site Billboard

All smiles after the official opening of the project at Nakoro.
L-R: Inia Saula – Project Manager DoE, Ravinesh Nand – Technical Advisor GIZ, Deepak Chand – Actg Director Energy, and Frank Rokowaqa - Manager Rural Electrification projects, DoE

Yasawa High School and Naviti District Primary School Solar Project

- Consultation with School management – performed underground reticulation and load survey. In early 2019 the Department of Energy (DOE) team visited Yasawa High and Primary School to hold consultation with teachers and school management on the proposed Solar Hybrid project. The briefing were conducted on the use of the system, number of lights and power point. There were also discussion on the installation of Spark meters that will control the use of electricity per household. On the same trip the DOE team re-confirming the design and proposed reticulation at both schools. In additional, the load survey were also done to determine the current and future load at the school.

Consultation meeting with teachers and school committee at Yasawa

- System Size and description – roof mounted

The Yasawa High and Primary School Solar-diesel hybrid Mini Grid project has the capacity of 30KW. The batteries and inverters are installed on one of the new building at the school. The solar PV is roof mounted and generator is housed separately. The system is able to supply 37 households with electricity at the school compound including class rooms, teachers quarters, dining hall, dormitories for girls and boys.

Roof mounted solar system (Left) and Generator house (Right)

- Official opening - 27/08/20

The commissioning of the 30KW Yasawa High and Primary School Solar Mini Grid project was done on 27th August 2020. The official guests were Hon. Jone Usamate the Fiji Minister of Infrastructure and Meteorological Services and EU Ambassador for the Pacific Mr. Sujiro Seam.

Official opening of the 50 kW Yasawa High and Primary School Mini Grid project

For details on the project implementation progress at Yasawa, refer to the report ***200810 FJ03 - Yasawa Installation and Commissioning Report.***

Project Highlights – Photo snapshots of project journey at Naviti Island

Photo	Caption
 	The Project Manager, Mr Inia Saula on a trip to Yasawa High School, Naviti island
 	Building materials for Yasawa High School solar project
	Solar Hybrid installation ispevtion with GIZ, DoE and DO at Yasawa High School, May 2020.

	The school students at Naviti, Yasawa sing farewell songs for the departure of the official party
	Project Manager (Inia Saula, DoE) and Project Technical Advisor (Ravinesh Nand, GIZ) on the project official opening day.

Kioa Island Solar Project

- Gender consultation Assessment

In July 2019 Department of Energy team and GIZ officer Ms. Lusiana Nasegai conducted at Gender Consultation Assessment at Salia village, Kioa island. It was attended by elders, women's group and youths.

The discussion were on the expectations of the community regarding the proposed solar mini grid system. They looked at the advantages and disadvantages of the project and ways to improvements.

- GeoTech Survey -16/07/19 -19/07/2019

The team from Mineral Resources Department (MRD) conducted the Geotechnical Assessment of the potential sites in the village for Solar Hybrid installation. From the number of sites identified, MRD recommended the best site, which is at the edge of the village playground. In the beginning. the

villagers including the elders were reluctant to give in this piece of land, however at the end they all agree as solar project site.

Project Highlights – Photo snapshots of project journey at Kioa Island

Photo	Caption
   	Community Consultations at the Village Hall at Salia village, Kioa island

	The MRD recommended site for solar project installation at Salia, Kioa.

4. Results against Logframe

This project has achieved its outcomes as set out in the Project Design Document (PDD). Nonetheless, this achievement was not without challenges on the way. However, despite all these challenges, the project team completed all activities including the technical implementation, financial audit and the project ended on 30th September 2020.

Table 6: Results achieved against logframe in Project Design Document

Note that the logframe has been modified to allow for easier reporting. Some indicators, baseline and targets in the original logframe were not clearly aligned and made reporting impossible.

Description	Indicator	Baseline	Target	Achievements	Validation	Validation Ref
Objective To contribute towards environmentally sound and sustainable power systems for energy production for rural communities with use of indigenous energy sources to reduce GHG emissions, financial burden and dependency on high cost of fossil fuels.	Number of solar PV hybrid systems installed by 2020	3 solar PV hybrid systems installed in 2015	6 solar PV hybrid system installed by 2020	2 additional Solar-diesel hybrid systems installed.	Installation & Commissioning Report - Nakoro Installation & Commissioning Report – Yasawa	200921 FJ03 - Installation and Commissioning Report Nakoro 200810 FJ03 - Yasawa Installation and Commissioning Report
	Number of community with sustainable power supply system established	0 solar PV system established in 2015 in Nakoro, and Yasawa	2 additional solar PV hybrid system installed in Nakoro and Yasawa	2 achieved (refer amendment to project design)	Installation & Commissioning Report - Nakoro Installation & Commissioning Report – Yasawa	200921 FJ03 - Installation and Commissioning Report Nakoro 200810 FJ03 - Yasawa Installation and Commissioning Report

