Terminal Evaluation Report of
Fiji Renewable Energy Power Project (FREPP)

(PIMS # 4358, GEF # 4131)

Prepared By

Nisar Ahmad Khan

February 2019

Commissioned by

United Nations Development Programme (UNDP) Pacific Office in Fiji

ACKNOWLEDGEMENTS

Most humbly, I am grateful to God Almighty for the countless mercies bestowed on me to complete this assignment. Indeed, this undertaking was accomplished with most generous and forthcoming cooperation and support of all stakeholders. I am greatly indebted and thankful to all colleagues and members of the local communities, who facilitated and contributed during the course of this evaluation.

My sincere and special thanks are due to all UNDP colleagues and especially to Ms. Emma, Ms. Melaia and Mr. Vimal for their kind and constant guidance, support and facilitation throughout the evaluation exercise. I am also highly indebted to the DOE team especially to Mr. Joeli, Mr. Jeke and Mr. Frank for their substantial technical inputs and their fine and caring company during the field mission. With prayers, I highly regard and acknowledge the commendable contributions of the former Project Manager Ms. Susana Pulini, who very sadly passed away, during early January 2019, after brief illness. I met her during the evaluation mission, while she was Director Water and Sewerage at DOE, and found her very kind, humble and thoroughly professional. Review of project reports suggest that under her supervision and leadership FREPP progressed the most. May God rest her soul in peace.

I also wish to sincerely thank all colleagues from EFL, FCCC, FSC, USP, Copra Millers, Department of Cooperative and Bukuya Community, whom I met during the evaluation exercise, for their time, technical inputs and gracious hospitality. Kindly forgive for not mentioning all names, as the list goes long.

Sincerely
Nisar Ahmad Khan

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ACRONYMS

NBP	National Biofuel Policy
DOE	Department of Energy
EFL	Energy Fiji Limited
FCCC	Fiji Competition and Consumer Commission
FEA	Fiji Electricity Authority
FJD	Fijian Dollars
FREPP	Fiji Renewable Energy Power Project
FSC	Fiji Sugar Corporation
G+H	Grue + Hornstrup
GEF	Global Environment Facility
GHGs	Greenhouse Gases
GoF	Government of Fiji
IPPs	Independent Power Producers
M&E	Monitoring and Evaluation
MW	Mega-Watt
MWh	Mega-Watt Hours
NDP	National Development Plan
NEP	National Energy Policy
NGOs	Non-Governmental Organizations
PB	Project Board
PMU	Project Management Unit
PPA	Power Purchase Agreements
PPP	Public Private Partnership
RE	Renewable Energy
SPC	Special Purpose Company
tCO2	Tones CO2 emissions
TE	Terminal Evaluation
TGF	Tariff Guarantee Fund
UNDP	United Nations Development Programme
UNDAF	UN Development Assistance Framework
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States Dollars
USP	University of the South Pacific
VRE	Vara Renewable Energy

EXECUTIVE SUMMARY

Project Summary Table

Project Title:	Fiji Renewable Energy Power Project (FREPP)			
GEF Project ID:	4131	Project Financing	*at endorsement (Million US$)*	*at completion (Million US$)*
UNDP Project ID:	4358	GEF financing:	975,000	975,000
Country:	Fiji	IA/EA own:	N/A	N/A
Region:	Asia-Pacific	Government:	1,553,673	4,478,673
Focal Area:	Climate Change Mitigation	Other: - Vara Renewable Energy - FSC Labasa Cogen Plant - Secretariat of the Pacific Community	15,000,000 0 0	Cancelled 17,000,000 11,250
FA Objectives, (OP/SP):	GEF-4 Strategic Program 3: Promoting market approaches for the supply of renewable electricity in utility scale grid-based power systems; and GEF-4 Strategic Program 4: Promoting sustainable energy production from biomass and modern uses of biomass.	Total co-financing:	16,553,673	21,489,923
Executing Agency:	Department of Energy, Ministry of Infrastructure & Transport	Total Project Cost:	17,528,673	22,464,923
Other Partners involved:	Department of National Planning (Senior Beneficiary), Fiji Electricity Authority (FEA), Fiji Commerce Commission, Ministry of Public Enterprise, Ministry of Economy, etc.	ProDoc Signature (date project began):		22/12/2011
		(Operational) Closing Date:	Proposed: 22/12/2014	Actual: 31/05/2018

Project Description

The goal of the project was to reduce Green House Gases (GHGs) from power sector in Fiji. The project objective was removal of major barriers to the widespread and cost-effective use of grid based renewable energy (RE) supply via commercially viable renewable energy technologies. The project consisted of 4 main outcomes;

1) Facilitation of investments on energy projects, particularly on RE and biomass-based power generation;
2) Technical feasibility of harnessing RE resources are ascertained and made widely known;
3) Markets for specific renewable energy technologies are supported; and
4) RE developments integrated into National Development Plan towards 100% Electrification of Fiji.

The Department of Energy (DOE) remained the designated Implementing Partner for the project, under the National Implementation Modality. A number of relevant stakeholders were actively involved in project implementation including government agencies, development partners, private sector, academia and local communities.

The project was originally designed for a three-year timeframe from December 2011 to December 2014, however due to several factors the project implementation was delayed and its timeline was extended to May 2018. At the time of project design, the total project budget was estimated at USD 17.5 Million. However, in later years the co-financing commitments from Government. and private sector were increased, enhancing the total cost of the project to USD 22.5 Million, this included USD 0.75 Million from GEF, 4.5 Million from DOE and 17.0 Million from Fiji Sugar Corporation.

Project Evaluation Rating Table

Evaluation Rating			
1. Monitoring and Evaluation	***rating***	**2. IA& EA Execution**	***rating***
M&E design at entry	4 (MS)	Quality of UNDP Implementation	5 (S)
M&E Plan Implementation	4 (MS)	Quality of Execution - Executing Agency	4 (MS)
Overall quality of M&E	4 (MS)	Overall quality of Implementation / Execution	4 (MS)
3. Assessment of Outcomes	**rating**	**4. Sustainability**	**rating**
Relevance	2 (R)	Financial resources:	3 (ML)
Effectiveness	4 (MS)	Socio-political:	4 (L)
Efficiency	4 (MS)	Institutional framework and governance:	4 (L)
Overall Project Outcome Rating	4 (MS)	Environmental:	4 (L)
		Overall likelihood of sustainability:	4 (L)

Summary of Findings and Recommendations

Overall FREPP's objective and interventions were found relevant in addressing the prevailing barriers to the wide-scale use of renewable energy resources for power generation in Fiji. The project has made considerable progress towards achieving its objective and goal. However, there is a still long road ahead to achieve the National Development Plan (NDP) target of 100% power

generation through RE sources by 2036. Therefore, it is recommended to UNDP to continue external technical and especially financial support for promotion of renewable energy in Fiji. DOE and UNDP should continue exploring, the possibilities for mobilizing resources and preparation of a new project proposal in consultation with stakeholders to follow up on FREPP interventions and to further promote wider scale use of RE in Fiji.

FREPP has successfully implemented a wide range of interventions, many of these interventions are of longer term nature therefore they will still require continuous follow up to realize their full effectiveness and impact. Therefore, it is recommended that DOE with the support of UNDP should develop a follow up strategy.

Some of the interventions needing further follow up includes; 1) Approval and endorsement of National Biofuel Policy, 2) Finalization and replication of Bukuya PPP Model, 3) Improvement and continuous updating of the Energy Information Forum portal, 4) Preparation of assessment/feasibility reports of RE power projects, 5) Sorting of the tariff and biomass issues in FSC Labasa power project, 6) Sorting of the profitability and management of Biofuel Mills, 7) Follow up on the proposed standardized PPA template with Energy Fiji Limited (EFL) and, 8) Follow up on the National Electrification Plan with ADB.

FREPP has faced considerable delays during implementation and its end date has to be extended from Dec 2014 to May 2018. These delays mainly resulted from non-endorsement of updated National Energy Policy (NEP) and time consumed by lengthy processes for establishment of Project Board, PMU and recruitment of project staff and procurement of goods and services. Furthermore, limited number (only 2 persons PMU) and turnover of project staff also considerably hampered implementation.

Therefore, it is recommended to UNDP and DOE that in future such projects timeframes should be estimated realistically by allocating adequate and sufficient time for project organization, mobilization, recruitment of staff, procurement of goods and services and implementation of activities, etc. It is also recommended that such project should employ adequate number of fulltime staff keeping in view the scope of the project.

The project has fostered successful collaboration with a wide range of stakeholders including governmental institutions, private sector, development partners, academia and local communities. However, it also has faced some partnership issues and its initially planned major co-financier dropped out during implementation, resulting in immense delays.

Therefore, it recommended to UNDP and DOE that in future such projects, partners should be selected carefully keeping in view their relevance, expertise, interest and commitment. Similarly, in case of co-financing commitments some sort of guarantee should be obtained in the start to ensure availability of resources.

The project strived to effectively monitor and evaluate its progress and performance, however M&E was limited to progress reporting and field visits. The absence of dedicated M&E expertise

within the PMU has considerably hampered the development and implementation of effective project M&E system, especially collection, analysis and reporting of data related to project outcomes and impact indicators.

Therefore, it is recommended to UNDP and DOE that such project should employ dedicated M&E expertise, which should take care of the development and implementation of a rigorous M&E and keep track of project outcomes and impact indicators. Furthermore, all stakeholders also need to be regularly involved in the M&E through regular six-monthly and annual review meetings.

The goal of the project was to reduce GHGs from power sector in Fiji. Overall it can be concluded that project RE demonstrations have contributed in the reduction of GHGs from the power sector. However, in view of the preliminary analysis, the original project target of cumulative reduction of 935.8 ktons CO2, by end of project, seems to be quite ambitious. Precise cumulative data on GHGs is not estimated by the project so far, however, project report on evaluation of 10 MW biomass FSC demonstration project, has estimated a total reduction of around 24.3 ktons CO2 during 2015-17, around 8 ktons per year.

Therefore, it is recommended that DOE, with the help of UNDP, may conduct a comprehensive study to estimate the exact status of GHG reductions from project interventions. Furthermore, it is also recommended that for future such projects the targets should be fixed realistically, keeping in view the scope of the project interventions and, rigorous mechanisms should be put in place to collect and analyses time series data on impact related indicators.

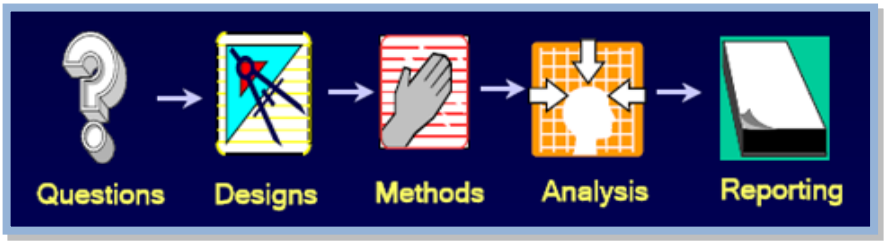
1. INTRODUCTION

1.1 Purpose of Terminal Evaluation

In accordance with UNDP and GEF M&E policies and procedures, all full and medium-sized UNDP support GEF financed projects are required to undergo a terminal evaluation upon completion of implementation. The overall purpose of this evaluation is to assess the relevance, effectiveness, efficiency, sustainability and impact of project interventions, outputs and outcomes. The evaluation also intended to assess the project design and key financial aspects of the project, including the extent of co-financing and the extent to which the project was successfully mainstreamed with other UNDP priorities.

1.2 Scope & Methodology

In view of the objectives, scope and duration of the Terminal Evaluation, a semi structured mixed method approach has been adopted using both qualitative and quantitative data collection and analysis methods and tools. The TE was conducted in line with the guidance, rules and procedures established by UNDP and GEF as reflected in the UNDP Evaluation Guidance for Terminal Evaluation of GEF Financed Projects. In summary the overall evaluation process consisted of five standard steps i.e. 1) Evaluation Questions, 2) Evaluation Design, 3) Data Collection Methods, 4) Data Analysis and 5) Presentation and Reporting.



a) Main Evaluation Criteria

In line with ToRs and Guidelines for Conducting Terminal Evaluations of UNDP-Supported, GEF-Financed Projects, the TE thoroughly adhered to the standard assessment criteria of Relevance, Effectiveness, Efficiency, Impact and Sustainability to assess the overall progress and performance of the project. Following is a summary description of each criterion;

- **Relevance:** How does the project relate to the main objectives of the GEF focal area, and to the environment and development priorities at the local, regional and national levels?
- **Effectiveness:** To what extent have the expected outcomes and objectives of the project been achieved?
- **Efficiency:** Was the project implemented efficiently, in-line with international and national norms and standards i.e. the economic use of resources to achieve desired results and timeliness of project interventions?
- **Sustainability:** To what extent are there financial, institutional, social-economic, and/or environmental risks to sustaining long-term project results?

- **Impact**: Are there indications that the project has contributed to, or enabled progress toward, reduced environmental stress and/or improved ecological status?

In addition to above standard criteria the evaluation also assessed the following aspects/dimensions of the project.

Project Design, Results Frameworks and Implementation arrangements
To assess the suitability of Project Design, Results/Logical Frameworks, Monitoring and Evaluation Frameworks, Implementation Arrangements and Partnerships etc.

Project Finance/Co-Finance
To assess the key financial aspects of the project, including the extent of co-financing planned and realized. Variances between planned and actual expenditures have been assessed and presented in the prescribed template in the TE Report. Please see table in executive summary.

Mainstreaming
To assess the extent to which the project was successfully mainstreamed with other UNDP priorities, including poverty alleviation, improved governance, the prevention and recovery from natural disasters, and gender.

b) Evaluation Criteria & Ratings

An assessment of project performance was carried out, based on expectations set out in the Project Logical Framework/Results Framework, which provides performance and impact indicators for project implementation along with their corresponding means of verification. The evaluation covered the main criteria of relevance, effectiveness, efficiency, sustainability and impact. Please see rating table in Executive summary.

c) Evaluation Questions

A number of evaluation questions were formulated, to assess the overall relevance, efficiency, effectiveness, impact and sustainability of the project. Additionally, specific questions are also formulated to assess other aspects like project design, implementation arrangements, project finance/co-finance and mainstreaming etc. The evaluation questions were used during the key informant interviews and focus group discussions during the data collection process. For details please see Annex1: Evaluation Matrix, and Annex-2 Detailed list of Evaluation Questions.

d) Data collection methods/tools

As mentioned, mixed data collection approach has been adopted using both qualitative and quantitative data collection methods and tools. It to highlight that most of the data was collected in qualitative form through key informant interviews, focus group discussions and field observations. While quantitative data related to project progress and output and outcome targets etc. was extracted from project related documents, reports, publications and secondary sources etc.

Efforts were made to ensure maximum participation of relevant stakeholders during the data collection process. However, in the limited time available for the field mission it was not possible to reach out to every single stakeholder or to visit every single intervention in the field. Therefore, selection of key respondents was mainly based on their role and level of engagement during project implementation. Following are the main data collection tools to be used during the evaluation;

- ***Desk Review of official records and documents***

A good deal of relevance, efficiency, effectiveness, impact and sustainability related data was obtained from review of project documents, official records and secondary sources. These included, but are not limited to, Project Document, Project Progress Reports including PIRs, Annual Work Plans, Financial Reports, Project Budget Revisions, Midterm Review Report, Technical Reports/Publications, Project Board Meeting Minutes, Case Studies, GEF Tracking Tools, National Strategic and Legal Documents, and secondary sources etc.

- ***Key Informants interviews***

Key informant's interviews remained the main instrument for collection of primary data during the evaluation exercise. Key persons among all stakeholders were identified in consultation with UNDP and Project team at DOE, and semi structured interactive interviews were conducted with reference to evaluation questions related to project relevance, effectiveness, efficiency, impact and sustainability.

Persons met	
Stakeholders	**No of persons**
UNDP	2
DOE	4
FSC	5
Copra Millers	2
USP	1
Cooperative Department Lautoka	2
Bukuya Hydro Company and Community members	5
FCCC	3
EFL	2
Total	26

The main criteria for selection of respondents was based on their role and level of involvement in project implementation, including main beneficiaries. In total 26 key people were met and interactive interviews and focus group discussions were conducted in Suva, Labasa, Savusavu, Rabi, Laukota and Bukuya. Main respondents included key persons/officials from UNDP Pacific Office, Project team, Department of Energy, Bukuya Village Community, Fiji Department of Co-operatives, Energy Fiji Limited, Fiji Commerce Commission, Fiji Sugar Corporation, University of the South Pacific and Copera Millars etc. For the detailed list of persons met, please see Annex 1.

Meeting with DOE

Meeting at FSC Mill Labasa

Discussion at Bukuya Village

- **Field Visits Focus Group Discussions**

The TE consultant also visited project field interventions especially the RE demonstration projects like power plant at Fiji Sugar Mills, Labasa, Copra Mill at Savusavu, Biofuel Mill at Rabi, Wind monitoring stations on Viti Levu and Bukuya Hydro project. The evaluation team physically observed selected project interventions in the field to assess their progress and performance. Accordingly, on spot interviews and focus group discussion were conducted with management teams, partners and target groups/beneficiaries

FSC Labasa Power Plant

Bukuya Hydro station

Rabi Biofuel Mill

e) Data Analysis, Presentation and Reporting

In view of the nature of evaluation questions and use of mix-method approach, the acquired data was analyzed both qualitatively and quantitatively. Since most of the primary data was acquired in qualitative form therefore it was processed manually using qualitative data analysis techniques like validations, triangulations, interpretations and abstractions. Data collected from review of documents, key informant interviews, group discussions and field observations were validated and triangulated through comparing different data sources to identify similarities and patterns.

Efforts were made to logically interpret opinions and statements, keeping in view the specific context of various respondents. Qualitative data was used to draw comparisons between pre project situation and post project situation to assess the effectiveness of the project interventions. On the other hand, quantitative data was analyzed using simple statistical methods to determine progress and trends. Quantitative data related to project interventions and Log-frame output/outcome indicators and target was mostly obtained from project documents and analyzed to assess the progress for various project targets. The same was also validated through discussions with stakeholders and direct field observations.

A debriefing/presentation was held for stakeholders on the preliminary findings of the evaluation exercise on 30 November 2018, soon after the completion of the field mission. After detailed analysis a draft evaluation report has been prepared, on prescribed GEF TE format, and is circulated to UNDP and project team for their comments and suggestions. All received comments and suggestions will be considered and as appropriate incorporated in the final TE Report.

f) Timeline

Overall the proposed evaluation assignment consumed 30 working days spread over November 2018 to February 2019.

2. PROJECT DESCRIPTION AND DEVELOPMENT CONTEXT

2.1 Project start and duration

According to original project document, the proposed implementation timeframe of FREPP was from 1st April 2011 to 1st April 2014. However, the project document was officially signed on 22nd December 2011 and tentatively its end date was extended to December 2014. Down the road project implementation timeframe was further extended through several extensions, first to 28th June 2016 and later on to December 2017, however the project was finally closed in May 2018. Main reasons for the project timeframe extensions includes delays in project organization like establishment of PMU, non-approval of the proposed 2013-2020 National Energy Policy –which was a prerequisite for a number of project interventions-, change of co-financiers and partners, natural calamities –Cyclone Winston in 2016- and turnover of project staff, etc. These issues are discussed in detail in the following sections.

2.2 Problems that the project sought to address

Fiji continues to be highly dependent on imported petroleum products for power generation, transportation, industrial and household uses. Overall the project intended to address the problem of excessive greenhouse gases emissions from Fiji's power sector. The project document noted that this could be done by replacing fossil fuels with renewable energy resources such as biomass, biofuel, hydro, wind, etc. The initial situation analysis concluded that there are a number of barriers to the widespread and cost effective use of grid-based commercially viable renewable energy technologies.

Among others the major constraints/barriers included; 1) Absence of an integrated energy policy and plan, including the enactment and enforcement of an Energy Act and associated implementing rules and regulations, 2) Lack of development, promotion and utilization of alternative indigenous RE energy resources, 3) Financial constraints, linked to the limited government funding for energy investments. Even private power developers have financing constraints, and they too are dependent on external financing for energy investment projects in the country and, 4) Limited capacity (manpower and technical) in the Fiji Department of Energy (FDOE), which is the Government's focal point for the energy sector including energy policy development and oversight of energy sector operations.

The project document concluded that that these issues and barriers needs to be addressed in order to realize the sustainable development and utilization of the country's RE resources including biomass, biofuel, hydro, wind and solar, etc., for electricity and non-electricity purposes. In nutshell the project mainly focused on the removal of these barriers related to policy, regulations, markets, finances, and technical capacities to promote optimal use of RE resources for power generation.

2.3 Project goal and objective

As per project document the goal of the project was reduction of greenhouse gases emissions from Fiji's power sector. The objective of the project was removal of barriers to the widespread and cost-effective of grid-based renewable energy supply via commercially viable renewable

energy technologies. The project objective was also in line with the GEF-4 Strategic Program 3, on promoting market approaches for the supply of renewable electricity in utility scale grid-based power systems; and Strategic Program 4, on promoting sustainable energy production from biomass and modern uses of biomass.

The project consisted of 4 main components, each addressing specific categories of barriers, and these are: (1) Energy Policy & Regulatory Frameworks; (2) RE Resource Assessments and RE-based Project Assessments; (3) RE-based Power Generation Demonstrations; and, (4) RE Institutional Strengthening. FREPP was expected to facilitate investments in RE-based power generation in Fiji, which will support the socio-economic development of the country, make use of the country's RE resources and reduce GHG emissions. The expected outcomes of the project were:

Outcome 1: Facilitation of investments on energy projects, particularly on RE and biomass-based power generation;
Outcome 2: Technical feasibility of harnessing RE resources are ascertained and made widely known;
Outcome 3: Markets for specific renewable energy technologies are supported
Outcome 4: RE developments integrated into National Energy Plan towards 100% Electrification.

2.4 Main stakeholders

The main stakeholders of FREPP included;

- United Nations Development Programme (UNDP) Pacific Office, Fiji and Global Environment Facility (GEF) – *Financiers and Overseers.* UNDP also provided needed technical and project management support.
- Department of Energy (DOE) – *Main Implementing Partner.* This is under the Ministry of Infrastructure & Transport, The Department of Energy (DOE) focuses on four strategic areas for the development of a sustainable energy sector in Fiji i.e. Energy Planning, Renewable energy, Energy security and Power sector[1]. The DOE chaired Project Board and hosted and oversaw the Project Management Unit.
- Department of Environment – *National GEF Operational Focal Point* – This is responsible for environmental matters including those that are climate change-based. The overall mission of the department is to promote the sustainable use and development of Fiji's environment and efficient implementation of policies, legislation and programs. [2]
- Energy Fiji Limited (EFL) – *Commercial producer and distributer of electricity.* EFL is a state owned company, previously it was Fiji Electricity Authority (FEA). EFL is responsible for the Generation, Transmission and Retail of electricity on the larger islands[3]. FREPP collaborated with EFL for promotion of RE and development of a proposed standardised Power Purchase Agreement.

[1] http://www.fdoe.gov.fj/
[2] https://doefiji.wordpress.com/
[3] http://efl.com.fj/about-us/

- Ministry of Finance – is responsible for *funding and financial mechanisms* to support all projects in Fiji, including renewable energy. The ministry has been renamed as Ministry of Economy and its primary role is to support the Government in the efficient and effective management of the national economy consistent with the sustainable achievement of Government's vision for the nation.[4] Budget and Planning Department, involved in endorsing and approval of the budget of the DOE.
- Fiji Competition and Consumer Commission (FCCC) – Established in 2010 to ensure the integrated framework for the regulation of monopoly market structures; encourage competition, prevent restrictive trade practices, ensure consumer protection, and undertake pricing of public utilities and other price controlled items.[5] the FCCC is the *regulator of electricity tariff* supplied by the EFL via the grid.
- Ministry of National Planning – is the *coordinator all development activities* through the Development Sub Committee (DSC) comprising all Permanent Secretaries or heads of government ministries. Its mission is to ensure better coordination of national development efforts through the effective formulation, implementation and monitoring of Government initiatives and forward looking socio-economic planning, statistical analysis and advice.[6]
- Vara Renewable Energy – A private sector company, which initially signed letter of commitment and co-finance with FREPP for establishment of 3 MW biomass power generation plant at the cost of around USD 15 Mill. However, the co-financing agreement was not materialized and was subsequently cancelled in 2013.
- Fiji Sugar Corporation – *Co-financiers*. FSC is the largest producer and exporter of sugar in Fiji. Beside sugar it also produces a significant amount of power through bagasse (sugar cane residue) combustion. After Vara's withdrawal, FSC was selected as a partner for one of the demonstration by extending its capacities to produce energy from bagasse and as well from biomass to produce electricity all round year.
- Bukuya Community – *Beneficiaries*. Bukuya community was involved through a cooperative to effectively and efficiently manage and operate the 100 KW hydro project.
- University of South Pacific and Fiji National University – these *academic institutions* were involved from time to time in capacity building and research related interventions in renewable energy.

In addition to above a wide range of stakeholders from governmental institutions, development partners, private sector and civil society were engaged from time to time during various events, trainings and workshops.

[4] http://www.economy.gov.fj/about-us.html
[5] http://fccc.gov.fj/about-fccc-2/
[6] http://www.planning.gov.fj/

3. FINDINGS OF THE EVALUATION EXERCISE

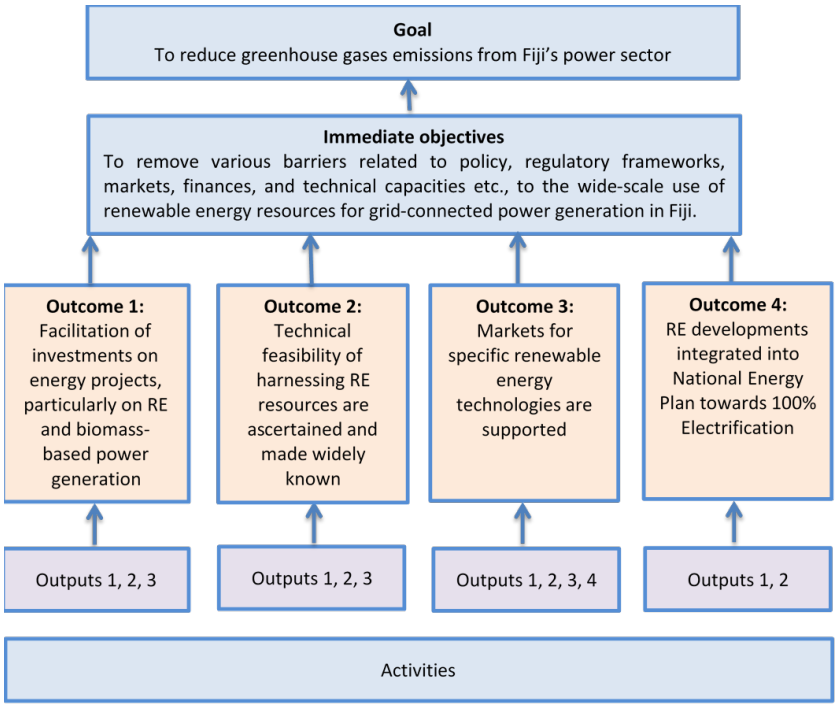
3.1 Project Design/Formulation

3.1.1 Analysis of LFA/Results Framework

A detailed project Logical/Results Framework was formulated at the time of project design consisting of goal, objective, component outcomes and respective outputs for each outcome. The RF also provided specific Indicators, Baselines, Targets, Sources of verification and Risks and Assumptions. Overall the project logical framework intended to achieve the goal of reduction in greenhouse gases emissions from Fiji's power sector through removing various barriers to the wide-scale use of renewable energy resources for grid-connected power generation in Fiji.

It was intended that the goal and objective will be reached by achieving four interrelated outcomes i.e. 1) Facilitation of investments on energy projects, particularly on RE and biomass-based power generation, 2) Technical feasibility of harnessing RE resources are ascertained and made widely known, 3) Markets for specific renewable energy technologies are supported, 4) RE developments integrated into National Energy Plan towards 100% Electrification. Similarly, a number of outputs were formulated to achieve each outcome. Broadly it can be concluded from analysis that that the original results framework was well formulated and exhibited clear linkages among, outputs, outcomes and objective. However, some of the outcome and impact targets were found a bit ambitious, keeping in view the limited resources of the project. These include targets like cumulative greenhouse gas emission reduction and Share of RE in Fiji's power generation mix by EOP etc.

Project Results Framework



Review of the results framework and discussion with project management team suggest that during project implementation a number of changes were made in the RF, especially at the output level, to adjust it to the dynamic implementation conditions. Major changes were made under outcome 1. The Project Board in its 2nd meeting in April 2014, decided that in the absence of an enabling environment for producing and promoting the 'Fiji Energy Act', the output related to formulation and endorsement of Energy Act and relevant rules and regulations need to be changed to the formulation and endorsement of Bio-fuel Policy and implementing rules and regulations.

Similarly, output 1.3 was also changed from capacity building of government institutions to De-Risking of Tariff Guarantee Fund. Discussions suggest that the major reason for bringing in these changes were related to non-endorsement of the proposed draft 2013-2020 National Energy Policy. A comprehensive new national policy document was formulated, after the expiry of 2006 national energy policy document, with the consultation of key stakeholders and was submitted for Cabinet approval in November 2013, however the endorsement didn't materialize.

Overall it can be concluded that these changes in the outputs have their own implications for achievement of the outcomes, as the respective outputs were specifically designed to achieve specific outcomes. However, these changes can also be considered as a good practice of adoptive management to adjust the result framework to the changing circumstance during project implementation.

3.1.2 Assumptions and Risks

The project document includes a risk log consisting of potential risks and relevant mitigation measures to neutralize and address these risks during project implementation. Following is the details of these risks and its impact on project progress and performance.

a) Ineffective project management – Limited capacity in the Government of Fiji to effectively manage and implement major national projects was considered a risk in the risk log and as a mitigation measure it was outlined that the availability of dedicated project personnel will facilitate effective and efficient implementation of the project activities. Though the project has had a dedicated Project Manager and a Project Assistant based in the PMU at DOE. However, discussions with project team and DOE suggest that on one hand, the two people's team was too small to manage a project of this scope and on the other hand the Project Manager's position remained vacant for a while, which significantly hampered the pace of implementation and project timeframe has to be extended several times.

b) Limited recognition and commitment of the Government – It was highlighted that there could be limited commitment among relevant agencies for formulation and endorsement of comprehensive policies and energy legislation. This also included the lack of appropriate allocation of government resources and enforcement on energy development initiatives, etc. The risk-log outlined as a mitigation measure that awareness will be raised on project interventions and project benefits will be advocated and all key policy stakeholders will be involved and updated on progress regularly.

The project has made significant strides to involve all key stakeholders from time to time and provided its inputs to enhance recognition and commitment of the government toward formulation of policies and regulations. FREPP was not directly involved in the formulation of proposed 2013-20 National Energy Policy, however, the non-availability of an updated and approved national energy policy document greatly hampered realization of some of the project outcomes and outputs and has indirectly caused significant delays in project implementation. Similarly, the National Biofuel Policy, formulated by the project, is also awaiting its endorsement.

c) Political change – It was highlighted that changes in the government may result in the new administration not supporting the energy policies, and possibly repeal of the Energy Act. As a mitigation measure it was outlined that the Preparation and endorsement of a comprehensive legislative framework will help ensure that the overall directions in the energy sector will survive changes in government. Discussion with stakeholders suggest that though the political situation remained rather very stable with no major upsets, however despite the political stability the endorsement of the proposed new national energy policy document didn't materialize, resulting in delays and changes in project outputs and interventions.

d) Failure of some of the demonstration projects – It was highlighted that failures of the demo projects will reduce stakeholder confidence to invest including finance required hardware installations. As a mitigation measure it was outlined that the proposed package of capacity building and enabling environment activities, centered on each demonstration project, will facilitate sustainability of these projects.

Down the road project faced issues in implementation of the proposed biomass power demonstration, which was supposed to be implemented by Vara RE, through a co-financing of USD 15 Million. However, this arrangement didn't materialize due to lack of interest and cooperation from Vara RE and the project had to look for and found a new partner i.e. Fiji Sugar Corporation, which upgraded its existing co-gen power plant at Labasa Mill, by installing a new 10 MW capacity equipment, at the cost of around USD 17 Million. However, in this case power is produced using bagasse and only during the few months of crashing season. Demonstration related to bio-fuel Mills also were faced with a number of issues like lack of profitability and demand, poor management and damage from cyclone Winston.

e) Lower oil prices – It was highlighted as a risk that a significant reduction in fossil fuel prices will makes renewable energy a less attractive option to local, national and international investors. The significant drop in international oil prices during 2014-15, considerably impacted the profitability, especially for bio-fuel and most of the bio-fuel mills stopped producing bio-fuel for local consumption due to lack of demand and higher prices.

3.1.3 Lessons from other relevant projects incorporated into project design

At the time of designing of FREPP project, Fiji was also participating in two on-going regional renewable energy projects supported by the GEF. These were the Pacific Islands Greenhouse Gas Abatement through Renewable Energy Project (PIGGAREP) and Sustainable Energy Financing

Project (SEFP). PIGGAREP supported in-country activities in Fiji included a Technical Assistance on Residential roof-top PV grid connected system study for the main island of Viti Levu, enhancement of the Energy Information Systems and the implementation of a RESCO Manager (a computer software management tool) for the Fiji SHS Program.

The Project Document highlighted that the implementing partner of FREPP -the DOE, was also the national focal point for PIGGAREP and SEFP. Therefore, this helped in facilitating the coordination of GEF supported RE interventions in Fiji, including FREPP. It was intended that FREPP will complement these two projects, as well as past, on-going and planned national and regional interventions on RE development and utilization to increase the project impact, and avoid duplication of efforts. It is important to highlight that the implementing partner for FREPP -the DOE- was also the national focal point for PIGGAREP and SEFP. Therefore, it was also found very instrumental to incorporate lessons and good practices, especially the coordination mechanisms from these projects in the design of FREPP.

3.1.4 Planned stakeholder participation

FREPP design envisaged active participation of wide range of stakeholders to achieve its outputs and outcomes. Following is a summary of the main stakeholders and their planned participation, as originally outlined in the project document;

- Department of Energy (DOE) – to serve as the main implementing partner for the project
- Department of Environment – National GEF Focal Point –to be involved in the monitoring of the project performance.
- Energy Fiji Limited (EFL) –to facilitate for promoting the commercialization of RE-based power generation and best practices gained from the project.
- Ministry of Economy –to be involved in the detailed characterization of project budgets and plans
- Beneficiaries - Local communities to be involved in management of micro grids etc. Other beneficiaries will include governmental institutions and private companies etc.
- Independent Power Producers/Investors –to be involved in investment of energy projects
- Fiji Competition and Consumer Commission (FCCC) – to be involved in tariff related issues for micro grids etc.
- Banks – to be involved in in provision of funds for investment projects on commercial terms
- Ministry of Strategic Planning – to ensure better coordination of national development efforts through the effective formulation, implementation and monitoring of Government initiatives and forward looking socio-economic planning, statistical analysis and advice.
- Development partners – to provide technical support
- Politicians – to be involved in approval of RE policies
- RE Hardware Suppliers –to be involved in provision equipment and material

3.1.5 Replication approach

The project document highlighted that lessons and good practices from FREPP will contribute to the achievement of similar goals and objectives in Fiji and especially in the Pacific Island Countries

that are working collectively under various sub-regional and regional RE programmes. It was intended that FREPP successful experiences will serve as a model for other PICs or SIDS elsewhere.

Discussions with stakeholders suggest that the most promising achievement of the project was establishment and implementation of Bukuya hydro power model. A community based private company has been established to operate the hydro power station and electricity distribution in 3 villages. The arrangement is found successful and stakeholders are of the view that this can and will be replicated in other such remote off grid villages for electricity supply. On the other hand, the wider scale replication of bio-fuel production and processing units is found difficult at the moment due to lack of profitability of the business model due to limited demand for bio-fuel, lower oil prices and management issues in running of the milling units in remote islands. Most recently DOE has taken steps to improve performance of biofuel mills by handing over some of the biofuel mills to a private company –Copra Millers, and it is expected that this will help in increasing the profitability of the biofuel mills.

The 10 MW biomass power generation facility at the FSC Labasa will continue to produce significant amount of electricity during the crushing seasons. It is important to note that coinciding with the project implementation timeframe, another major development took place for the promotion of biomass based RE i.e. the establishment Nabou Green Energy Limited[7], which is Fiji's first Independent Power Producer (IPP)[8]. The company is comprised of four key stakeholders; GIMCO, GS Power, Mirae Asset Daewoo and Tropik Fiji Ltd and have established a 12MW biomass power plant at Nabou, Sigatoka. The plant was completed and inaugurated in late July 2017 and a 25 years PPA has been signed between EFL and NGE for purchase of electricity and presently the facility is providing electricity to the main grid. Though FREPP has not interacted with NGE but this development can be viewed as a substantial step in replication and promotion of biomass based RE in Fiji.

3.1.6 UNDP Comparative Advantage

UNDP role remained very instrumental during all phases of project formulation and implementation. Overall UNDP brings along a number of creditable comparative advantages and has been contributing in the development of Fiji in particular and Pacific islands in general. UNDP long standing presence in the Fiji, since 1970, has allowed it to foster strong collaborations with governmental institutions -at the national and regional level-, international development organizations, civil society, academia, private sector and local communities.

Discussion with stakeholders suggest that UNDP also enjoys very good relations with the GoF and sound reputation with all stakeholders based on its apolitical and neutral development agenda and role. It is evident from the fact that in 2006 -in the wake of political situation in Fiji- when other international agencies had somehow curtailed their collaborations with GoF, UNDP continued its assistance and support even in those difficult times. This was the specific reason

[7] NGE Webpage: http://ngel.com.fj/?page_id=120
[8] WB defines IPPs as 'power projects that are, in the main, privately developed, constructed, operated, and owned; have a significant proportion of private finance; and have long-term power purchase agreements with a utility or another off-taker'

that UNDP became GEF Implementing Agency (IA). Initially WB was GEF IA and WB then requested that UNDP to become IA. Among others, these strong connections with GoF and other stakeholders allows UNDP to bring various stakeholders together and coordinate various projects and programmes with greater ease and effectiveness compared to other development partners and governmental agencies.