Outcome 1 The communities of Nakoro have access to clean, affordable, consistent and sustainable energy supply	*Indicator 1.1* Number of solar PV hybrid systems installed, operated and maintained by the community of Nakoro	In 2015 no solar PV Hybrid systems operated and maintained by these communities	In 2020, 1 solar PV hybrid system installed and is operated and maintained by the community of Nakoro	1 solar PV hybrid system installed in Aug 2020 and is operated by the community of Nakoro	Installation & Commissioning Report - Nakoro	200921 FJ03 - Installation and Commissioning Report Nakoro
	Indicator 1.2 By 2020 there is an increase in daily number of hours of uninterrupted electricity supplied to all households on Nakoro from 2016 levels	In 2015 communities of Nakoro receives 2-4 hours of energy supply daily	In 2020, all households in Nakoro receive 24 hours of electricity daily (an increase of 18 – 22 hours)	From July 2020, al houses started receiving 24 hrs per day electricity.	Final Evaluation Report – Nakoro	201030 FJ03 Project Final Evaluation Report
	Indicator 1.3 By 2020 80% of the population in the communitiy of Nakoro(of which half surveyed are women) express that they have benefitted from uninterrupted energy supply				Beneficiary Assessment – Nakoro	201029 FJ03 - Beneficiary Assessment Report

	Indicator 1.4 By 2020 the annual consumption of diesel in Nakoro is reduced as compared to consumption levels in 2015 (measured in gallons or litres)	In 2015 community of Nakoro use 4 litres of fuel/day	By 2020 the annual consumption of diesel in community is reduced as compared to consumption levels in 2015 (measured in gallons or litres)		Beneficiary Assessment – Nakoro	201029 FJ03 - Beneficiary Assessment Report
Outcome 2 Yasawa High School has access to clean affordable, consistent and sustainable energy supply	*Indicator 2.1* Increase in number of hours of uninterrupted electricity supplied to Yasawa High School by 2020	In 2015 students of Yasawa High School receives x hours of energy supply daily	In 2020, students in Yasawa receive 24 hours of electricity daily (an increase of 18 – 22 hours)	From July 2020, students started receiving 24 hrs per day electricity.	Final Evaluation Report – Yasawa	201029 FJ03 Project Final Evaluation Report Draft
	Indicator 2.2 By 2020 the annual consumption of diesel in Yasawa High School is reduced as compared to consumption levels in 2015 (measured in gallons or litres)	In 2015 Yasawa High school uses x litres/gallons of fuel for energy	By 2020 the annual consumption of diesel for Yasawa High School is halved as compared to consumption levels in 2015 (measured in gallons or litres)		Beneficiary Assessment – Yasawa	201029 FJ03 - Beneficiary Assessment Report

	Indicator 2.3 By 2020 80% of student express that quality of education (different teaching modes used relating to use of electricity in hours to study after dark) enhanced		Yasawa High School Students express that quality of education (different teaching modes) improved		Beneficiary Survey – Yasawa (to also include Student Survey)	201029 FJ03 - Beneficiary Assessment Report
Outputs						
Output 1 Feasibility and social inclusion studies and design of Solar PV hybrid systems (Nakoro & Yasawa) produced	Indicator 1.1 Number of feasibility reports produced.	1 report in 2017	1 feasibility report per site		Gender Assessment - Nakoro Gender Assessment – Yasawa	181025 FJ3 Gender Assessment Report_Nakoro 181026 FJ3 Gender Assessment Report _Yasawa High School
	Indicator 1.2 Number of systems designed in line with load assessments in communities and SEIAPI guidelines by 2017	1 community solar PV hybrid system for Solevu Secondary in 2017 1 Government operated solar PV hybrid system for Tukavesi Government Station in 2017	1 Solar PV hybrid systems designed (1 per identified site)	1 Solar PV hybrid system designed for Nakoro and 1 system designed for Yasawa	Design Report - Nakoro Design Report - Yasawa	190408 FJ3_Nakoro PV Design 190226 FJ3_ Yasawa PV DEsign