UNDP also brings along specific advantages in provision of administrative and technical assistance and most importantly mobilization of needed financial resources. Needless to emphasize that UNDP capacity of bringing in quality and matching international expertise and skills from all around the world is of great value in management and implementation of such projects. The project was implemented using UNDP's National Implementation (NIM) modality and accordingly UNDP provided all needed administrative, operational, procurement, technical and capacity building support during implementation.

UNDP also diligently exercised its role in the quality assurance and monitoring and evaluation of the project interventions and results, including regular progress reporting and mid-term evaluation, etc. It is important to highlight that UNDP also played an important role in facilitation to address issues related to project management and implementation as an important member of the Project Board. Overall it can be concluded that the project duly benefited from UNDP wide range of advantages and expertise.

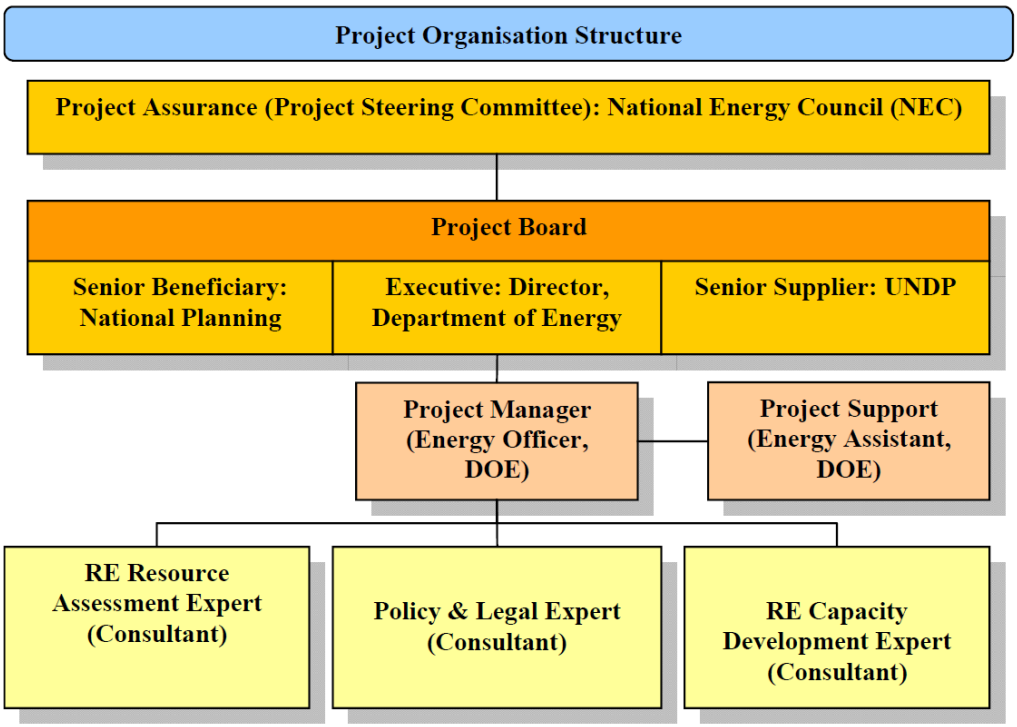
3.1.7 Linkages between project and other interventions within the sector

The Project Document highlighted at the time of project design that FREPP was fully in line with the overall plan of the Government of Fiji i.e. "Roadmap for Democracy and Sustainable Socio-Economic Development 2009–2014". Furthermore, the FREPP was also consistent with the priorities outlined in 2006 National Energy Policy that had the vision of 'A sustainable energy sector for Fiji' and a mission 'To provide an enabling environment for a sustainable energy sector'. It is important to note that the 2006 NEP was due for revision in 2011. In 2013 a comprehensive new national energy policy document was developed in consultation with key stakeholders. The draft policy document was submitted to GoF for approval in November 2013, however since then its approval is still pending. Nevertheless, the project interventions are also fully in line with GoF 5 and 20 years National Development Plan 2017 –Transforming Fiji, which aims at achieving 100% power generation through renewable energy by 2030.

The project is also aligned with the United Nations Framework Convention on Climate Change (UNFCCC), ratified by GoF in 1993. Which calls for commitments and obligations to contribute to the ultimate objective of the UNFCCC, which is to achieve the "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system". The project objective and interventions are also fully in line with GEF-4 Strategic Program 3 on promoting market approaches for the supply of RE and Strategic Program 4, on promoting sustainable energy from biomass etc. Similarly, FREPP also complement UNDAF Outcome of mainstreaming of environmental sustainability and sustainable energy into regional and national policies and, UNDP Strategic Plan environment and sustainable development outcomes.

3.1.8 Management arrangements

FREPP was managed and implemented using UNDP National Implementation Modality (NIM). The DOE was the designated as the Implementing Partner for the project, which executed the project on behalf of the Government of Fiji (GOF). Based on request from the Government, UNDP provided support to the project. UNDP took the role of the Senior Supplier, while National Planning Ministry represented the GOF and acted as the Senior Beneficiary of the Project. The three parties made up the core members of the Project Board whose main function was to strategically guide the course of the project towards achieving its objective.



In the original organization structure the responsibility of project assurance rested with the proposed National Energy Council, however the establishment of NEC did not materialize and the project was mainly overseen and guided by the Project Board, which was headed by DOE and consisted members from UNDP, Ministry of Strategic Planning and project team. The constitution and activation of PB was considerably delayed and held its 1st meeting in May 2013, after a lag of 18 months, since project formal signing in December 2011. In total PB met only three times i.e. in 2013, 2014 and 2016, however despite the late start and limited number of meetings the PB has played an important role in overseeing and guiding the project and especially revisiting of project outputs and making necessary adjustments to project results framework in the wake of changing circumstances.

To manage and implement the project a Project Management Unit was established at DOE, consisting of a National Project Manager and a Project Assistant. The main functions of PMU included day-to-day management including coordination, monitoring and evaluation, progress

reporting, and formulation of annual work plans. For technical support project employed several consultants from time to time. Discussions suggest that establishment and operationalization of PMU also took considerable time, almost a year, however afterwards it functioned efficiently for a while until the Project Manager left project in 2015.

The position remained vacant for a considerable time and later on the former Project Assistant was elevated to the position of PM furthermore in the last year, in the absence of the PM the project was looked after directly by the officials of the DOE. UNDP concerned unit staff also greatly facilitated project management especially budgetary/financial affairs and monitoring and reporting of progress. Discussions suggest that the late operationalization and vacant positions in the PMU were mainly attributed to the cumbersome DOE recruitment processes for project staff. Subsequently the delay in establishment of PMU, vacant positions and understaffing has significantly slowed down project implementation and progress.

Other implementing partners of FREPP included; 1) Energy Fiji Limited (EFL) –project collaborated with EFL in the development of a draft proposed standardized Power Purchase Agreement template-. The Standardized PPA was developed in consultation with EFL. In the start EFL was reluctant to share its generic PPAs, but later on it provided required information to project consultants, who developed the standard PPA. 2) Fiji Competition and Consumer Commission (FCCC) –project collaborated with FCCC for establishment of electricity tariff for Bukuya Hydro Project, 3) Fiji Sugar Corporation – project collaborated with FSC, after Vara RE withdrawal, as a partner for one of the demonstration i.e. 10 MW co-gen power plant at FSC Labasa, 4) Bukuya Community –project collaborated with Bukuya community to effectively and efficiently manage and operate the 100 KW hydro project, 5) Rabi community –project collaborated with local community in management of Rabi Bio-fuel Mill, 6) University of South Pacific and Fiji National University –Though these academic institutions didn't implement specific project interventions, however they regularly participated in project workshops and events and provided their inputs and suggestions.

Overall it can be concluded that despite challenges and delays the project management tried to cope with and adopt itself to the dynamic circumstances during implementation. UNDP and DOE provided much needed management and implementation support especially in the wake of understaffing and vacant positions in the PMU. Discussions also suggest that overall cooperation between all stakeholders, with few exceptions i.e. Vara RE and EFL, during implementation remained optimal and forthcoming.

3.2 Project Implementation

3.2.1 Adaptive management

As mentioned in earlier sections FREPP faced a number of challenges arising from dynamic implementation environment. These challenges called for a number of adaptive management measures to adjust project design, results frameworks and implementation arrangements to the changing circumstances. Project Board played a lead and instrumental role in analyzing these design and implementation challenges and suggesting specific measures to overcome them.

The foremost among these adaptive measures included changes in the project Results Framework, especially at the output level. Major changes were made under outcome 1. At its 2nd meeting, in April 2014, the Project Board decided that in the absence of an enabling environment for producing and promoting the 'Fiji Energy Act' the output related to formulation and endorsement of Energy Act and relevant rules and regulations need to be changed to the formulation and endorsement of Bio-fuel Policy and implementing rules and regulations. Similarly, the output 1.3 was also changed from capacity building of government institutions to De-Risking of Tariff Guarantee Fund. The major reason for these changes were related to non-endorsement of the proposed 2013-2020 National Energy Policy, which was considered as a prerequisite for realization of the mentioned outputs.

The Project Board also took adaptive measures by replacing Vara RE as the main co-financier – which originally signed a letter of commitment for co-financing of USD 15 Million for establishment of biomass based power generation plant, however down the road, due to lack of interest and cooperation of Vara RE and especially non-securing of a PPA with EFL, this commitment was not materialized. Therefore, in 2014 the PB decided to involve Fiji Sugar Corporation, as a partner, for one of the demonstrations, i.e. 10 MW biomass power plant at FSC Labasa. This change in partner came very timely and FSC invested around USD 17 Million in upgradation of their 10 MW power generation plant.

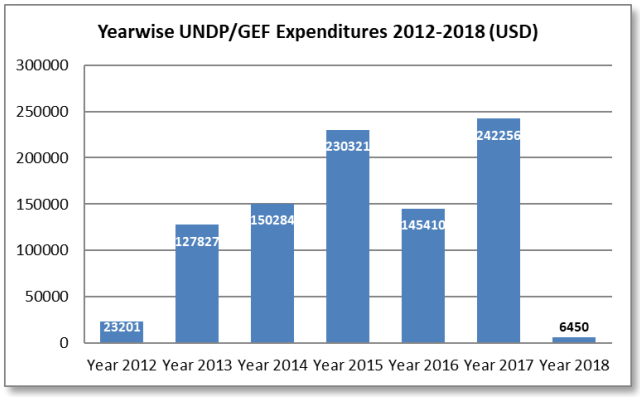
In addition to several other smaller adjustments the PB also approved the no-cost extensions of the project to complete remaining project interventions, etc. Though these changes have their own implication for realization of project specific outcomes, these changes can be also considered as a good practice of adaptive management to adjust to the changing circumstance during project implementation.

3.2.2 Project Finance and Expenditures

According to the original Project document, the total project budget was estimated at USD17,528,673, comprising of US$ 975,000 from GEF, USD 1,553,673 from government co-financing, and USD 15,000,000 as co-financing from the project partner i.e. Vara Renewable Energy (VRE). The government co-financing was duly fulfilled; it was increased to US$4,478,673 during project implementation.

However, the co-finance of USD 15 Mill from VRE for establishment of a biomass power demonstration project didn't materialize. The main reasons being the lack of interest from VRE in collaboration with FREPP and non-securing of a suitable Power Purchase Agreement with EFL. Subsequently the co-finance agreement with VRE was cancelled by the Project Board in 2013. Search for new co-financier was started and a number of potential partners were identified and after due consultations and evaluation, Fiji Sugar Cooperation was selected, as alternative co-financier, with a total co-financing of around USD 17 Million. Though the withdrawal of VRE considerably delayed the implementation, however project was successful in securing a reliable and willing alternative partner and with an increased co-financing.

At the time of project closure, the total budget was reported at USD 22,464,923, comprising USD 975,000 from GEF resources, USD 4,478,673 from government co-financing, USD17,000,000 from FSC co-financing and US$11,250 as support from the Secretariat of the Pacific Community. It is important to mention that the government co-finance substantially increased from USD 1.55 Million to USD 4.47 Million. Analysis of records suggest that the government co-finance was mainly related to the funds utilized by the DOE for establishment of the 9 Biofuel Mills in small islands. On the other hand, the co-financing from FSC were utilized for installation/upgradation of a 10 MW biomass power demonstration project at FSC's Labasa Mill.



According to UNDP Combined Delivery Reports (CDRs) from 2012 to 2018, FREPP has utilized USD 925,749, i.e. 95% of its total GEF resources. Component wise expenditures details were not available from the CDRs, however assessing from the scale of interventions it can be easily assessed that the major chunk of resources, including co-finance of USD 4.47 Mill from Government and USD 17 Mill from FSC, were spent under Output 3.1 i.e. Designed and implemented RE-based power generation demonstrations. Year wise distribution of Govt. and FSC expenditures were not available however analysis of GEF funds suggests that expenditures grew steadily from 2012 to 2015, then dropped in 2016 and rose again 2017, finally dropping to the lowest levels in 2018 (please see chart),

Overall it can be concluded that, for the core-funds from GEF/UNDP, allocations were made based on annual and quarterly work plans and budgets, which were duly approved by the Project Board. Analysis and discussion also suggest that project core-funds were managed and spent in an efficient, cost effective and accountable manner, using GoF and UNDP standard financial management and procurement systems and procedures, keeping in view the best value for money.

3.2.3 Monitoring and evaluation (Evaluation Rating: 4-Moderately Satisfactory)

Project document has outlined a number of monitoring and evaluation measures and activities to effectively monitor and report the progress of project interventions and results. Following is the summary of M&E mechanisms and activities of the project;

According to project organizational structure, the proposed National Energy Council was supposed to perform the project assurance function, however the establishment of the NEC couldn't materialize, therefore at the highest level the project was monitored and overseen by the Project Board, which met in 2013, 2014 and 2016 and reviewed project progress and performance and decided on required corrective measures. Though PB only met three times during the seven-year lifespan of the project, however its inputs were found instrumental in

monitoring and streamlining of project interventions, especially revision and alignment of various outputs.

At start of the project, in October 2012, an inception workshop was organized to bring on board all stakeholders to discuss and generate consensus and to enhance participation and ownership. The Project Results Framework Matrix was presented and discussed in details and inputs were received from stakeholders. Similarly, the management arrangements, roles and responsibilities, co-financing sources were presented, reviewed and reconfirmed. A multi-year work plan was also presented and was reviewed and validated. The Inception Workshop Report remains a key reference baseline document.

Review of RF and discussions suggest that during project implementation a number of changes were made in the RF. Major changes were made under outcome-1 and output related to formulation and endorsement of Energy Act was changed to the formulation and endorsement of Bio-fuel Policy and implementing rules and regulations. Similarly, output related to building capacity of government institutions was changed to De-Risking of Tariff Guarantee Fund.

PMU remained responsible for day-to-day monitoring and evaluation of project interventions and results. Project progress has been regularly reported on quarterly and annual basis through furnishing a series of Quarterly Progress Reports (QPRs) and Annual Project Implementation Reports (PIRs) during 2012-2018. Prepared using standard formats these progress reports describe the progress of implementation of activities, including major issues and challenges and way forward. The QPRs were found slightly abstract, as it presented the progress only in a tabular form, in line with the RF. PIRs were more elaborate and combined both UNDP and GEF requirements. UNDP CO was regularly engaged in oversight and quality assurance of project and has closely monitored the project interventions on quarterly and annual basis through regular progress review and reporting. In addition, the project also monitored its progress through internal monthly and quarterly review meetings and project team also regularly visited field interventions to observe their progress and performance.

In April 2016, an independent Mid-term Review of the project was commissioned and conducted, which reviewed project design, progress and performance and provided a number of recommendations for streamlining and improvement of project interventions. The key conclusions of the MTR included:

- The Project concept was fully aligned with the country development priorities.
- Indicators related to the new Outputs that have been introduced need to be defined accordingly.
- The non-endorsement of the NEP by Cabinet has prevented the implementation of a number of planned activities and several of the Outputs had to be changed.
- Implementation of the activities under the PRODOC for the Mid-Term of the Project show important delays, mainly in activities of Components 1 and 4.

- The committed co-financing of US$ 15 million for VARA RE project was not realized due to the cancellation of the project. However, an additional co-financing commitment was realized as a result of the incorporation of the FSC Labasa project as a demonstration project.
- In spite of these setbacks, the Project has been able to achieve concrete and tangible results.
- The activities done and the outputs achieved so far are moderately likely to be sustainable or lead to making the expected outcomes sustainable in the medium to long term

Analysis of the key conclusions suggest that findings of MTR matched with the conclusions of this TE Report. As both reports acknowledged the high level of relevance and alignment of the project with national priorities. Similarly, the main reason for delay in project intervention is related to the non-endorsement of the NEP. It is also noted in both reports that despite several delays the project has made considerable progress to achieve its results.

The MTR also provided a number of recommendations, following is a list of key recommendations and its status at the time of Terminal Evaluation;

- A one-year extension of the EOP is recommended to allow sufficient time for the finalisation of the pending activities. This recommendation was duly addressed by extending the end of project date from June 2016 to May 2018.
- Urgent actions should be taken to ensure that Cabinet endorses the NEP 2014 ASAP. This recommendation was slightly beyond the control of the project, as project had no direct involvement in the development of NEP 2014. As mentioned earlier as such the endorsement of NEP 2014 didn't materialize.
- The indicators for new Outputs 1.1 and 1.2 need to be properly defined. The recommendation was duly addressed and relevant indicators were identified in the revised RF.
- The PMU needs to identify another demonstration project where the PPP (developed for Bukuya Hydro Project) can be tested for replication potential. This recommendation has not materialized so far due to pending tariff approval by the FCCC.
- In May 2014, the FCCC increased the minimum IPP tariff from 0.2565 FJD/kWh to 0.3308 FJD/kWh. However, this tariff is substantially below the cost of thermal generation and hence needs to be revised accordingly. This recommendation didn't materialize and tariff remained at 0.3308 FJD/kWh.
- The tendering of the contract for the implementation of the Centralised Energy Database should be done ASAP. This recommendation partially materialize as such the tendering process was considerably delayed and finally the project decided to establish an online portal where renewable energy related information was uploaded for reference and use of stakeholders.
- To increase budget for activities under Output 2.3, in order to able to meet the proposed target of 6 completed and published feasibility studies. This recommendation was partially materialized as only 2 feasibilities could be completed, due to the time consuming nature of some of the feasibility studies like wind and hydro projects.

- To organise a follow up event of investment forum to show progress made on the various actions undertaken by FREPP. This recommendation also didn't materialize and no follow up event could be organized, due to the non-endorsement of the NEP.
- A prompt agreement should be reached with ADB on how to move forward with the preparation of National Electrification Plan or otherwise consideration should be given to reallocating the budget for this activity. Regarding this recommendation, the Project Board, keeping in view the willingness and funding from ADB, decided in its March 2016's meeting that the output could be classified as 'completed by ADB'.
- To recruit a replacement for the Project Manager which resigned in May 2015 and has not yet been replaced. This recommendation was partially addressed, the Project Assistant was elevated to the position of PM, while the position of Project Assistant remained vacant.