Output 2 Project committees established at Nakoro and Yasawa	Indicator 2.1 Number of Project committees established and functioning at Nakoro and Yasawa in 2020	No committee established for solar PV hybrid projects	1 committee - Solar Committee per site	Established 1 Solar Committee at Nakoro and 1 solar committee at Yasawa	Infrastructure Management Report – Nakoro Infrastructure Management Report – Yasawa	201026 FJ03 - Infrastructure Management Report 190604 FJ3_Matababani Registration Certificate _Nakoro
Output 3 Contractors for supply and installation of Solar PV hybrids systems engaged	Indicator 3.1 Number of signed contracts for Solar PV-bybrid systems in 2020	In 2017, 0 contracts were signed	1 contract signed for installation of each system - 1 per site	1 contract with Clay Engineering and 1 contract with CBS Power Solutions	Supply & Install Contract – Nakoro Supply & Install Contract – Yasawa	190405 FJ03 - Supply & Install Contract Nakoro 191128 FJ03 - Supply & Install Contract Yasawa
Output 4 Supply and installation of Solar PV hybrid systems at Nakoro and Yasawa	Indicator 4.1 Number of solar PV hybrid systems installed by 2020 at Nakoro and Yasawa	In 2017, no community Solar PV hybrid systems established 1 government operated solar PV hybrid systems established	1 system per site	1 x 30 kW system installed at Yasawa 1 x 55 kW system installed at Nakoro	Installation & Commissioning Report - Nakoro Installation & Commissioning Report – Yasawa	200921 FJ03 - Installation and Commissioning Report Nakoro 200810 FJ03 - Yasawa Installation and Commissioning Report
Output 5 Operation and maintenance, end user and income generation trainings delivered at Nakoro.	Indicator 5.1 Number of men and women operating and maintaining the solar hybrid system at Nakoro.	0 trained	2 people trained (1 man and 1 woman) to operate and maintain the solar hybrid system at Nakoro	Solar committee trained for each project site by the contractors.	Installation & Commissioning Report - Nakoro Installation & Commissioning Report – Yasawa	200921 FJ03 - Installation and Commissioning Report Nakoro 200810 FJ03 - Yasawa Installation and Commissioning

						Report, Refer section 9.0 Capacity Building.
	Indicator 5.2 Communities aware of how to utilise power supply to their homes	0 people are aware of how to use power generated from solar systems	50% of the communities are aware of how to use power generated from solar systems		Final Evaluation Report – Nakoro	
Output 6 Operation and maintenance, manual produced in english and in local language	Indicator 6.1 Maintenance and operation manual produced and utilised	0 operation and maintenance manual produced in local language	1 operation and maintenance manual of solar PV hybrid systems developed and utilized	1 operation and maintenance manual of solar PV hybrid systems developed and utilized for each site	Operation & Maintenenace Manual, Nakoro Operation & Maintenenace Manual, Yasawa	200901 FJ03 - Nakoro Hybrid System O&M Manual 201021 FJ03 - Yasawa MiniGrid O&M Manual
Output 7 Solar PV-diesel hybrid systems installed and in operation	Indicator 7.1 Number of solar PV hybrid systems operational in 2020	1 community solar PV hybrid system for Solevu Secondary in 2017	1 community solar PV hybrid system Nakoro and 1 community solar PV hybrid system for Yasawa	1 x 30 kW system installed at Yasawa 1 x 55 kW system installed at Nakoro	Installation & Commissioning Report - Nakoro Installation & Commissioning Report – Yasawa	200921 FJ03 - Installation and Commissioning Report Nakoro 200810 FJ03 - Yasawa Installation and Commissioning Report
	Indicator 7.2 Number of households connected to solar PV hybrid system and receiving 24 hour power	In 2017 Nakoro and Yasawa communities receive 2-3 hrs of electrictty produced from individual diesel generators	100% of Households at Nakoro and Yasawa receiving 24 hrs of power supply	100 % (46 pre-pay meters) of houses at Nakoro and 100% (37 pre-pay meters) of school building/quarters receive 24 hrs electicity per day	Installation & Commissioning Report - Nakoro Installation & Commissioning Report – Yasawa	200921 FJ03 - Installation and Commissioning Report Nakoro 200810 FJ03 - Yasawa Installation and Commissioning Report

Summary of Key Challenges – Yasawa High School Project Site

Due to the remoteness of the site, there are a lot of challenges faced during and prior to construction of this project.

- **Offloading Facilities -** Considering the fact that there are no wharf at Naviti Island, all offloading had to be done offshore. This was one of the biggest challenge faced at the early stage of the project where proper planning, weather, Sea Tide, Barge draught height and selection of machineries was of utmost importance. Even a wrong selection of Machineries would have completely cramped any offloading works.