The Project document also included an independent Terminal Evaluation of the project towards the end of the project. The objectives of the TE is to assess the relevance, effectiveness, efficiency, sustainability and impact of project interventions, outputs and outcomes. The evaluation also assessed the project design and key financial aspects of the project, including the extent of co-financing planned and realized. The evaluation also assessed the extent to which the project was successfully mainstreamed with other UNDP priorities. The TE also draws conclusions and provides recommendations to improve the sustainability of benefits and to improve performance of future such initiatives.

Overall it can be concluded that the project strived to effectively monitor and evaluate its progress and performance and the quality of its progress reporting was noteworthy, however It is important to mention that the absence of dedicated resources and specific M&E expertise/team within the PMU has somehow hampered the development and implementation of a comprehensive and effective project M&E mechanisms, especially collection, analysis and reporting of data related to project progress and outcomes and impact indicators.

3.2.4 Overall project implementation/execution, coordination, and operational issues

FREPP has made commendable efforts and has strived rigorously to contribute towards its intended results. However, given the dynamic and complex nature of implementation environment it has also faced a number of execution, coordination and operational issues which considerably hampered implementation of project interventions and achievement of project results. Some of the major issues and challenges FREPP faced are outlined in the following;

a) Procedural and process delays

Establishment of PMU and recruitment of project staff consumed considerable time and project was operationalized in July 2012 after a laps more than year from the original start date of April 2011. Organization of Project Board was further delayed and held its 1st meeting in April 2013. Furthermore, the turnover of project staff, especially the Project Manager rendered the position vacant for a while, which also substantially delayed implementation of project activities. Furthermore, bidding and approval processes for service providers to conduct various project studies and activities like establishment of central database systems were also considerably

delayed due to cumbersome and multi-tiered governmental vetting and approval procedures. Due these delays the project timeframe had to be extended from 2014 to 2018. Discussions with the project team suggest that these delays are mostly attributed to the cumbersome and complex project staff recruitment processes and time taken to formalize project board, organize inception workshop, and develop and approve work plans, etc.

b) Non-endorsement of the draft 2013-2020 National Energy Policy

As mentioned in the previous sections a number of project outcomes and outputs were directly linked to the availability of an updated and approved National Energy Policy. It is important to highlight that NEP 2006, was expired in 2011. Therefore, a new draft NEP was formulated, in consultation with stakeholders, and was submitted to the GoF for approval in November 2013, however it wasn't formally endorsed by the cabinet. The non-availability of an approved new NEP significantly impacted project implementation and delayed progress especially on project outcome-1, which called for producing and promoting the Fiji Energy Act. However, after a long waiting period, finally project outcome-1 had to be modified to the formulation of Bio-fuel Policy, etc. Though this change can be considered a measure of adaptive management, it also had implications for achievement of the project objective and goal. It is also important to highlight that the draft Bio-fuel policy, formulated by the project, was submitted to GoF in 2015, however it is also still awaiting approval by the cabinet.

c) Cancellation of the Vara Renewable Energy (VRE) demonstration project

According to original project document Vara Renewable Energy – a Private Company- signed a letter of commitment for co-finance of USD 15 Mill for a 3 MW biomass power demonstration project. However, this arrangement didn't materialize due to lack of active collaboration from VRE and non-securing of Power Purchase Agreement with FEA. Therefore, the agreement of co-finance with VRE was cancelled by the PB in 2014. Soon after a new commitment letter was signed with Fiji Sugar Cooperation, as alternative partner, for installation of a 10 MW co-gen power plant at Labasa Mill, with a total co-financing of around USD 17 Million. Needless the emphasize that withdrawal of VRE considerably hampered and delayed the implementation of one of the important demonstration projects.

d) Natural calamities

In February 2016 Cyclone Winston –a category 5 cyclone and one of the strongest in the recorded history- brought about wide spread destruction in Fiji with huge loss of life, property, infrastructure and tens of thousands of peoples were forced to evacuate their homes. Overall the cyclone has also considerably hampered FREPP implementation as on one hand it directly impacted project interventions like destroying or damaging most of the newly established bio-fuel mills and 11 out of 15 wind monitoring stations in Viti Levu. The impacts of the disaster was so overwhelming that naturally all attention and efforts of governmental institutions and development partners were diverted to the emergency and rehabilitation work, therefore FREPP activities were put on the back burner for a while.

3.3 Project Results

3.3.1 Overall results (attainment of objective) (Evaluation Rating: 4-Moderately Satisfactory)

The following table provides a summary of achievements of project outcomes and outputs against specified indicators and targets as outlined in the of Project Revised Results Framework. The RF was revised by the Project Board in April 2014. Detailed analysis is provided in the following sections on Relevance, Efficiency, Effectiveness, Sustainability and Impact.

FREPP Results Framework: Summary Targets and Achievements

Objective / Outcome/ Outputs	Indicator	Baseline	Target	Total Achievement and Remarks
Goal: Reduction of greenhouse gas emissions from Fiji's power sector.	Cumulative greenhouse gas emission reduction from power generation in Fiji by the end of project (EOP), ktons CO2	316.4	935.8	Precise cumulative data not available. However according to project estimates 24.3 ktons CO2 was reduced from 2015-2017 (3 years) by FSC Labasa Demonstration Project[9])
Objective: Removal of major barriers to the widespread and cost-effective use of grid-based renewable energy supply via commercially viable renewable energy technologies	Cumulative installed new private sector-owned RE-based power generation capacity by EOP, MW Share of RE in Fiji's power generation mix by EOP, % Cumulative electricity production from RE-based power generation plants by EOP, GWh	0 52 494.0	4.7 89 1505	10 MW (Fiji Sugar Corporation Labasa) 67% (2015)[10] Up-to-date data not available
OUTCOME 1: Facilitation of investments on energy projects, particularly on RE and biomass-based power generation	Cumulative investment on RE-based power generation by EOP, US$ million	0	$ 100 Mil	$ 17 Mil (Fiji Sugar Corporation) $ 45 Mil (Nabou Green Energy Limited)[11]
Output 1.1: Bio-Fuel Policy	No. of proposed articles on the Bio-Fuel Policy that are endorsing RE-based power generation in Fiji A cabinet-approved comprehensive Bio-fuel Policy promulgated Institutional reform of DOE to effectively administer the Fiji Biofuel Act	0 0 0		Bio-fuel Policy, Strategic Action Plan, Policy and Legislation Gap Analysis formulated. National Biofuel Policy and Strategic Action Plan submitted to GoF, but so far not approved by cabinet Didn't materialize. Awaiting approval of NBP and SAP.
Output 1.2: Formulation of IRR for Bio-fuel Policy	No. of specific IRRs enforced by EOP	0		Didn't materialize. Awaiting approval of NBP and SAP. The DOE will

[9] Evaluation of FSC Labasa Power Project
[10] https://energypedia.info/wiki/File:Fiji_Energy_Targets_2013.png
[11] http://star.gsd.spc.int/images/presentation17/Presentations_STAR/Day2/Session_07_Geo_Resources/keynote_eltech_Kyung.pdf

Objective / Outcome/ Outputs	Indicator	Baseline	Target	Total Achievement and Remarks
	No. of revised IRRs proposed to enhance Bio-fuel Policy implementation by EOP	0		prepare a 'white paper' on the IRR based on the previous inputs (i.e. the Gap Analysis Paper of existing legislation). Didn't materialize. Awaiting approval of NBP and SAP.
Output 1.3: De-Risking of Tariff Guarantee Fund	No. of RE-based power generation projects that benefits from TGF by EOP %. of approved RE-based power generation projects that benefit from the TGF by EOP	0 0	1 100	Report on Tariff Structure on the PPP model for the Bukuya Hydro Project prepared. TGF is not established yet. TGF is still to be piloted before its large scale replication.
OUTCOME 2: Technical feasibility of harnessing RE resources are ascertained and made widely known	No. of identified technically viable RE projects EOP No. of investors that made use of available technical information on feasible RE-based energy system projects by EOP	0 0	6 20	8 waste sites identified for waste to energy. Monitoring of hydro and wind potential in progress at several sites. Data not available
Output 2.1: Operational Centralized Energy Database System	No. of clients that request services from the central clearinghouse for their RE-based energy systems project EOP No. of clients that make use of the central energy database system each year % of clearinghouse and central energy database system clients each year that are satisfied with the services received No. of implemented RE-based power generation projects that were facilitated by the central clearing house system by EOP.	0 0 0 0	300 150 80 20	An online portal for the Centralized Energy Information Forum, has been established (www.reinfofiji.com.fj) and RE related studies and reports are uploaded.[12] The information portal is open for all to access relevant information. Data not available Data not available

[12] The procurement process for a service provider for establishment of the database system was considerably delayed due to cumbersome governmental approval procedures and was finally dropped due to higher cost estimates from bidders, in-turn a simple web-portal has been established for RE related information.

Objective / Outcome/ Outputs	Indicator	Baseline	Target	Total Achievement and Remarks
Output 2.2: Completed and published RE resource assessments	No. of comprehensive RE resource assessments completed by EOP	0	12	Studies on waste-to-energy are completed and available online www.reinfofiji.com.fj, Monitoring of hydro potential in 6 sites in progress (reports awaited) 15 wind monitoring stations established data collection in progress (reports awaited)
	Average % increase in currently known RE potentials that was established after the RE resource assessments	0		Precise data not available.
	No. of investors that made use of the RE resource assessment data/information in the design of their RE-based power generation projects by EOP	0	6	Precise data not available.
Output 2.3: Assessed feasibility of RE investments	No. of completed and published new feasibility studies of IPP investments by EOP	0	6	Pre-feasibility reports of Buca and Nukuloa micro hydro power projects completed. (Rest will be completed by DOE in times to come)
	No. of planned new feasibility analyses to be carried out by EOP	0	4	Same as above
	% of interested investors in Fiji that expressed confidence in the technical and financial viabilities of RE-based power generation projects by EOP	0	30	Precise data not available (RE Investment Forum was organized in April 2015 in collaboration with Investment Fiji)
OUTCOME 3 Markets for specific renewable energy technologies are supported	No. of additional rural households that have access to green electricity by EOP.	0	10,000	300 HH from Bukuya Hydro Project
	No. of financial closures achieved for new RE-based power generation projects by EOP	0	20	Precise data not available
	No. of RET system equipment/component suppliers & distributors in Fiji by EOP	0	7	Precise data not available
		0	100	Precise data not available

Objective / Outcome/ Outputs	Indicator	Baseline	Target	Total Achievement and Remarks
	Overall volume of business in the RE market in Fiji by EOP, US$ million			
Output 3.1: Designed and implemented RE-based power generation demonstration	Overall installed capacity of RE-based power generation demo projects by EOP, MW	0	4.7	FSC Labasa Biomass Project (10 MW); Bukuya Micro-Hydro Project (100 KW),
	No. of demo projects that are both operationally and financially viable by EOP	0	10	2, FSC Labasa and Bukuya Hydro
	No. of planned RE-based power generation projects that are replicating any of the demo projects by EOP	1	16	No planned projects yet. (Bukuya PPP will be replicated after approval)
	Total installed capacity of replication RE-based power generation projects by EOP	0	3	No planned replications yet.
Output 3.2: Prepared Standard Power Purchase Agreement (PPA) for IPPs	Endorsed Standard Power Purchase Agreement (SPPA) templates that are used for IPP projects in Fiji	0	1	Standard PPA templates developed but not endorsed or adopted by EFL.
	No. of IPP RE-based power projects that made use of any of the approved SPPA templates by EOP	0	6	SPPA templates not endorsed or adopted by EFL
Output 3.3: Completed Investment Promotion Package	No. of prospective investors making enquiries with government agencies	0	15	Precise data not available
	Cumulative number of investors that expressed and planned to invest & implement RE-based power generation projects by EOP	0	10	Precise data not available
Output 3.4: Completed assessment and developed RE incentives schemes	A comprehensive report on options and issues related to the establishment of a subsidy fund for private sector renewable energy investment published			3 reports completed including; 1) Report on the Review of Existing Subsidy and Incentive Schemes 2) Report on Review of International Experiences in the RE Subsidy and Incentive Schemes; and, 3) Report on the Design of Incentive Schemes for RE-based Power Generation Projects.
OUTCOME 4	Cabinet Approved-Electrification Master Plan	0	1	ADB is working on the Electrification Master Plan

Objective / Outcome/ Outputs	Indicator	Baseline	Target	Total Achievement and Remarks
Renewable Energy developments integrated into National Energy Plan towards 100% Electrification of Fiji.	Average annual budget for the Electrification Master Plan by EOP, US$ million	0	10	Will be done after the EMP
	% utilization of Fiji's RE resources (for power purposes) by EOP	52	90	No precise data available
Output 4.1: Completed training programme on integrated energy planning (IEP) and administrative energy policy for government personnel	No. of GOF personnel trained on IEP and energy policy each year starting Year 2011	2	6	Training workshop organized in 2016 and attended by 26 participants including GoF officials
	% trained GOF personnel that are actively engaged in RE-based power generation policy making, planning and implementation, operations and evaluation by EOP	0	50	Precise data not available
	No. of training institutions that are capable and qualified in IEP and energy policy training/capacity building by EOP	2	2	SPU and FNU are well qualified institutions
Output 4.2: Completed and approved National Electrification Master Plan	Cabinet Approved-Electrification Master plan	0		ADB is still working on the Electrification Master Plan. Its approval will be sought once ready
	Average annual budget for the Electrification Master Plan by EOP, US$ million	0	10	Will be done once EMP is approved

3.3.2 Project Relevance (Evaluation Rating: 2-Relevant)

The Government of Fiji has ratified the United Nations Framework Convention on Climate Change (UNFCCC) and as a Party to the UNFCCC, Fiji has assumed certain commitments and obligations to contribute to the ultimate objective of the UNFCCC, which is to achieve the "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system". Overall FREPP agenda of reducing GHGs was consistent with the UNFCCC goals and objectives.

The FREPP objective and interventions were duly aligned with the Government of Fiji's Roadmap for Democracy and Sustainable Socio-Economic Development 2009–2014. Accordingly, FREPP objectives and interventions was made consistent with the priorities outlined in National Energy Policy (NEP) 2006, that has the vision of 'A sustainable energy sector for Fiji' and a mission 'To provide an enabling environment for a sustainable energy sector'. Analysis suggest that project interventions from 2014 onwards were also aligned with the mandate and priorities of proposed new 2013-2020 NEP, which was prepared and submitted for endorsement in November 2013.

Similarly, project goal and objective are also found consistent with the recent 5 and 20 years National Development Plan of GoF. The 5 years NDP calls for electricity for all by 2021, and the 20 years NDP targets 100% electricity generation from renewable resources by 2036[13]. Project scope was also in line with the mission of DOE –the main implementing partner, i.e. to provide an enabling environment for a sustainable energy sector[14]. It is important to mention that several DOE programs have specific focus on the promotion of renewable energy in the country.

In addition to its relevance to Government of Fiji policies and priorities, project objectives and interventions are also highly relevant to UNDP and GEF global priorities of promoting the agenda of renewable energy. The project objective was aligned with UNDAF Outcome 1.1 i.e. By 2017 the most vulnerable communities across the PICT s are more resilient and select government agencies, civil society organizations and communities have enhanced capacity to apply integrated approaches to environmental management, climate change adaptation/mitigation, and disaster risk management. Similarly, the project objectives were in line with and contributed to the achievement of UNDP Sub-regional programme outcome 4 (2013-17) i.e. Improved resilience of PICTs, with a particular focus on communities, through the integrated implementation of sustainable environmental management, climate change adaptation and/or mitigation and disaster risk management.

Project outcomes were also consistent with GEF Strategic Objective and Programs i.e. SP-3: Promoting Market Approaches for Renewable Energy and SP 4: Promoting and Sustainable Energy Production from Biomass. Project objectives and interventions are also in line with Global SDGs, especially Goal 7: Affordable and Clean Energy, and Goals 9, 11 and 13.

Overall it can be concluded that project objective and interventions were found highly relevant and consistent with Government of Fiji policies, UNDP and GEF priorities and needs of the beneficiary institutions and communities.

3.3.3 Project Effectiveness and Efficiency (Evaluation Rating: 4-Moderatly Satisfactory)

Following is the detailed analysis of the progress made and level of achievement of outcomes and outputs targets;

Component 1: Energy Policy & Regulatory Frameworks

Outcome 1: Facilitation of investments on energy projects, particularly on RE and biomass-based power generation

In the original project design this component intended to put in place an overarching legal/regulatory framework on energy, based on a clear and consistent energy policy. It was aimed that an Energy Act will be formulated, enacted and enforced though a set of clearly defined implementing rules and regulations, that will guide developments in the energy sector including in the area of renewable energy development and utilization.

[13] http://www.fiji.gov.fj/getattachment/15b0ba03-825e-47f7-bf69-094ad33004dd/5-Year---20-Year-NATIONAL-DEVELOPMENT-PLAN.aspx
[14] http://www.fdoe.gov.fj/

However, in 2014 Project Board made major changes to outcome 1, due to the delay in the endorsement of the proposed 2013-2020 National Energy Policy by the cabinet, which was considered a prerequisite for formulation and enactment of Energy Act and supportive regulations. Accordingly, the scope of outcome-1 was modified and it was decided that instead of pursuing the Energy Act the project should work towards formulation and endorsement of Bio-fuel Policy and implementing rules and regulations. Similarly, outputs were also modified to correspond to the changes made. Following are the details of progress and effectiveness of individual outputs;

Output 1.1: Formulation and Endorsement of Bio-Fuel Policy

Fiji depends heavily on imported petroleum products to meet the demands of power generation and transport sectors. This on one hand results in high import bills and on the other hand it remains a major contributor of GHG emissions. The Government of Fiji intended to harness the potential of biofuels to contribute positively to the economy, wellbeing of people and the environment. In this regard the Biofuel Development Unit of DoE had launched a Biofuel Program and has established a number of Biofuel Mills in the islands. Though some of the specific measures for promotion of biofuels already are articulated in various policy and strategy documents, the overall scope or policy for biofuels in Fiji was not clearly defined. Therefore, it was decided by the Project Board to formulate a specific biofuel policy to effectively facilitate and promote the biofuel sector in the country.

FREPP has made considerable efforts in the formulation of a draft National Biofuel Policy and Strategic Action Plan through active involvement of relevant stakeholders. Existing policies and regulations were analyzed and reviewed keeping in mind the various parameters of biofuel production, use and promotion, including biofuel feedstock production, biomass extraction and processing, biofuel energy marketing and usage. In addition, policy conflicts and policy gaps were also highlighted during the review process.

A comprehensive National Biofuel Policy document was prepared with the overall vision of developing and promoting an efficient, resilient, environmentally sustainable biofuel sector that contributes to Fiji's long term energy security through renewable resources while helping the country achieve economic and environment development goals set for the country. The goals of the proposed National Biofuel Policy of Fiji are to;

- Create conducive environment for the development of advanced and progressive biofuel industry in the country
- Encourage biofuel usage in the transport sector
- Establish pro-poor biofuel feedstock supply chain to augment rural income and reduce poverty
- Develop an environmentally sustainable biofuel industry.

The proposed policy was aligned with and supported renewable energy performance indicators identified in the National Energy Policy-2006, Sustainable Energy for All (SE4All): Rapid Assessment and Gap Analysis (2014), Green Growth Framework (2014) and the 2012 National

Climate Change Policy. A detailed National Strategic Action Plan was also formulated to guide implementation of the policy. The draft Biofuel Policy and Action Plan was shared with key stakeholder and comments were received from various quarter like; Fiji Revenue & Customs Authority (FRCA), the Office of the Prime Minister, University of the South Pacific, Paradise Beverages Ltd, Niu Industries, Warrior Biojet Inc. Similarly, the Biofuel Policy and Action Plan were also reviewed thoroughly in the stakeholder's workshop organized in December 2017 and inputs were provided to improve its final version.

Discussions with DOE suggest that presently the proposed NBP and SAP are undergoing various stages of policy vetting and approval processes in the governmental circles. Once agreed by the ministries, the policy will be presented for the approval and endorsement of the cabinet. Overall it can be concluded that despite late start, FREPP has made commendable efforts in formulation of the draft NBP and SAP. Once approved and in place the NBP have the potential to significantly improve, facilitate and promote the biofuel sector in the country. However, it is also important to highlight that policy approval and endorsement is a cumbersome and time consuming process and will further require rigorous and persuasive efforts, especially on the part of DOE, to get the policy approved as soon possible.

Output 1.2: Formulation of Implementing Rules and Regulations (IRRs) for Bio-fuel Policy
It was envisaged that detailed IRRs will be formulated to guide and facilitate the implementation of the NBP. This output depended on the availability of an approved and endorsed NBP as a prerequisite. Since the NBP and SAP are yet to be approved by the cabinet therefore the formulation of IRRs is pending.

Discussions suggest that with the completion of FREPP, the pending activities are being handed over to DOE for further follow up. Therefore, once the NBP is approved, DOE will make efforts to formulate necessary IRRs, etc. In this regard DOE will prepare a 'white paper' on the IRR based on the initial work that was completed in March 2017, i.e. the Gap Analysis Paper of existing legislation and identification of new Biofuel Legislations for Fiji.

Output 1.3: Tariff Guarantee Fund Developed and Piloted
This output was also modified from capacity building of government institutions, as outlined in the original project document, to the development of Tariff Guarantee Fund. The major reason being the non-endorsement of the proposed 2013-2020 National Energy Policy. The new output envisaged the development of a Tariff Guarantee Fund (TGF) to cover major operational and maintenance risks. An initial TGF has been designed based on the Bukuya micro-hydro project, which involves partnership between a private company and the community co-operative. The TGF is to be established in form of an ESCRO-Bank Account, to ensure that the costs for major maintenance required can be ensured at any time of the operation of the Bukuya PPP. It was also outlined that the private company must transfer 11% of revenues to the TGF, to accumulate sufficient funds in the TGF.

It was envisaged that the fund will, at all times, have an amount equal to the value of 3 months of revenue as a guarantee form of payment to the private company operating the Bukuya project.

Thus, the TGF needs to be seeded with initial capitalization of 3 months of revenue, afterwards the fund will receive money from the sale of electricity. The requirement for the seed capital is mainly to mitigate the risk to the private company of non-payment by consumers. It was also emphasized that the TGF will be piloted and tested, before the model/framework is submitted for Cabinet approval. The overall intention was to have a standardized TGF, which can be replicated in community-based RE projects.

Discussions with Bukuya SPC representatives suggest that the TGF is yet to be formally established, as so far the company has not opened a bank account and is keeping its revenue in cash at the village. Furthermore, currently the Special Purpose Company (SPC) has negligible savings and all of its monthly revenue is consumed by the operational expense, i.e. salaries, etc. It is also not very clear that who will provide the seed funds for the TGF, which equals to three months of revenue. Therefore, further efforts are needed to streamline and establish the TGF for Bukuya project and get the model TGF approved from the cabinet for wider scale replication.

Component 2: RE Resource Assessments

Outcome 2: Technical feasibility of harnessing RE resources are ascertained and made widely known

The original project document envisaged that this component will address the technical and information barriers pertaining to the availability and technical feasibility of harnessing the country's RE resources, particularly mini/micro hydro, wind, geothermal, and biomass. This was to be achieved through the delivery of specific outputs, following are the details of progress and effectiveness of individual outputs.

Output 2.1: Establishment of an Operational Centralized Energy Database System

Initially it was envisaged that a comprehensive energy database system will be established as a repository for all energy related information in the country. It was intended that all energy related data will be made available to all stakeholders to duly utilize and benefit from it. Analysis of progress reports and discussions suggest that development of the ToRs and search for suitable service providers took considerable time. The ToRs and tenders for establishment of the database was prepared and modified several times and the procurement process for selection of suitable service providers was considerably delayed due to complex governmental contract awarding and approvals processes.

Initially FREPP intended to select a suitable service provider for the development of the database through GoF ITC services. However, due to the immense delay in ITC's approval of the tender for selection of service providers, the project requested UNDP to directly recruit a consultant to undertake the development of the database. An international consultant was identified but the offer was withdrawn due to the lack of project budget for the activity. After long to and fro, finally a simple online portal for the Centralized Energy Information Forum, was established at www.reinfofiji.com.fj and some energy related studies, reports and information have been uploaded and is currently open for stakeholders to access relevant information.

Presently the portal contains various documents and studies related to national policies, biofuel/petroleum, energy demand management, rural electrification, renewable energy development and investors related information. However, analysis suggest that presently it carries limited amount and generic information. It is important to mention that FREPP has generated a good deal of energy related information during its life, but much of this information is yet to be uploaded on the portal. Overall it can be concluded that there is still a long road ahead to make this portal serve as a comprehensive one stop database for energy related information to help stakeholders duly benefit from it.

Output 2.2: Completed and published RE resource assessments

This output called for assessments of potential RE resources including, hydro power, waste to energy, solar and geothermal, etc. Overall it was intended that these assessments will provide stakeholders and especially investors with reliable and authentic RE resource data/information for the design of their RE-based power generation projects.

FREPP has implemented a number of activities to achieve this output. Most of the work was done in the areas of waste to energy and a number of studies were conducted; 1) Report on W2E Feasibility of Resources, 2) Report on Recommendation from W2E Technology Research, 3) Report on Quantification & Assessment of W2E Resources, and, 4) Report on Options & Recommendations for Implementation of W2E in Fiji

These reports included quantitative and qualitative assessments of potential wastes to energy resource generated in Fiji and major characteristics of waste resources for each identified waste streams. In total 8 waste sites (landfills and dumps) were identified across Fiji, which have the greatest potential for generating energy from waste. The studies also estimated that the total annual electricity generation potential from waste in Fiji is around 38,146 MWh. The studies also identified a number of waste to energy generation technologies including thermo-chemical and bio chemical processes. A number of options and recommendations were also provided to develop and promote power generation through waste in Fiji.

Discussions with stakeholders suggest that overall project research works were found instrumental in exploring the potential of waste to energy in Fiji. However, over the years no significant progress or investment could be made to generate power through waste, as presently there is no such facility in Fiji, which is actively generating energy from waste.

In addition, assessment of hydro power potential in 6 sites continued and time-series data has been regularly collected, the data has been compiled and analyzed including pre-feasibility reports of Buca and Nukuloa micro hydro power projects have been compiled and the rest will be issued in due course by the DOE. To assess potential of wind energy DOE has established 15 wind monitoring stations in Viti Levu, out which 8 were severely damaged by in 2016 by Cyclone Winston. In this regard FREPP also helped in the organization of a training for DOE in WindPro software to analyze the wind related data. Discussions with DOE staff suggest that collection of wind data is currently in progress and will be analyzed and reports will be issued in due course. Discussions also suggest that assessment of hydro and wind potential is a time consuming process

and requires data collection over longer durations to make authentic and reliable assessments. It is also important to highlight that assessment of geothermal and solar power resources were later on dropped from the list of assessments.

Output 2.3: Assessed feasibility of RE investments

Analysis of project progress reports suggest that not much has been done under this output. Originally it was planned to be done through external consultants, however this didn't materialize and it was decided that this will be done internally by DOE. Discussions with DOE staff suggest that assessment of feasibility of RE investment requires a longer time frame to complete therefore hopefully it will be completed in sometime in future.

Component-3: RE-based Power Generation Demonstrations

Outcome-3: Markets for specific renewable energy technologies are supported

This project component was intended to contribute to the re-establishment of the RE market in Fiji. The envisioned approach was to showcase strategically important RE-based power generation applications with co-financing from government and private sector. The demonstration program was not meant only for showing the applied RE technology, but also the entire aspect of planning, design, engineering, financing, installation, and management arrangements of the installed facility and their support systems. A number of outputs were identified to achieve the overall outcome, following are the details of progress and effectiveness of individual outputs.

Output 3.1: Designed and implemented RE-based power generation demonstration

The original Project Document envisaged implementation of two demonstrations i.e. 1) Grid connected biomass-based power generation plant, and 2) Small scale mini-grid biodiesel power generation plant. It was intended that these two demonstrations will achieve a combined CO2 emission reduction of about 170 ktons (based on 10 years' operations). It is important to highlights that the biomass based power generation plant was included as a demonstration in the original project design due to foreseen involvement of Vara Renewable Energy as Co-financier for the establishment of a USD 15 Mill, 3 MW biomass power plant.

In 2013 the collaboration arrangement with VRE was cancelled by the Project Board and expression of interest from new relevant partner (co-financier) was relaunched. It is important to highlight that Grue + Hornstrup A/S [15], a Denmark based company -providing consultancy services for international energy and environmental projects- was contracted by the project to facilitate the selection and evaluation of relevant partners for RE power generation demonstrations of the project.

G+H after detailed deliberations and evaluations of 8 potential demonstration projects, identified two best demonstrations projects i.e. establishment/upgradation of 10 MW biomass power plant at Fiji Sugar Corporation's Mill at Labasa and the Bukuya Hydro Project. As mentioned earlier project original design also envisaged a third demonstration project i.e. small scale mini-grid

[15] http://www.g-h.dk/en/home.aspx

biodiesel power generation plant. In this regard FREPP collaborated with DOE and local communities for assessment of biofuel market potential and development of strategies to promote production and use of biofuel to reduce dependency on imported petroleum products. Following is a summary of the selected FREPP RE demonstration projects:

- **FSC Labasa co-gen biomass based power plant**

After the withdrawal of VRE, three potential contenders were short listed by the project through G+H for the proposed biomass power demo projects. These included Fiji Sugar Corporation, Tropik Woods and Pacific Renewable Energy. After detailed consultations, analysis and evaluation FSC Labasa Mill was selected as the best option for the biomass based RE demo. The FSC was selected on the basis of willingness of its management to collaborate with project and its relevance to project mandate. Furthermore, at that time, FSC Labasa was already in the process of undergoing a major 10 MW upgrade to enhance its capacity.

The main components the of expansion and upgrading work included: 1) Rehabilitation of the 200 tph (tons per hour) biomass boiler, 2) Installation of a 50 tph biomass boiler, 3) Installation of a 10 MW condensing turbine, and 4) Rehabilitation of auxiliary systems for the combined power generation system[16]. It was intended that this combined system would provide year around power generation and export of electricity in two modes: 1) Outside of crushing season the 50tph boiler along with the condensing turbine, and, 2) During crushing season, the 200tph boiler along with the back-pressure turbine.

The installation was completed and the plant was commissioned in mid-2015. FREPP prepared a detailed M&E framework to monitor of the progress and evaluate the effectiveness of the project. FSC Labasa Power Plant was visited during this evaluation exercise and detailed discussion were held with Mill management and engineers, including physical observation of installed power plant components and equipment.

However, in recent years the plant has been operational only during the crushing season, i.e. from June to December. Discussions with mill management and analysis of reports suggest that

[16] Project Evaluation Report of FSC Labasa Biomass Project

there are several challenges that have limited the project from reaching the full potential of power generation all-round year. The first, involved the 50 tph boiler, though installed, it remains out of operation due to technical reasons. This requires additional investment to operationalize the boiler, however according to Mill management the current top management of FSC, which took over around 2017, is more interested in focusing on their core business -Sugar-, rather than generation of energy, therefore no further investment is being planned at the moment.

The second important challenge is the lower power purchase prices offered by EFL to the FSC for exporting electricity to the grid. Currently FSC sells electricity to main grid at the power purchase price of 0.21 FJD/kWh, which is considerably lower than domestic tariff of EFL, set by the Commerce Commission, which is currently 0.331 FGD/kWh. Therefore, the current power purchase price is not profitable enough to encourage FSC to make additional and new investments. The third challenge is the availability of biomass for running of the power plant in off season. Bagasse, sugarcane waste, is the main source of fuel presently used to generate electricity during the crushing season. After the crushing season the availability of sufficient quantity of other biomass fuel cannot be ensured at the moment, therefore the plant couldn't generate electricity in offseason.

Overall it can be concluded from discussions and analysis of reports that, despite its limitations, the power plant is found very effective in increasing biomass power generation and have been exporting considerable quantity of electricity to national grid since 2015. Report on evaluation of FSC Labasa –prepared by G+H-, notes that since the implementation of the project, the FSC Labasa demonstration project has exported 9,281 MWh (2015), 9,794 MWh (2016) and 11,391 MWh (2017) of electricity to national grid. Which has resulted in the project contributing to an average GHG reduction of 0.8 tCO2e for every MWh of electricity exported which works out to 7,425, 7,835 and 9,113 tCO2e for the 3 years respectively[17]. These GHG reductions significantly contribute to the FREPP goal of reduction of GHGs from demonstration projects. It can also be suggested that if the mentioned challenges of fixing the boiler, enhancing of electricity purchase rates and availability of biomass are sorted out in times to come than the plant has all the capacity to provide electricity all round year, resulting in further reduction in GHGs from diesel operated power plants.

- **Bukuya Micro-Hydro Power Project**

The development of a Public Private Partnership (PPP) Model for the 100 kw Bukuya Micro-Hydro Power Project[18] was selected as one of the three demonstration projects under FREPP. It focused on the designing and implementation a PPP Model for management and operation of renewable energy mini grids. Bukuya hydro power station and mini grid was originally installed in 1989, for supplying electricity to the villages of Bukuya, Tabalei, and Natabuquto in Viti Levu. The hydro power plant and distribution grid was rehabilitated in 2015 by DOE after several years of non-operation. Afterwards it was repaired again by DOE in 2016 after cyclone Winston. Presently it is providing electricity to 275 households in three adjoining villages.

[17] Project Evaluation Report of FSC Labasa Biomass Project
[18] http://ic-sd.org/wp-content/uploads/sites/4/2018/10/Douglas-Marett.pdf

Bukuya village was visited during the evaluation exercise and discussions were held with community members and officials of the Special Purpose Company (SPC) and the hydro station was physically observed by the evaluation consultant.

Discussions and analysis of reports suggest that FREPP provided support to create a more sustainable operation for the hydro project, by introducing a business model under a Special Purpose Company to manage, maintain and operate the power station and distribution network. The technical assistance was provided through a specialized team of G+H, and contracting of pre-paid metering by the national company i.e. Clay Energy. DOE retained the overall responsibility for implementing the PPP and its oversight.

Discussions also suggest that the Hydro power project was previously looked after and managed by the Bukuya Cooperative, however the cooperative faced various challenges in managing the operations in a profitable and sustainable way. The main challenge was the non-payment of bills by the community and lack of funds for operational expenses. Therefore, there was a need for establishing and developing a PPP model involving the community cooperative and a private company to manage the project in a sustainable manner. In this regard FREPP undertook a number of capacity building/technical assistance activities including stakeholder consultations, baseline setting and M&E framework, procurement and installation of 311 prepaid meters and 3 vending machines, to secure revenue collection under the PPP. FREPP also provided technical assistance for the identification of income generating activities for the respective community.

A comprehensive PPP Model framework was developed through range of activities, which included stakeholder consultations, development of actions plan, preparation of the PPP model and agreement, right of way agreement, tariff setting methodology, bylaws of the PPP Governing Board, SPC by-Laws, registration and accounting procedures and capacity development. Based on the above, the G+H consulting team, developed a 'PPP Model Framework' document which acted as guidance document for the DOE for implementing future PPPs.

Discussions with communities suggest that in March 2018 a Special Purpose Company was established and registered with Registrar of Companies. The company is headed by a Director,

elected by Bukuya community, and consists of two elected members, one each from the villages of Tabalei, and Natabuquto. The SPC currently employs four staff members, a supervisor, 2 electricians and a sales clerk. After the installation of pre-paid meters, people come and buy electricity on advance basis at the rate of 0.40 FGD/unit. The revenue situation has considerably improved and non-payment issues of electricity bills has been sorted out with the installation of prepaid meters. Presently the system is being managed on break even basis with little saving. The revenue is being kept in the village in the absence of a SPC bank account and is used mostly for salaries of the staff.

Discussions with stakeholders and analysis of documents suggest that the established PPP Model is working efficiently and effectively, however there are still some challenges like lack of interaction between the community cooperative and the SPC, lack of accountability and transparency mechanisms for the SPC, non-availability of bank account, lack of savings to undertake major repairs and higher tariffs. Presently the tariff for Bukuya project is 0.40 FGD/KWh as compared to the EFL regular domestic tariff of 0.331 FGD/kWh. Discussions with Fiji Commerce and Competition Commission suggest that they are in the process of gathering necessary documentations for setting up of the tariff for the Bukuya Hydro Project. Overall it can be concluded that the PPP Model is quite successful and can be successfully replicated, given the availability of required resource and cooperation of all stakeholders, to manage and operate other such community based micro hydro power plants and micro grids.

- **Promotion of Biofuels**

Government of Fiji is intended to harness the potential of biofuels to contribute positively to the economy, wellbeing of people and the environment. In this regard the Biofuel Development Unit at DoE originally targeted to install 20 Biofuel Mills across Fiji, out of which nine have been already installed in the islands of Koro, Rotuma, Cicia, Gau, Rabi, Vanua Balavu, Lakeba, Moala and Matuku. The overall aim was to produce renewable diesel (80:20 –Diesel to Coconut Oil), with coconut oil and coconut meal as byproducts. It was intended that the produced biodiesel was to be used by the local communities for power generation on the respective islands. It was also aimed that beside meeting the energy needs the projects will also help in generating incomes for local communities and will contribute to environmental sustainability.

FREPP has collaborated with DOE to promote biofuels, as a RE demonstration project, and have conducted a number of studies to enhance profitability and sustainability of biofuel mills. These included Biofuel Market Assessments and development of Strategies for Biofuel Procurement, Transport, Distribution and Marketing. FERPP has also compiled and consolidated data on biofuel demand and supply and has conducted gender assessment of bio-fuel projects. However, analysis of project reports and discussion with stakeholders suggest that despite good intentions, the operations of the biofuel mills have been severely affected by numerous challenges. These included lack of demand for products on host islands, operation and management issues, low quality of products, lack of marketing and transportation facilities and infrastructure damages by Cyclone Winston. Overall these challenges and issues have severely impacted the profitability and sustainability of the biofuel mills all over Fiji.

Rabi Biofuel Mill was visited during the evaluation exercise and discussions were held with mill operators. The mill started operations in 2013 and was managed by the Rabi Island Council and supervised and overseen by the DOE. During initial years it produced biodiesel for local consumption, however later the demand for biodiesel was substantially reduced due to, among others, the lower international oil prices during 2014-16.

This coupled with lack of interest and ineffective management by the community has severely impacted the profitability and sustainability of the business model and the mill was closed for a while. Given the difficult circumstances, DOE has decided to change the management and has recently handed over the mill operations to Copra Millers –a private company, specializing in production and export of coconut oil. Since Copra Millers main business is coconut oil therefore presently the mill is only producing coconut oil, most of which is for export purposes.