- **Inadequate Water Supply -** Yasawa high School school is completely dependent on rain water for their daily water needs for cooking and drinking. Due to inadequate water supply, CBS had to mobilize to site as minimum staff possible considering this fact also keeping in mind there are no delays.

- **Inadequate Food and Fuel Supply -** Workers/People usually have to travel more than 2 hours by fiber boat to Lautoka for buying food items, fuel supplies or any other required hardware materials. There are no shops or service providers available locally on the island.

- **No Power Supply -** People depend on generators for their daily electricity needs. Lack of fuel storage sometimes-delayed works, which required use of electrical tools and machineries.

- **Poor Telecommunication Network -** Office Staffs face difficulties getting in contact with on-site staffs due to poor network on the island. Project progress updates were only provided to Head Office subject to Telecommunication network availability.

- **Health Facilities -** There are no Health Facilities available close by on the island. Therefore personal hygiene was a stated a priority for all staffs on the island. Sufficient backup fuel supplies were stored at all times in case of an emergency where staffs may need immediate transfer to the main land.

Summary of Key Challenges – Nakoro Village Project Site

- Travel – Due to the remote location of the village, travel to and from the village was time consuming.

- Communication – due to poor network in the area, getting online system visibility was a challenge. Specialized BTS equipment was installed to get a stable connection but even then, there were periods of connection dropouts.

- Installation – Project process was halted due to the COVID19 pandemic. Project works resumed after it was declared by Government that it was safe to do so.

4.2. Financial Status

Table 8: Provides an indication of utilized budget for the implementation of project outputs and activities. For details, please refer to the final financial report of October 2020.

Output / Activity	Planned budget	Estimated utilization of GIZ financing as of 30th Sep 2020 (draft Fin report)	Contributions by recipient
Cost of Materials and equipment	€ 7500.00	€ 7256.70	
Cost of third-party services	€ 30, 900.00	€ 11,034.61	
Construction Costs	€ 615,000.00	€ 617,677.91	
Personnel Costs	€ 52,400.00	€ 53,530.12	€25,000
Travel Expenses	€ 13,400.00	€ 14,657.71	€ 5500.00
Operating and Administrative Costs	€ 800.00	€ 2009.21	
Total	€ 720,000.00	€ 706,166.26	€30,500

As per the draft of the final financial report of 30th September 2020, €13, 833.74 remained unutilised. However, the cost of project end financial audit (quotation price: FJD 10,301.00) will be paid directly by GIZ and then booked as a cost to this project. This would be added under the third party cost category.

The contributions by the Government of Fiji as per the initial Financing Agreement signed in 2016 was €425,000.00 but this was reduced to €30,500 under the last supplement to the Financing Agreement in 2020. The reason being that the third site Kioa, will be fully funded by the Government and will be implemented in 2021, which is outside of the timeline for the Financing Agreement signed with GIZ. The implementation at project sites of Nakoro and Yasawa were fully funded by the project.

5. Learning and Innovation

5.1 Project Visibility

Table 9 – Developed project visibility products

Report Title
200831 FJ03_FINAL PRESS RELEASE
200825 FJ03 - Facebook posts on Fiji Energy ACSE projects
Project Sign Board Nakoro

Table below presents a summary of significant information resources and knowledge products the project has developed.

Table xx–Developed information resources, including knowledge products

Information Resources and Knowledge Products
171210 FJ03 - Feasibility Study Report Nakoro
180824 FJ3_Nakoro Hybrid Project -TOR_Tender Doc
181025 FJ3 Gender Assessment Report_Nakoro
181026 FJ3 Gender Assessment Report _Yasawa High School
181116 FJ03 - Geotechnical Report Nakoro
190226 FJ3 -Yasawa High School -TOR _Tender Doc.
190226 FJ3 Yasawa Village REticulation
190226 FJ3_ Yasawa PV DEsign
190408 FJ3_Kioa PV Design
190408 FJ3_Kioa REticulation
190408 FJ3_Nakoro PV Design
190408 FJ3_Nakoro REticulation
190409 FJ03 Nakoro Village _RE Design
190604 FJ3_Matababani Registration Certificate _Nakoro
190801 FJ3 Gender Assessment_ Kioa
200805 FJ3_Yasawa High Ssch_EFL Compliance Cert.
200831 FJ03 brief - Fiji Sustainable Energy Hybrid Power Project
200831 FJ03_FINAL PRESS RELEASE
201026 FJ03 - Infrastructure Management Report
200901 FJ03 - Nakoro Hybrid System O&M Manual
201021 FJ03 - Yasawa MiniGrid O&M Manual