Overall it can be concluded that presently the biofuel market is not fully developed and conducive in Fiji, therefore biofuel mills all over are faced with profitability and sustainability issues. Discussions suggest that there is a greater need to promote the use of biofuel, especially by the local communities, to make the biofuel business more profitable and sustainable.

Output 3.2: Prepared Standard Power Purchase Agreement (PPA) for IPPs

This output called for review of existing EFL PPA template and development of proposed Standardized Power Purchase Agreement template to encourage and facilitate IPPs to invest in the electricity sector in Fiji. In this regard FREPP engaged consultants from IT Power Group –an Australian consulting company, specializing in renewable energy, and energy efficiency- and has implemented a number of activities to achieve this output. As a first step, a detailed review of the existing PPA regime in Fiji's power sector was conducted through a series of consultations with stakeholders and organization of a PPA review workshop. The existing PPA mechanisms of EFL were thoroughly scrutinized from the various and often conflicting perspectives of investors, EFL, GoF and other stakeholders and against the relevant elements of the draft Fiji 2013-2020 National Energy Policy (NEP), the existing Regulatory Regime and the contemporary practices associated with independent power production in Fiji.

Based on the inputs from review and consultation exercises a proposed improved standardized PPA template was developed. It was intended that the standardized PPA template will encourage interest and investment and will appropriately mitigate risk for all parties and provide an appropriate balance between risk and reward for IPPs. Three key drafting themes have guided the production of the standard PPA template; 1) Respecting existing PPA Frameworks; 2) In

accordance with the needs, objectives and interests of the energy economy and its stakeholders, and, 3) Inducing balance in Counterparty Risk and Reward.

The final draft of the developed standard PPA was shared, in 2015, with stakeholders and most importantly with EFL, which was the main responsible body for endorsement and adoption of the standard PPA. Discussions with project team and review of progress reports suggest that, over the years, no comments or suggestions were received from EFL on the draft PPA and neither was it approved or adopted. The EFL) officials met during the evaluation exercise informed that as such it was not possible to adopt or stick to a standardized PPA template keeping in view the varied nature of contractual requirements and obligations of each IPP project, therefore PPAs need to be flexible and are negotiated on case to case basis. Having said this examples from other countries[19] suggest that standardized PPA templates are not uncommon and can be adopted with relative ease and adjustments.

Overall it can be concluded that FREPP has strived to its best to improve the existing PPA mechanisms and has provided commendable inputs, however somehow it was unsuccessful in convincing, especially the EFL on the utility and benefits of adopting a standardized PPA template for IPPs. Presently EFL is using its own generic PPA template and negotiates PPAs with IPPs on case to case basis.

Output 3.3: ***Completed Investment Promotion Package***

A number of activities were outlined to achieve this output, including review and listing of bankable investment opportunities, preparation of investment information packages and publications and organization of an investors' forum. Analysis of project reports suggest that FREPP, with the technical inputs of consultants from IT Power, has conducted a detailed Review of Existing Bankable Investment Opportunities in Fiji and has identified 18 RE projects, of which 11 are possible candidates for short to medium term bankability based on the adopted criteria. Project had also furnished a detailed report on the Formulation of an Independent Power Producer and Investment Framework for Developers of Renewable Energy Power Generation Projects in Fiji. The report has proposed twelve policy mechanisms or programs to promote the uptake of renewable energy in Fiji.

FREPP had also organized an RE Investment Forum on 9th April 2015, which was attended by over 100 participants representing key stakeholders including governmental institutions, private sector companies, international development partners, and academia. The objectives of the Forum were to;

- Provide an opportunity to a wide range of stakeholders to discuss and share the experiences and practices of establishing renewable energy power projects in Fiji;
- Update knowledge and provide a platform for investors, project developers and governments to exchange information and facilitate networking
- Furnish Investors with screened, pre-feasibility projects that have good investment potential.

[19] https://ppp.worldbank.org/public-private-partnership/sector/energy/energy-power-agreements/power-purchase-agreements

Analysis of reports and discussions with stakeholders suggest that the forum provided a rare opportunity for bringing together sector stakeholders especially the private sector companies and investors to discuss and deliberate on RE related projects and potential investment opportunities. Overall it can be concluded that FREPP has contributed substantially in providing much needed technical and investment related information and networking opportunities for stakeholders in general and investors in particular.

Output 3.4: Completed assessment and developed RE incentives schemes

Under this output FREPP through IT Power consultants has prepared three reports: 1) Assessment of the existing incentive schemes in Fiji, 2) Review of international experiences in RE support schemes, and 3) Design of renewable energy incentive schemes for Fiji. The report on assessment of the existing incentive schemes in Fiji examines existing subsidies and incentives available in Fiji for renewable energy through detailed review of documents and a series of consultations with stakeholders. It provides details of the existing power generators and assessment of current and proposed mechanisms and indirect support mechanisms for renewable energy in Fiji.

The report on review of international experiences in RE support schemes discusses some of the key policies, mechanisms and strategies used world-wide to support and increase the deployment of renewable energy technologies. It also summarizes best practices based on international experience and describes the current state of international mechanisms used to drive renewable energy. The report also provides recommendations for specific support mechanisms for electricity submarkets in Fiji, covering centralized generation, distribution grids, mini-grids and off-grid generation.

The report on the design of renewable energy incentive schemes for Fiji, proposes new, and modification to existing renewable energy incentive schemes in Fiji. It describes the process for designing, implementing and evaluating such incentive schemes, then summarized each of the schemes proposed for Fiji. The report identifies the parties who should be involved in design, implementation and evaluation, then explains how the assessment criteria can be used to evaluate them.

From discussions with stakeholders it couldn't be ascertained that how these studies were utilized or applied by stakeholders in the following years to attract new investments from IPPs in RE. Overall a follow up mechanism was lacking to make due use of the valuable products produced by the project.

Component 4: RE Institutional Strengthening

Outcome 4: Renewable Energy developments integrated into National Energy Plan towards 100% Electrification of Fiji.

This component was originally intended to address the needs to further enhance the capacity of the FDOE and the energy sector in integrated energy planning. A particular focus of this was the preparation of a master plan for the electrification of the country. The outcome from this project

component was the integration of RE development and utilization in the national energy planning with a view of 100% electrification of the country. A number of outputs were outlined to achieve this outcome, following is the details of achievement status of individual outputs.

Output 4.1: Completed training programme on integrated energy planning (IEP) and administrative energy policy for government personnel

Analysis of project progress reports suggest that a number of activities have been implemented, including, training need assessment, development of workshop materials and organization of a two days' training workshop in 2016, which was attended by 26 participants from all stakeholders and was facilitated by G+H consultants. The workshop aimed to build the capacities of stakeholders to design, engineer, install, operate and maintain renewable energy based power generation systems.

Though the workshop didn't focus specifically on the IEP and administrative energy policy as called by the output, due to non-approval of the proposed new NEP. However, the workshop evaluation suggest that it was found effective in enhancing knowledge and skills of participants in various aspects of RE based power generation systems. The workshop was also instrumental in bringing together diverse RE sector stakeholders to share and learn from each other experiences. Nevertheless, the occasion also provided the opportunity to connect private sector with the governmental institutions.

Under this output project also conducted a study on Design and Establishment of an Effective and Least-Cost Tariff Collection System for DOE's Solar Home Systems Projects. The study was meant to identify and address various issues in the SHS tariff collection systems to promote the overall goal of 100% electrification in Fiji. The study also recommended options for establishment of effective and low cost tariff collection systems. The study recommended that the use of pay as you go (PYG), offers the best opportunity to improve the current situation. It highlighted that the necessary supporting infrastructure and knowhow for PYG is already in place, therefore it can be relatively easily adopted.

Output 4.2: Completed and approved National Electrification Master Plan

Original project document included this activity. However, in the later years government requested ADB to support the development of electrification master plan. Keeping in view the interest and funding from ADB the Project Board decided in its March 2016's meeting that, the output could still be included as part of FREPP but would be classified as 'completed by ADB'. The budget allocation for this was re-programmed to enhance the PMU capacity. It is important to highlight that the latest status of the electrification master plan couldn't be ascertained by this evaluation, as meetings with ADB couldn't materialize.

3.3.4 FREPP Knowledge Products

It is important to mention that as a technical assistance project, FREPP has commissioned and completed a wide range of research studies and reports related to various aspects of RE in Fiji. Though these knowledge products were developed to achieve various project outputs and outcomes, they also considerably enriched the body of knowledge for energy sector in general

and RE in particular. After the termination of the project these knowledge products needs to be carefully sorted out keeping in view its usefulness and applicability and made available to stakeholders for future reference and use for the development and promotion of RE sector in Fiji. Some of these documents are already available online on the energy information portal developed by the project. Following is a list of the knowledge products generated by FREPP.

List of FREPP Knowledge Products

- Development of National Biofuel Policy in Fiji: Context and Status
- National Biofuel Policy of Fiji-2018
- National Biofuel Strategic Action Plan of Fiji
- Gap Analysis of Existing Legislation and Identification of New Biofuel Legislations for Fiji
- Report on W2E Feasibility of Resources
- Report on Recommendation from W2E Technology Research
- Report on Quantification & Assessment of W2E Resources,
- Report on Options & Recommendations for Implementation of W2E in Fiji
- Report on Design and Establishment of an Effective and Least-Cost Tariff System for Solar Home Systems
- Project Evaluation: FSC Labasa
- FINAL Inception Report Demo Project
- Report on Identified Suitable Demo Project
- FSC ME Reporting and Baseline Setting
- Bukuya Micro Hydro - Final Baseline and ME
- Report Income Generating Activities and Tariff Structure
- Bukuya Research Report for Republic of Fiji
- Report of Capacity Building Workshop for RE
- Report of Bukuya Hydro PPP-SPC Approach
- Inception Report of Biofuel Market Assessment
- Report of Assessment of Biofuel Market
- Report on Strategy for Biofuel Market
- Review of Existing Power Purchase Agreements
- Standardized Power Purchase Agreements for IPPs
- Review of Existing Bankable Investment Opportunities in Fiji
- Assessment of the existing incentive schemes in Fiji,
- Review of international experiences in RE support schemes and
- Design of renewable energy incentive schemes for Fiji.
- Report on RE Investment Forum
- Report on Capacity Building Workshop on the Development of RE Power Generation Systems
- Gender Survey Reports for Koro and Rabi Biofuel Mills

3.3.5 Mainstreaming

The ToR outlines that UNDP-supported GEF-financed projects are key components in UNDP country programming, as well as regional and global programmes. Therefore, the evaluation also assessed the extent to which the project was mainstreamed with other UNDP priorities, including poverty alleviation, improved governance, the prevention and recovery from natural disasters, and gender.

Review of UNDAF Pacific and UNDP Regional Programme documents suggest that FREPP objectives and interventions were found aligned with and contributed to the UNDAF Pacific 2013-

2017[20] Outcome 1.1; By 2017 the most vulnerable communities across the PICT s are more resilient and select government agencies, civil society organizations and communities have enhanced capacity to apply integrated approaches to environmental management, climate change adaptation/mitigation, and disaster risk management.

Similarly the project objectives were in line with and contributed to the achievement of UNDP Sub-regional programme outcome 4 (2013-17)[21]; Improved resilience of PICTs, with a particular focus on communities, through the integrated implementation of sustainable environmental management, climate change adaptation and/or mitigation and disaster risk management. The Sub-regional Programme document also highlighted that UNDP will bolster the resilience of communities in the countries and territories to cope with climate change, and will implement strategies that integrate environmental management, climate change adaptation and mitigation, and disaster risk reduction.

Building on those measures, UNDP facilitated transition to 'green', low-carbon development through the mainstreaming of climate change into sectoral planning and national strategic development strategies. UNDP also help develop environmental governance capacities in the countries and territories, focusing on sustainable resource management and biodiversity. Analysis suggest that FREPP interventions to reduce GHGs through promotion of renewable energy sources would help in reducing the impacts of climate change and improving environmental management especially in the energy sector.

FREPP objectives and interventions were also found aligned with other UNDAF (2013-17) priorities Area 3 i.e. Poverty reduction and inclusive economic growth. The development and availability of renewable energy especially for rural/remote communities with lower incomes would enhance inclusive economic growth and improve livelihoods and would help reduce poverty.

In addition, FREPP interventions also contributed to the UNDAF Priority Area 5 i.e. Governance and human rights. UNDAF highlighted that the UN will focus on improving the quality of governance, including the inclusion of vulnerable groups in decision-making processes, supporting implementation of development effectiveness principles, the engagement of civil society, traditional leadership, women and social partner's in the governance processes and advance compliance with international human rights norms and standards. In this regard FREPP directly engaged with local communities and cooperatives especially in the management and operation of Bukuya Hydro project. This helped greatly in inclusion of all community members in the decision making and management processes and similarly all community members benefited equally from project interventions.

[20] http://www.pacific.undp.org/content/dam/fiji/docs/UNDAF_Summary_Report_Final_LR.pdf
[21] http://www.pacific.undp.org/content/dam/fiji/docs/Pacific_SRPD_2013-2017.pdf

3.3.6 Sustainability of Project Interventions and Results (Evaluation Rating: 4-Likely)

Sustainability of project interventions and continuity of benefits, in the post project period normally depends on the availability of desired policies, institutional frameworks, human and technical skills, social acceptance, environmental viability and most importantly availability of desired financial resources. The project document has outlined a number of factors which were imperative for the sustainability of FREPP interventions and continuity of benefits. These included political, social and economic stability, conducive government policies, smooth and productive cooperation among stakeholders and effective support from development partners. Following is brief description of the main sustainability criteria.

a) Financial Resources:

The project design intended that the private sector investments in renewable energy will be enhanced through an environment that is conducive to sustain the operations with appropriate rate of returns. Project has made strenuous efforts to encourage and facilitate private sector investment in the generation renewable power. After initial withdrawal/cancellation of Vara RE co-financing arrangement, the project looked for a new co-financier for the biomass demonstration project. After due consultations and evaluations FSC was selected as an alternate partner, which at that time was already in the process of upgradation/installation of a 10 MW bagasse power project at Labasa Mill, with an overall investment of USD 17 Million.

The project capitalized on the opportunity and provided technical facilitation in the detailed evaluation of the project. Presently the power plant is supplying electricity to the national grid, but only during crushing season. Discussions with mill management suggests the operations of the power plant will be duly sustained by FSC in time to come and benefits will continue to flow. However, they also highlighted that presently the FSC management have no plans to invest further in the power plant to realize its full potential to generate electricity all round year.

Regarding biofuel mills, GoF has invested, around USD 4.5 Mill, in the establishment of the 9 bio-fuel mills, however these mills were faced with a number of management and profitability issues. Recently these mills have been handed over to Copra Millers, whose main business is coconut oil. Discussions with stakeholders suggest that Copra Millers are presently extracting only coconut oil, however they also plan to produce biodiesel once the profitability improves.

GoF has also invested heavily in revitalization of the Bukuya micro hydro and with the help of the project it has established a private company to operate and manage the power plant and micro grid. Presently despite a number of challenges, mentioned in the above section, power plant and distribution network is managed and operated satisfactorily by the Special purpose company and discussion with company and DOE officials suggest that the operations will be sustained through revenues from the sale of electricity. However, in case of a major break down or repair, the SPC don't have resources in hand to cope with it.

b) Institutional Frameworks and Policies

Overall DOE remained the main implementing partner and have guided and overseen the implementation of the project. Discussions with DOE suggest that the ownership level for the

project interventions is high and they have expressed their willingness to follow up on the remaining project interventions after the project termination. However, they also expressed that keeping in view the broad scope of RE agenda, they will still require external financial and technical support. Energy is a cross cutting thematic area and requires collaboration of multiple stakeholder including several governmental and non-governmental institutions. FREPP was instrumental in coordinating various activities among diverse stakeholders, this coordination role will be taken over by the DOE after the closure of the FREPP. However, for this DOE will require dedicated financial and technical resources.

On the other hand, the long delay in endorsement of proposed 2013-2020 National Energy Policy remains a major concern from sustainability point of view. Similarly, the endorsement of Biofuel Policy, prepared with support from FREPP, is also currently awaited. Once both policy documents are duly approved they will provide a sound basis for promoting and sustaining RE related investments and infrastructure especially from private sector. Similarly, the regulatory frameworks like power purchase agreements and implementation mechanisms also need to be made conducive to attract private sector.

c) Socio-economic and Political Stability: Overall project interventions are found socially acceptable and beneficial from citizen's point of view. Furthermore, in recent years, Fiji has witnessed considerable economic and politically stability and there is a substantial political will to promote the RE sector to cut down the oil import bill and to improve environmental conditions by reducing GHGs. Overall it can be concluded that presently there is no social or political barrier to the sustainability of RE related interventions.

d) Environmental viability: Environmentally, the project itself was a great advocate of and has promoted environmental sustainability in the energy sector. The goal of the project itself was to reduce the excessive GHG emissions from power generation through promotion of environmentally friendly technologies. Therefore, from sustainability perspective, project interventions are found environment friendly and viable.

Overall in view of the high level of acceptance and ownership of the project interventions by the relevant governmental institutions, private sector and especially by communities it can be concluded that project interventions like the FSC Biomass Power at Labasa and Bukuya Hydro Project are most likely to be sustained in the longer run. However, because of the resource intensive nature of the interventions/infrastructure, wider scale replication of interventions poses challenges in terms availability of required financial resources.

3.3.7 Impact of Project Interventions and Results

The main indicator identified to measure the goal was "Cumulative greenhouse gas emission reduction from power generation in Fiji by the end of project (EOP),". The project target for cumulative GHG reduction was fixed at 935.8 ktons CO2. This target was fixed for the initial two project demonstrations i.e. 3.2 MW biomass power project –to be done by VRE, and 20 biofuel mills, -to be established by DOE. It was also expected that in the longer run the project will help reduce 16% more GHGs in the energy sector, as compared to the without project scenario.

It is important to highlight that FREPP has not made any estimations or calculations so far on the status of overall GHG reductions, resulting from project interventions. As mentioned in earlier sections the status and dynamics of the demonstration projects also changed considerably. The biomass demonstration was implemented by FSC instead of VRE and the Biofuel mills also face management and profitability issues and the target of establishing 20 biofuel mills has also not been realized so far. In the given circumstances it was found difficult and slightly beyond the scope of this assignment to come up with calculation on GHG reductions.

Having said this, Report on Evaluation of FSC Labasa biomass power project –prepared by G+H consultants-, notes that since the implementation of the project, it has exported 9,281 MWh (2015), 9,794 MWh (2016) and 11,391 MWh (2017) of electricity to the national grid. This totals to 30,466 MWh (30.47 GWh) of electricity in the 3-year period. Thus overall it has resulted in an average GHG reduction of 0.8tCO2e for every MWh of electricity exported, which works out to 24,373 tons CO2 (or 24.3 ktons CO2) for the 3-year period since the start of operation.

Considering an annual average based on the 3-year data, the estimated direct reduction in GHG emission over 20-year period (or technical life span) is 162.49 ktons CO2. Which is short of the overall target of direct GHG reduction of 241.8 ktons CO2 from the proposed biomass demonstration project, as outlined in the project document. However, the plant was run periodically only in crushing season and with a limited export of electricity to the grid, as the Sugar Mill also have to meet its own requirements for electricity to run the mill.

Project document also envisaged that 20 biofuel mills will be established and it was estimated that total annual electricity production, using the biofuel, from each mill will be about 352.3 MWh. It was estimated that the use of the biofuel for power generation will translate into a total reduction of 244.1 tons of CO2 emission, for 20 mills, this amounted to 4,882.6 tons CO2/year. Throughout an estimated plant life of the biofuel mill of 10 years, this came up to 48,826 tons (48.8 ktons CO2). In this regard, as highlighted in the above sections, only 9 mills were established, which did produce biofuel in the initial years, however in the later years due several factors including lowering of international oil prices, their profitably was considerably reduced and many mills were also faced with management issues. So far no data have been compiled and available regarding reduction of GHGs from this intervention.

Overall it can be concluded that project demonstrations have considerably helped in reduction of GHGs form power generation. However, in view of the above basic analysis, the original project target of reduction of 935.8 ktons seems to be quite ambitious. There is a strong need to conduct comprehensive analysis of the direct and indirect GHG reductions resulting from the project demonstrations. In this regard DOE, with the help of UNDP, may conduct a study to estimate the exact status of GHG reductions from project interventions.

4. CONCLUSIONS, LESSONS AND RECOMMENDATIONS

Based on the detailed analysis of the evaluation exercise the following are the main findings, lessons and recommendations:

Key Finding 1: FREPP objective and interventions were relevant in addressing the prevailing barriers to the wide-scale use of renewable energy resources for power generation in Fiji. The project has made strenuous efforts to promote availability and use of renewable energy and has made rigorous efforts and considerable progress towards achieving its objective and goal. However, there is a long road ahead to achieve the NDP goal of 100% power generation through RE sources by 2036.

Recommendation 1: UNDP to continue external technical and especially financial support for further promotion of RE in Fiji. Such external support projects and programmes are found instrumental in fast forwarding of an agenda like renewable energy. DOE and UNDP should continue exploring, the possibilities for mobilizing resources and preparation of a new project proposal, in consultation with stakeholders to follow up on FREPP interventions and to promote wider scale use of RE in Fiji.

Key Finding 2: FREPP has implemented a wide range of interventions and have made considerable progress to achieve its outputs and outcomes. However, many of these interventions are of longer term nature therefore they will require continuous follow up in times to come to realize their full effectiveness and benefits.

Recommendation 2: DOE with the support of UNDP to develop a follow up strategy. Some of the important interventions and outputs needing follow up includes;

- ✓ **The approval of Biofuel Policy:** The draft BF Policy, prepared by the project, is presently in the vetting and approval process, therefore DOE should rigorously follow up to get the proposed policy approved as soon.
- ✓ **Bukuya PPP Model:** The Bukuya Hydro Power SPC is still in its infancy and needs capacity building, administrative and technical support. Specific issues, which needs to be immediately followed up on includes; opening of a bank account, establishment of tariff guarantee fund, putting in place accountability, coordination and reporting mechanisms and establishment of a standard tariff through FCCC etc.
- ✓ **Energy Information Forum portal:** All project knowledge products should be sorted out, keeping in view its usefulness and relevance, by DOE and uploaded to the information portal. Similarly, all other energy related information should also be uploaded for easy accessibility and future reference.
- ✓ **Assessment reports of hydro and wind potential:** DOE in due course to analyse the collected data and make available the detailed assessment reports for the benefit of stakeholders and investors.
- ✓ **FSC Labasa biomass power project:** DOE to follow up on remaining issues faced by the FSC Labasa. These include lower tariff, non-availability of biomass fuel (non-bagasse), lack of interest of FSC management and inadequate technical support.

- ✓ **Biofuel Mills:** DOE to work on development of a profitable model through increasing use and improving marketability of biofuels in the country.
- ✓ **Proposed standardized PPA:** DOE to advocate with EFL to incorporate elements from the standardized PPAs, prepared by the project, into the EFL's PPAs
- ✓ **The National Electrification Plan**: DOE to rigorously follow up on the formulation of NEP for its earliest formulation and endorsement.

Key Finding 3: FREPP has successfully implemented a wide range of interventions. However, it has also faced considerable delays during implementation and its end date was extended from Dec 2014 to May 2018. These delays mainly resulted from non-endorsement of NEP and time consumed by lengthy processes for establishment of Project Board, PMU and recruitment of project staff and procurement of goods and services. Furthermore, inadequacy (only 2 people PMU) and turnover of project coordinator also hampered the implementation.

Recommendation 3: For future such projects of UNDP and DOE, estimate timeframes/durations realistically by allocating adequate and sufficient timeframes for project organization, mobilization, recruitment of staff, procurement of goods and services and formulation of necessary implementation processes and procedures. Such project should employ adequate number of staff keeping in view the scope of the project interventions. Project plans also need to provide necessary allowance and flexibility for unforeseen delays and road blocks.

Key Finding 4: The project has fostered successful collaboration with a wide range of stakeholders including governmental institutions, private sector, development partners, academia and local communities. However, it also has faced some partnership issues and its major co-financier –VRE, dropped out during implementation, though the project found another co-financier, however this resulted in immense delays and changes in the project design.

Recommendation 4: In future such projects of UNDP and DOE, select partners carefully keeping in view their relevance, expertise, interest and commitment and, their roles and obligations should be clearly defined and agreed upon in advance. Similarly, in case of co-financing agreements/commitments obtain documentation to verifying availability of resources.

Key Finding 5: The project strived to effectively monitor and evaluate its progress and performance and the quality of its progress reporting was noteworthy, however most of the monitoring was limited to progress reporting and field visits. Furthermore, the absence of dedicated resources and specific M&E expertise within the PMU has considerably hampered the development and implementation of a comprehensive and effective project M&E system, especially collection, analysis and reporting of data related to project outcomes and impact indicators.

Recommendation 5: Such projects of UNDP and DOE need to employ dedicated M&E expertise, which should develop and implement a rigorous M&E mechanisms and provide continuous feedback to the management during implementation and keep track of project outcomes and

impact indicators. Furthermore, all stakeholders also need to be regularly involved in the M&E through six-monthly and annual review meetings.

Key Finding 6: The goal of the project was to reduce GHGs from power sector in Fiji. Overall it can be concluded that project RE demonstrations have contributed in the reduction of GHGs from power sector. However, in view of the preliminary analysis, the original project target of cumulative reduction of 935.8 ktons CO2, seems to be quite ambitious. It is also highlighted that the project has not undertaken estimations or calculations on the status of overall GHG reductions to assess the overall impact.

Recommendation 6: DOE, with the help of UNDP, conduct a comprehensive study to estimate the exact status of GHG reductions from project interventions. Furthermore, for future such projects set realistic GHG reduction targets, keeping in mind the scope of the project interventions, and, develop and implement rigorous mechanisms to collect and analyses time series data on impact related indicators.

Annex-1 List of Persons Met/Interviewed

No	Name	Designation	Organization
1	Ms. Emma Sale Mario	Programme Analyst	UNDP, Resilience & Sustainable Development Unit
2	Mr. Thomas Lynge Jensen	Energy Programme Specialist	UNDP, Bureau for Policy and Programme Support
3	Mr. Mikaele Belena	Director	Department of Energy
4	Mr. Joeli Valemei	Sr. Scientific Officer	Department of Energy
5	Mr. Frank Rokowaqa	Technical Officer	Department of Energy
6	Ms. Susana Pulini	Director Water and Sewerage (Ex. Project Manager)	Department of Energy
7	Mr. Jeke Pai	Biofuel Officer	Department of Energy
8	Prof: Mansour Assaf	Professor	University of South Pacific
9	Mr. Anand Nanjangud	General Manager Special Projects	Energy Fiji Limited
10	Mr. Karunesh Rao	Executive Projects & Public Relations Manager	Energy Fiji Limited
11	Ms. Akeneta Vonoyauyau	Manager Price Control & Monitoring	Fijian Competition & Consumer Commission
12	Ms. Senikavika Jiuta	Manager Legal Risk Management & Governance	Fijian Competition & Consumer Commission
13	Mr. Avneet Singh	Senior Market Analyst – Energy	Fijian Competition & Consumer Commission
14	Mr. Ashok Kumar	Mill & Supply Chain Manager	COPRA Millers of Fiji Limited
15	Mr. Ankur N. Chitroda	Design Engineer	COPRA Millers of Fiji Limited.
16	Mr. Lowane Teba	Mill Operator, Rabi Biofuel Mill	COPRA Millers of Fiji Limited.
17	Mr. Michael Faktaufon	Mill Manager, Labasa Mill	Fiji Sugar Corporation
18	Mr. Josefa Sarai	Team Leader ENG, Labasa Mill	Fiji Sugar Corporation
19	Mr. Ilaitia	Production Superintendent, Labasa Mill	Fiji Sugar Corporation
20	Mr. Elango	Cogeneration Engineer, Labasa Mill	Fiji Sugar Corporation
21	Mr. Rodetick Simmons	Team Leader Electrical, Labasa Mill	Fiji Sugar Corporation
22	Mr. Tevita	Director	Bukuya Hydro Power Company Limited
23	Mr. Luke Nabukete	Supervisor	Bukuya Hydro Power Company Limited
24	Ms. Mereaini Lewanibau	Payment Clerk	Bukuya Hydro Power Company Limited
25	Ms. Laisani	Cooperative Officer	Department of Cooperative Lautoka
26	2 Community members		Bukuya Village

Annex-2: FREPP Final Evaluation Field Mission/Meeting Schedule

Date	Stakeholders	Place
20th Nov 2018	UNDP	Suva
	University of South Pacific	Suva
21th Nov 2018	Department of Energy	Suva
	Energy Fiji Ltd (EFL)	Suva
22th Nov 2018	Field Visit FSC Labasa – Demonstration Project	Labasa
23th Nov 2018	Copra Millers	Savusavu
	Field Visit to Rabi Biofuel Mill	Rabi
24th Nov 2018	To Suva	Suva
26th Nov 2018	Field Visit to Wind Monitoring Stations at Vatukarasa, Navovo, Sanasana.	On way to Lautoka
	Department of Cooperative Lautoka	
27th Nov 2018	Field Visit to Bukuya Hydro Project	Ba
	Bukuya Hydro Power Company	Ba
28th Nov 2018	UNDP	Suva
	Fiji Consumer and Competition Commission	Suva
29th Nov 2018	Preliminary Analysis	Suva
30th Nov 2018	Presentation on Preliminary Findings	Suva

Annex-3: Evaluation Matrix

Evaluation criteria	Key questions	Data Sources/Methods	Indicators	Methods for Data Analysis
Relevance	• How does the project relate to the main objectives of the GEF focal area, and to the environment and development priorities at the local, regional and national levels? • How was the project aligned to the national policies and priorities of the Govt. of Fiji? • To what extent project interventions addresses the needs of the target groups/beneficiaries • To what extent did the objectives remain valid throughout the project duration? • Were the activities and outputs of the project consistent with the intended impacts and effects?	• Review of documents • Key informant interviews • Focus group discussions • Physical observation of interventions	- Alignment with GEF focal area - Alignment with the National priorities and plans - Alignment with the needs of the target groups	<u>Qualitative methods</u> - Triangulation - Validations - Interpretations - Abstractions
Effectiveness	• To what extent have the expected outcomes and objectives of the project been achieved? • What were the major factors influencing the achievement or non-achievement of the objectives? • Did the project activities contribute to the achievement of the planned outputs and have the different outputs been achieved and how? • What are the main quantifiable results (outputs and outcomes) of the project so far, against the original targets? • What is the quality of the results? How do the stakeholders perceive them and what is the feedback of the stakeholders on the project effectiveness?	• Review of documents • Key informant interviews • Focus group discussions • Physical observation of interventions in the field	- Outcome and output indicators from the project results framework will be used to assess effectiveness	<u>Qualitative methods</u> - Triangulation - Validations - Interpretations - Abstractions <u>Quantitative methods</u> - Progress and trend analysis
Sustainability	• To what extent are there financial, institutional, social-economic, and/or environmental risks to sustaining long-term project results? • To what extent the design, implementation and results of the project have incorporated financial, institutional, social-economic, and/or environmental risks to sustainability? • To what extent will the benefits of the project continue after the donor funding stops? • What were the major factors which influenced the achievement or non-achievement of sustainability of the project? • Did the project have had a clear exit strategy?	• Review of documents • Key informant interviews • Focus group discussions • Physical observation of interventions in the field	- Financial, institutional, social-economic, and/or environmental viability of project interventions and benefits	<u>Qualitative methods</u> - Triangulation - Validations - Interpretations - Abstractions <u>Quantitative methods</u> - Progress and trend analysis
Impact	• Are there indications that the project has contributed to, or enabled progress toward, reduced environmental stress and/or improved ecological status?	• Review of documents • Key informant interviews • Focus group discussions	- Outcome and Impact indicators from the project results	<u>Qualitative methods</u> - Triangulation - Validations

	• To what extent project longer term goal are shared by stakeholders? • What are the expected longer term impacts and benefits of the project interventions?	• Physical observation of interventions	framework will be used to assess impact	- Interpretations - Abstractions <u>Quantitative methods</u> - Progress and trend analysis

Annex-4: Evaluation Questions for project design, management and co-finance

Project design and Results/Logical framework

- How was the project designed and was the project design adequate and technically feasible to address the problems?
- Was the applied project approach sound and appropriate and were lessons from previous such initiatives incorporated in project design?
- Was the results chain from outputs, outcomes to impact clear, logical and achievable and whether the respective indicators and targets were SMART?
- Were there any changes/revisions made to the indicators or targets during implementation?
- Were the sources of verification/data able to verify status of indicators and were they cost-effective and reliable?
- Were critical risks and assumptions for achievement of project outputs and outcome and their mitigation measures identified and incorporated in the project plan?
- Did the project document included an M&E framework, if yes what were its salient features and how was it implemented?
- Were mechanisms in place for regular collection and analysis of data related to log-frame indicators?
- What was the project replication approach and are there any initiatives presently replicating project good practices?

Project implementation management

- How was the project management being organized originally and had changes been made during implementation and were they effective?
- Were roles and responsibilities of project stakeholders clear? Did various stakeholders fulfil their roles effectively and efficiently, if not why?
- What were the overall coordination mechanisms and were they being efficient and effective?
- What were the main issues faced during management and implementation of the project?
- What was the role of the project board/steering committee and was it effective to oversee and steer the project?
- What was the UNDP and implementing partner's comparative advantage?

Financial management and co-finance

- Did promised co-financing materialize, if not why?
- Was the flow of funds smooth or there are delays?
- Was co-financing being used strategically to help the objectives of the project?
- Were there appropriate financial controls, including auditing, reporting and planning in place to manage and monitor the funds?
- Were there any budget revisions and why and were they effective?

Annex 5: List of Documents Reviewed

- Project Document
- Quarterly Progress Reports
- Project Implementation Reports (PIRs)
- Consolidated Progress Reports
- Annual Work Plans
- Minutes of the Project Board Meetings
- Mid-Term Review Report
- Financial Statements
- Results and Resource Frameworks
- Project technical studies and Reports listed in the following
  - Development of National Biofuel Policy in Fiji: Context and Status
  - National Biofuel Policy of Fiji-2018
  - National Biofuel Strategic Action Plan of Fiji
  - Gap Analysis of Existing Legislation and Identification of New Biofuel Legislations for Fiji
  - Report on W2E Feasibility of Resources
  - Report on Recommendation from W2E Technology Research
  - Report on Quantification & Assessment of W2E Resources,
  - Report on Options & Recommendations for Implementation of W2E in Fiji
  - Report on Design and Establishment of an Effective and Least-Cost Tariff System for Solar Home Systems
  - Project Evaluation: FSC Labasa
  - FINAL Inception Report Demo Project
  - Report on Identified Suitable Demo Project
  - FSC ME Reporting and Baseline Setting
  - Bukuya Micro Hydro - Final Baseline and ME
  - Report Income Generating Activities and Tariff Structure
  - Bukuya Research Report for Republic of Fiji
  - Report of Capacity Building Workshop for RE
  - Report of Bukuya Hydro PPP-SPC Approach
  - Inception Report of Biofuel Market Assessment
  - Report of Assessment of Biofuel Market
  - Report on Strategy for Biofuel Market
  - Review of Existing Power Purchase Agreements
  - Standardized Power Purchase Agreements for IPPs
  - Review of Existing Bankable Investment Opportunities in Fiji
  - Assessment of the existing incentive schemes in Fiji,
  - Review of international experiences in RE support schemes and
  - Design of renewable energy incentive schemes for Fiji.
  - Report on RE Investment Forum
  - Report on Capacity Building Workshop on the Development of RE Power Generation Systems

Annex-6: Rating Scales

Ratings for Effectiveness, Efficiency, Overall Project Outcome Rating, M&E, IA & EA Execution	*Sustainability ratings:*	*Relevance ratings*
6: Highly Satisfactory (HS): no shortcomings 5: Satisfactory (S): minor shortcomings 4: Moderately Satisfactory (MS): moderate shortcomings 3. Moderately Unsatisfactory (MU): significant shortcomings 2. Unsatisfactory (U): major problems 1. Highly Unsatisfactory (HU): severe problems	4. Likely (L): negligible risks to sustainability 3. Moderately Likely (ML):moderate risks 2. Moderately Unlikely (MU): significant risks 1. Unlikely (U): severe risks	2. Relevant (R) 1. Not relevant (NR)
Additional ratings where relevant: Not Applicable (N/A) Unable to Assess (U/A)		

Annex-7: Consultant Agreement Form

Evaluation Consultant Agreement Form[3]

Agreement to abide by the Code of Conduct for Evaluation in the UN System

Name of Consultant: Nisar Ahmad Khan

Name of Consultancy Organization (where relevant): _____

I confirm that I have received and understood and will abide by the United Nations Code of Conduct for Evaluation.