6. Annexes

Table 10: List of Annexes

Annexes	Project Start Up and Management
1	140730_FJ3 Concept Note
2	140826_FJ3_Concept Note Evaluation
3	150401_GIZ CCCPIR_+Fiji-MoU
4	150401_GIZ CCCPIR +Fiji-MoU-Addendum
5	160622_FJ3_Project Design Document-FA81202106
6	160622_FJ3-FA81202106_EngVersion

7	160622_FJ3-FA81202106_GermanVersion
8	160622_FJ3-SA_FA81202106
9	170103_FJ3_FA81202106_Addendum 1
10	190308 FJ3 FA 81202106 _Addendum 2
11	200121 FJ3 FA 81202106 - Addendum 3
12	200130 EU-GIZ ACSE _FIJI Projects Location Map_FJ3&FJ4
13	200629 FJ03 - Fiji Govt Request for Reallocation of Funds
14	200909 FJ03 - Fiji Request for Top-Up
15	200921 FJ03 - VE(4)_Proposal for Amendment of Contract - FA 81202106
16	20xxx FJ03 FA 81202106 - Addendum 4
Annexes	**Project Results and Validations**
17	170323_ FJ3&FJ4 Technical Report 1
18	170323_ FJ3&FJ4 Technical Report 1
19	171210 FJ03 - Feasibility Study Report Nakoro
20	180101_FJ3 Technical Report 2
21	180821 FJ3_Dept.of Energy - EIA Letter_Nakoro
22	180824 FJ3_Nakoro Hybrid Project -TOR_Tender Doc
23	180912 FJ03 - Report of Ground Leveling Nakoro
24	181025 FJ3 Gender Assessment Report_Nakoro
25	181026 FJ3 Gender Assessment Report _Yasawa High School
26	181116 FJ3 -Tender Evaluation Meeting Minutes _Nakoro
27	181116 FJ03 - Geotechnical Report Nakoro
28	181117 FJ3 _Tender Evaluation Report _Nakoro
29	181203 FJ3_Letter of Request -Ext_Fiji Govt
30	190226 FJ3 -Yasawa High School -TOR _Tender Doc.
31	190226 FJ3 Yasawa Village REticulation
32	190226 FJ3_ Yasawa PV DEsign
33	190405 FJ03 - Supply & Install Contract Nakoro
34	190408 FJ3_Kioa PV Design
35	190408 FJ3_Kioa REticulation
36	190408 FJ3_Nakoro PV Design
37	190408 FJ3_Nakoro REticulation
38	190409 FJ03 Nakoro Village _RE Design
39	190603_FJ3 Technical Report 3
40	190131 FJ03 - Technical report # 4
41	190604 FJ3_Matababani Registration Certificate _Nakoro

42	190801 FJ3 Gender Assessment_ Kioa
43	190919 FJ3_Letter of Request - Ext_Fiji Govt
44	191128 FJ03 - Supply & Install Contract Yasawa
45	200311 FJ03 - Technical Progress Report # 5 Yasawa
46	200320 FJ03 - Technical report # 6 Nakoro
47	200529 FJ03 - Technical Report # 7 Nakoro
48	200701 FJ03 - Technical Progress Report # 8 Yasawa
49	200805 FJ3_Yasawa High Ssch_EFL Compliance Cert.
50	200831 FJ03 brief - Fiji Sustainable Energy Hybrid Power Project
51	200831 FJ03_FINAL PRESS RELEASE
52	201026 FJ03 - Infrastructure Management Report
53	200915 FJ03 - DoE Letter to GIZ - Confirmation of deliverables Nakoro & Yasawa
54	200921 FJ03 - Installation and Commissioning Report Nakoro
55	200901 FJ03 - Nakoro Hybrid System O&M Manual
56	200810 FJ03 - Yasawa Installation and Commissioning Report
57	200811 FJ03 - Yasawa Commissioning Sheet
58	201021 FJ03 - Yasawa MiniGrid O&M Manual
59	200825 FJ03 - Facebook posts on Fiji Energy ACSE projects
60	Xxxxxxx FJ03 – Letter from DoE – Technical Reports
61	201030 FJ03 - Project Final Evaluation Report
62	201030 FJ03 - Beneficiary Assessment Report
63	201030 FJ03 - Project End Technical Report
	Financial Validation
64	190426 FJ3 Clay Energy Invoice 8706_ Nakoro
65	190822 FJ03_FA 81202106_1st Direct Payment_Clay Energy
66	200602 FJ03_FA 81202106_Call for Disbursement No 3_Direct Payment_Clay Energy
67	200602 FJ03_FA 81202106_Call for Disbursement No 4_Direct Payment _CBS Power Solutions

The End