Signed at *place* Islamabad on *date* **16 October 2018**

Signature: _____

Annex-8: Audit Trail for FREPP Terminal Evaluation Report

S.No	Author	Comment Section & Page number[22]	Comment/Feedback on the draft TE report	TE consultant response and actions taken
1	DOE	EXECUTIVE SUMMARY P-4	Note that the Ministry is now called: Ministry of Infrastructure, Transport, Disaster Management and Meteorological Services.	Noted. In the table it is mentioned in short.
2	UNDP	Project Description P-5,	There were no sub-goals, only one (1) goal. Thus, there is no 'overall goal'	Modified. The word overall removed
3	UNDP	P-5	There is one project objective	Modified. The word main removed
4	UNDP	P-5	Define – abbreviations like GHGs, NEP, first time used.	Modified. defined.
5	DOE	P-5	Development instead of Energy	Modified
6	UNDP	P-5	Why have both this and the section on MAIN CONCLUSIONS AND RECOMMENDATIONS? No need for both as they basically present the same information	This is the summarized version of conclusions and recommendations for executing summary.
7	UNDP	P-6	Unclear – for what specifically? And who is the recommendation for?	Modified. Additions made
8	UNDP	P-6	Unclear - A project covering what specifically?	Modified. Additions made
9	UNDP	P-6	What is based on? Time needed depends on the scope of the project	Addressed. Time frame removed.
10	UNDP		Is the proposed 'new project proposal' part of such?	Yes it could be
11	UNDP	P-6	Enrichment – Not clear	Modified. Additions made
12	UNDP	P-6	NEP is Unclear - National Energy Policy or National Electrification Plan?	Elaborated
13	UNDP	P-6	Unclear – inadequacy?	Modified. Limited No of project staff
14	DOE	P-6	If engagement of staffs and flow of finances restricted in the Government processes, then its recommended that UNDP does it from their end while Ministry just provide the office space etc etc.	In NIM Project the IP is responsible for organization and implementation of the project.
15	DOE	P-6	M&E Missing from Acronyms	Added
16	UNDP	P-7	Unclear – workshops on what?	Modified

[22] Page Number refer to the track changes version of the report

17	UNDP	P-7	What was the findings from the preliminary analysis, i.e. ktons COs?	Elaborated
18	UNDP	1. INTRODUCTION 1.1 Purpose of Terminal Evaluation P-8	Unclear what this refers to – some text seems to be missing	Modified.
19	UNDP	1.2 Scope & Methodology P-8	In what way?	The evaluation adopted a semi-structured mix method approach
20	UNDP	P-9	These are not evaluation criteria. I suggest they are not bulleted – the don't fit with the standard assessment criteria mentioned above	Modified. Bullets removed. However they are kept as the TORs also mentioned them.
21	UNDP	P-9	Unclear – respondents to what?	Modified. Meant stakeholders
22	UNDP	P-10	I find it very surprising that this is the is no reference to the findings and recommendations of the mid-term review. TE needs to consider, build on the findings and recommendations from the MTR. This is a weakness and needs to be addressed	Modified. A discussion on MTR findings and recommendations has been added in the Monitoring and Evaluation Section.
23	UNDP	P-10	Unclear – only one consultant	Modified.
24	UNDP	P-11	After project - Unclear	Modified. Post project
25	UNDP	P-11	State actual days used	Modified
26	UNDP	2. PROJECT DESCRIPTION AND DEVELOPMENT CONTEXT 2.3 Project goal and objective P-12	Refer as per Project Document	Modified and Referred
27	DOE	2.2 Problems that the project sought to address P-12	One area too that needs addressing is the financial institutions. Too many requirements and they are not willing to take risks. IPPs & developers need money and if the banks are very difficult then things will not move. Banks need to align themselves to the government intention etc.	Good observation but was slightly beyond the scope of the project
28	UNDP	2.4 Main stakeholders P-13	Unclear – there are several matters they are not in charge of! Refer to official documentation that states the mission, authority, etc. (for several stakeholders)	Modified and Referred
29	UNDP	P-14	They are responsible for other matters, at least that is the case when the ELECTRICITY ACT 2017 takes effect	Noted and Modified

30	UNDP	P-15	What seminars and conferences	Modified
31	UNDP	3. FINDINGS OF THE EVALUATION EXERCISE 3.1.1 Analysis of LFA/Results Framework P-16	State which ones of the impact and outcomes indicators.	Modified and Elaborated.
32	UNDP	P-16	The scope is the exact opposite, i.e. expansive! 'The objective of the project is the removal of barriers to the widespread and cost-effective of grid-based renewable energy supply via commercially viable renewable energy technologies' – how can such be considered limited in scope?!	Modified. It meant the limited scope of project financial resources
33	UNDP	3.1.2 Assumptions and Risks P-17	Project Manager? Coordination is a subset of management	Modified
34	UNDP	P-18	Unclear – what are the reasons for non-approval? If you don't know the reasons don't make any statements on it. Furthermore, it needs to be clear that FREPP had no direct involvement in the development of the proposed 2013-2020 National Energy Policy	Modified and adjusted
35	UNDP	P-18	Unclear – it was decided not prepare the Energy Act, so of course enactment did not happen	Modified
36	UNDP	P-18	Unpack the 'somehow'	Modified. Elaborated
37	UNDP	P-18	Why this uncertainty about costs?	Modified (Official records mention 17 Mill. However, discussion with FSC Labasa suggest that it is around 15 Mill Official version of 17 Million is taken)
38	UNDP	P-19	An evaluation report is available, which was prepared with support from GGGI	Noted.
39	UNDP	3.1.3 Lessons from other relevant projects incorporated into project design P-19	Several did not materialize. Refer to: https://erc.undp.org/evaluation/documents/download/10150	Noted. Was extracted from Prodoc
40	UNDP	P-19	Vague – in what way?	Modified and Elaborated
41	DOE	3.1.4 Planned stakeholder participation P-19	EFL	Modified

42	DOE	P-19	Ministry of Economy	Modified
43	DOE	P-19	Fiji Competition and Consumer Commission	Modified
44	DOE	P-19	I thinks Ministry of Strategic Planning has now come under Ministry of Economy.	Its webpage suggest it is an independent ministry
45	DOE	3.1.5 Replication approach P-19	The new biofuel mill operational model is better to my view. Private sector operates while the communities have shares in the business. More accountability and transparency in terms of financials. Business operates on mainstream products such as coconut oil, making profit while subsidizing the small volume of biofuel demand on the island. I agree with consultant that wider scale replication is too early. Rabi and Lakeba biofuel is currently operating while cicia and gau biofuel this year. Its been operated by CMFL.	This is elaborated in the section on effectiveness under sub-section Bio-fuel Mills
46	UNDP	P-20	Vague – what specific aspects? In addition, considering this is a relatively recent intervention isn't it premature to make such conclusion?	This is being discussed in detail in sections on efficiency and effectiveness. The conclusion was made based on discussions with the stakeholders.
47	UNDP	P-20	Unclear – not sure 'cumbersome' is the right word in this context	Modified
48	UNDP	P-20	IPP needs to be defined. WB defines IPPs as '…power projects that are, in the main, privately developed, constructed, operated, and owned; have a significant proportion of private finance; and have long-term power purchase agreements with a utility or another off-taker' (https://openknowledge.worldbank.org/bitstream/handle/10986/23970/9781464808005.pdf?sequence=2) According to this definition FSC and Tropic Woods does not count	Noted and a definition added in footnote
49	UNDP		Unclear – this imply that there has been some interaction. What specifically?	Modified. No interactions
50	UNDP	3.1.6 UNDP Comparative Advantage P-21	This was the specific reason UNDP became GEF IA. Initially WB was the IA. WB then requested that UNDP took over the project	Noted. Added

51	UNDP	P-21	Than compared to?	Modified
52	UNDP	P-21	The first part of the sentence contracts the latter! In pure NIM UNDP basically provides oversight only. However. If requested by Govt. support services can be provided, e.g. related to procurement and recruit,	Discussions with UNDP and DOE suggest that due to specific project situation, UNDP was requested to provide all kind of support services.
53	UNDP	3.1.7 Linkages between project and other interventions within the sector P-21	Covering what years? Use the exact title	Modified
54	DOE	3.1.8 Management arrangements	Competition and Consumer commission.	Modified
55	UNDP	P-22	NEC was envisaged as part of what national policy document? To my knowledge such has never existed. An Advisory Committee was mentioned in the 2006 NEP, but to my knowledge such did not materialize. In the proposed 2013-2020 NEP document a National Energy Coordination Committee (NECC) is included but such is yet to be established	It is right. This is mentioned here because the project document has made a reference to NEC in the context of project assurance. Please see the organizational structure in the Prodoc
56	UNDP	P-22	To my knowledge a NEC have never existed. If correct obviously it cannot be re-organized	Modified
57	UNDP	P-23	Facilitation of annual work plans -unclear	Modified
58	UNDP		project was looked after directly by the officials of the DOE -unclear	During 2017-2018, a DOE Scientific Officer was partly looking after the affairs of the project in the absence of a full time PM
59	UNDP	P-23	Vague – what specifically	Modified
60	UNDP	P-23	Was there any 'collaboration' between the project and EF: on this? If yes, elaborate	Modified and elaborated
61	UNDP	P-23	Vague – what specific capacity building activities and research?	Modified and elaborated
62	DOE	3.2 Project Implementation 3.2.1 Adaptive management	There needs to be stronger collaboration between FREPP and Government. FREPP also need to understand the policy directions government is taking. Example; Government was more interested in the NDP and NDC and other policies seems to take the back seat. As a result, these policies find difficulty in implementation.	FREPP was implemented itself by the Government (DOE-as implementing partner) under NIM. About the priorities setting FREPP had a specific mandate so it couldn't venture in other broader areas like NDP etc.

63	UNDP	P-24	Already mentioned – no need to repeat	Repeated in the context of adoptive management for the reference of readers.
64	UNDP	P-24	Why the Vara RE agreement didn't materialize	Elaborated
65	UNDP	P-24	What was the specific support from FREPP?	Discussed in details in the Effectiveness section…FSC Labasa demonstration
66	UNDP	P-24	Why this uncertainty on costs? And above is written 15-17 Million – be consistent	Made consistent
67	UNDP	3.2.2 Project Finance and Expenditures P-25	Lack of interest in what?	
68	UNDP	P-25	For what? US$11,250 as support from the Secretariat of the Pacific Community	Not sure on specifics. But was utilized for project related activities.
69	UNDP	3.2.3 Monitoring and evaluation P-26	Unclear – was compared to?	Modified
70	UNDP	P-26	NEC was envisaged as part of what national policy document? An Advisory Committee was mentioned in the 2006 NEP, but to my knowledge such did not materialize	Agreed. However, it was outlined in the organizational structure (Prodoc) that NEC was supposed to perform this function. Therefore, it is included here for reference.
71	UNDP	P-26	Was the RF matrix revised? If so in what areas?	Elaborated
72	UNDP	P-26	Unclear: a. More abstract than? b. QPRs are public documents – refer to UNDP's Information Disclosure Policy	Modified
73	UNDP	P-27	Reads as a contradiction	Modified
74	UNDP	P-27	I find it very surprising that this is the is no reference to the findings and recommendations of the mid-term review. TE needs to consider, build on the findings and recommendations from the MTR. This is a weakness and needs to be addressed	Duly addressed. A detail discussion and analysis has been added in reference to findings and recommendations of the MTR in this section on M&E.
75	UNDP	P-28	Unclear – above is written that '…QPRs were more abstract'	Though they were more abstract but the overall quality was good.
76	UNDP	3.2.4 Overall project implementation/execution, coordination,	Lack of interest (of Vara RE) in what?	Modified

		and operational issues P-29		
77	UNDP	3.3 Project Results 3.3.1 Overall results (attainment of objectives) P-30	Make clear when this is from (Revised RRF)	Modified
78	UNDP	P-30	Here the findings from the mid-term review would be useful to include	Details on MTR findings are already discussed in detail in the section on Monitoring and Evaluation. This table is for summary of achievement at the end of Project.
79	UNDP	3.3.2 Project Relevance P-35	'Fully' is used 21 times – in my view it's unnecessary	Modified. Removed
80	UNDP	P-35	Unclear – what agenda?	Elaborated
81	UNDP	3.3.3 Project Effectiveness and Efficiency P-36	This have been mentioned already – no need to repeat	Removed
82	UNDP	Component 1: Energy Policy & Regulatory Frameworks P-36	Unclear (wording)	Modified
83	UNDP	P-36	Already mentioned – no need to repeat	Repeated to give a bit of the context to the reader.
84	UNDP	P-38	Recently the Fiji Rural Electrification Fund (FREF) was established: https://www.leonardodicaprio.org/fiji-rural-electrification-fund/ Are there any linkages to this vis-a-vis the Tariff Guarantee Fund par? Or are they completely separate initiates?	According to discussions, Tariff Guarantee Fund is meant for Bukuya micro-hydro project to cover maintenance and operational risks.
85	UNDP	P-38	Consider alternative wording	Modified
86	UNDP	Output 2.1: Establishment of an Operational Centralized Energy Database System P-39	Note the information available on the Pacific Regional Data Repository (PRDR): http://prdrse4all.spc.int/countries/fiji	Its an interesting site with lots of data and reports. The site developed by the project is also having similar kind of energy related information.
87	UNDP	P-39	Unclear (Role of ITC in procurement)	Modified. Elaborated
88	UNDP	Component-3: RE-based Power	Unclear – so there was a market that disappeared? (referring to the reestablishment of market for RE)	This is mentioned in the Prodoc (Page 30 paragraph 74)….it reads

		Generation Demonstrations P-41		"This project component is intended as an attempt to contribute to the re-establishment of the RE market in Fiji….."
89	UNDP	Output 3.1: Designed and implemented RE-based power generation demonstration P-41	This has been mentioned already – no need to keep repeating	Removed.
90	UNDP	P-42	Contradiction in terms	Modified
91	UNDP	P-42	Make clear in what other ways FREPP provided support	FSC Labasa was already undergoing a 10 MW upgrade. Project capitalized on this as a demonstration project. All technical and physical work was done by FSC Labasa. Project main contribution was preparation of a detailed Project Evaluation.
92	UNDP	P-43	The same is the case for on-season power! This reads as a truism	Modified.
93	UNDP	P-43	Lower than?	Domestic tariff of EFL. Elaborated.
94	UNDP	P-43	Make a hyperlink to the conference paper prepared by G+H et al: Applying Systems Thinking to Integrate Sustainability in PPPs for Mini-grids: Bukuya Mini-Hydro Case Example - http://ic-sd.org/wp-content/uploads/sites/4/2018/10/Douglas-Marett.pdf	Interesting paper. Thanks for sharing, As advised I have made a reference to document and webpage in the footnote.
95	UNDP	P-44	What specific challenges?	Main challenges added
96	UNDP	P-45	The challenges mentioned are not 'small'!	Small removed
97	UNDP	P-45	What was the tariffs before?	Additions made
98	UNDP	P-45	It is still early days so it is unclear how such conclusion can be made including the several challenges mentioned (with reference to successfulness of PPP Bukuya Model)	Discussions with community and stakeholders suggest that it is working very well and they are also of the view that the challenges can be overcome in near future. Therefore, it can be concluded that it is quite successful.

99	UNDP	P-45	It is still early days so it is unclear how such conclusion can be made including the several challenges mentioned	It can be replicated if similar conditions are created
100	UNDP	P-45	Already mentioned above – also getting rid of this and the other several repetitions will make the report shorter	Noted. Repetition all over report minimized.
101	UNDP	P46	Unclear - how can a demand be made profitable?	Modified. Elaborated
102	UNDP	Output 3.2: Prepared Standard Power Purchase Agreement (PPA) for IPPs	Is this still the case when the 2017 Electricity Act takes affect? (with reference to EFL PPAs)	Discussions with EFL suggest that presently they are responsible for this.
103	UNDP	P-47	How come then such is possible in other countries of the world? This needs to be made clear here. E.g. check here for various standardized PPA templates: https://ppp.worldbank.org/public-private-partnership/sector/energy/energy-power-agreements/power-purchase-agreements	Elaborated with reference to the provided link. However, discussions with EFL suggest that they are convinced that standardized templates cannot be adopted.
104	UNDP	Output 3.4: Completed assessment and developed RE incentives schemes P-48	Unclear – instrumental for what specifically?	Modified
105	UNDP	P-48	This contradicts the sentence before – be consistent!	Modified
106	UNDP	Output 4.1: Completed training programme on IEP and administrative energy policy P-49	Unclear (reference to administrative energy policy)	Taken from Prodoc "Output 4.1: Completed training programme on integrated energy planning (IEP) and administrative energy policy.."
107	UNDP	P-49	There are dozens of such workshops/meetings throughout the year here in Fiji, either national specific or regional meetings	Agree….and every workshop is supposed to contribute in advancing the specific cause.
108	UNDP	Output 4.2: Completed and approved National Electrification Master Plan P-50	Was that done or not?	Most probably done, as all budget was utilized.
109	UNDP	3.3.4 FREPP Knowledge Products	Unclear – sorted in what way? Preserved?!	Elaborated

110	UNDP	P-50	Many are already available online	Yes...but all are not presently uploaded.
111	UNDP	P-50	Yes they are project deliverables, but can national policies and action plans be considered knowledge products?	I think they can be, as they also enrich the body of knowledge
112	UNDP	3.3.5 Mainstreaming P-51	This section is weak	Section is rewritten and improved considerably. Please see the changes. However, only generic information could be obtained from secondary sources like UNDAF Pacific and UNDP Regional Programme documents etc.
113	UNDP	3.3.6 Sustainability of Project Interventions and Results P-53	Again, it is unclear reading this draft report in what specific ways FREPP facilitated this multi-million dollar investment. To make the claim that the 'project was successful in facilitating FSC to upgrade a 10 MW biomass power project' causality and attribution are critical	Modified. FSC Labasa was already undergoing a 10 MW upgrade. Project capitalized on this as a demonstration project. All technical and physical work was done by FSC Labasa. Project main contribution was preparation of a detailed Project Evaluation.
114	UNDP	P-53	Above is written '14-17 Million' and 15-17 Million' and now 17 Million' - be consistent!	Made consistent at 17 Million
115	UNDP	P-53	Unclear – on p. 42 several significant challenges are mentioned 'like lack of interaction between the community cooperative and the SPC, lack of accountability and transparency mechanisms for the SPC, non-availability of bank account, lack of savings to undertake major repairs and higher tariffs.' Considering these challenges how can the conclusion be that 'Presently the system is working very well… '?	Discussions with community and stakeholders suggest that presently it is working well and they are also of the view that the challenges can be overcome in near future. Modifications made.
116	UNDP	P-53	Unclear (with reference to future coordination)	Modified
117	UNDP	P-53	To my knowledge such (NEC) has never existed. If correct, obviously it cannot be revitalized. An Advisory Committee was mentioned in the 2006 NEP, but to my knowledge such did not materialize. In the	Modified

			proposed 2013-2020 NEP document a National Energy Coordination Committee (NECC) is included but such is yet to be established	
118	UNDP	P-54	Vague - what are the specific 'good practices'?	Elaborated
119	UNDP	3.3.7 Impact of Project Interventions and Results P-54	Repetitive – no need to repeating this	
120	UNDP	P-54	Why? (with reference to GHG estimates)	FREPP has not made any cumulative estimations or analysis on the status of overall GHG reductions, resulting from project interventions.
121	UNDP	P-55	This reads as a truism	Removed.
122	UNDP	4. CONCLUSIONS, LESSONS AND RECOMMENDATIONS P-56	This section can be structured better. It is clear what recommendations are as they are numbered and highlighted. But that is not the case for key findings or lessons. Thus, either highlight also for key findings and lessons or alternatively use another structure: E.g. a) First mention key findings (consider use headings such as project design, project management, M&E, etc); b) Then mention all the recommendations and c) lastly lessons	Modified in line with the 1st option of keeping the same format by highlighting the key. It is important to mention that each recommendation is related to respective key finding/conclusion.
123	UNDP	P-56	Unclear – for what specifically? And who is the recommendation for?	Modified
124	UNDP	P-56	What is based on? Time needed depends on the scope of the project	Modified
125	UNDP	P-56	A project on? Mention the scope	Modified
126	UNDP	P-56	Repetition from main text. No need for such level of details in a conclusion	Modified. Repetition minimized. However, some elements are retained to give the reader a quick context.
127	UNDP	P-57	Whom is this recommendation for? (several)	Modified
128	UNDP	P-58	Contradiction in terms	Modified
129	UNDP	General	Beside above comments, several edits and grammatical corrections were also made in the draft text of the report	All included/Accepted