



Second Pacific Energy Investors Forum

Final Report

August
2016



SECOND PACIFIC ENERGY INVESTORS FORUM

FINAL REPORT



PACIFIC POWER ASSOCIATION

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Figure 1: Regional Map of the Pacific Islands



Source: Courtesy of the University of Texas Libraries, University of Texas at Austin, Texas, US.
 The boundaries and names shown on this map do not imply official acceptance or endorsement by the International Renewable Energy Agency.

Abbreviations

ADB	Asian Development Bank
CES	Clean Energy Solutions
EIB	European Investment Bank
EPC	Electric Power Corporation, Samoa
FEA	Fiji Electricity Authority
FSC	Fiji Sugar Corporation
FSM	Federated States of Micronesia
FWI	Fuel Wood Industries Limited
GWh	Gigawatt-Hours
IFC	International Finance Corporation
IPP	Independent Power Producers
KV	Kilovolts
MSW	Municipal solid waste
PIC	Pacific Island Countries
PPA	Power Purchase Agreement
PPP	Public Private Partnership
PRIF	Pacific Region Infrastructure Facility
PUC	Pohnpei Utilities Corporation
RfP	Request for Proposal
RJE	Robin Johnson Engineering Pty. Ltd
SOE	State Owned Enterprise
TA	Technical Assistance
TWI	Tropik Wood Industries
VITAL	FSM Petroleum Corporation

1 Introduction

The purpose of this report is to assist governments and utilities of 13 Pacific Island countries (PICs)¹ to increase access to renewable energy through private sector investments. The report aims to show case to private sector developers and investors some of the planned investor-ready power projects in the PICs for on-grid and off-grid power generation, transmission and distribution. It also provides information on the track record of the PICs in engaging with private sector investors to develop power projects.

The report is prepared by the Pacific Power Association with funding by the Asian Development Bank (ADB). It involved working closely with the Governments and power utilities of the PICs, other international donors and the Pacific Region Infrastructure Facility (PRIF) Energy Sector Working Group² to identify potential private sector investment opportunities and to document the existing and on-going private sector investments in the power sector.

The Consultant was engaged in June 2016 to prepare this report through an ADB Technical Assistance. The preparation of the report involved:

1. desk research and discussions with governments and power utilities in the PICs and collection of preliminary information;
2. in-country missions from 26th June – 13th July to 5 selected countries (Cook Islands, Fiji, PNG, Samoa and Tonga) where there appeared to be significant private sector investments;
3. updating of the list of private sector investments in the power sector based on inputs from the power utilities; and
4. working closely with PIC utilities, governments and donors to identify and develop project proposals investor prospectuses for planned private sector investment opportunities.

The report will be presented and circulated at the Pacific Power Association Annual Conference to be held in Tonga during Aug 1-5, 2016. The conference will be attended by PIC utilities and private sector investors and serves as a forum for exchange of ideas and information that could help advance some of the power projects that are identified in this report through private sector investments. This is the second Pacific Energy Investors Forum Report. The first Pacific Energy Investors Forum Report was presented during the Pacific Power Association Annual Conference in Tahiti in 2014.

This Report comprises an analysis of Trends in Private Sector Investments in the Pacific Power Sector (Section 2), Power Sector and Country Analysis, (Section 3), Project Proposals for Private Sector Investment (Section 4), Private Sector Investment Issues in the Pacific Power Sector (Section 5) and Recommendations (Section 6). The attachments to the report include the list of projects developed or to be developed by independent power producers (IPPs) (Attachment 1) and project proposals for selected power projects identified by the utilities that could be undertaken by the private sector (Attachment 2).

¹ The 13 countries are ADB Developing Member Countries: Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Nauru, Palau, Papua New Guinea, Republic of Marshall Islands, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu.

² The Pacific Region Infrastructure Facility (PRIF) Energy Sector Working Group includes the Asian Development Bank, Australian Government Department of Foreign Affairs and Trade (DFAT), European Union, JICA, New Zealand Aid Programme and the World Bank Group. The PRIF is a multi-development partner coordination and technical support facility which supports infrastructure development in the Pacific.

2 Trends in Private Sector Investments in the Pacific Power Sector

Over the last decade Pacific Island countries have made significant strides in creating an enabling environment for private sector participation in the power sector. Many countries are updating and enacting new regulations and policies to attract private sector investments. As evidenced from the statistics collected in this study, power utilities have been actively promoting private sector investments and negotiating with independent power producers (IPPs) to develop and operate power generation facilities, particularly from renewable energy sources.

There has been a significant increase in the number and total capacity of IPP projects since a similar study was last conducted in 2014. The categories comprise:

- Existing IPPs - projects that have been implemented:
- Selected IPPs - those with IPPs selected and/or under implementation; and
- Planned IPPs – projects under various stages of planning and IPP not yet selected.

The total capacity of IPPs is estimated to be 745 MW with investment cost of USD 2,668 million. Table 1 shows statistics on the Existing, Selected and Planned IPPs with the 2014 data shown in parentheses. The Planned Projects, with capacity of 202 MW and estimated investment cost of USD 594 million, are expected to be tendered out over the next few years. They represent significant investment opportunities for IPPs who are prepared to negotiate power purchase agreements with PIC utilities.

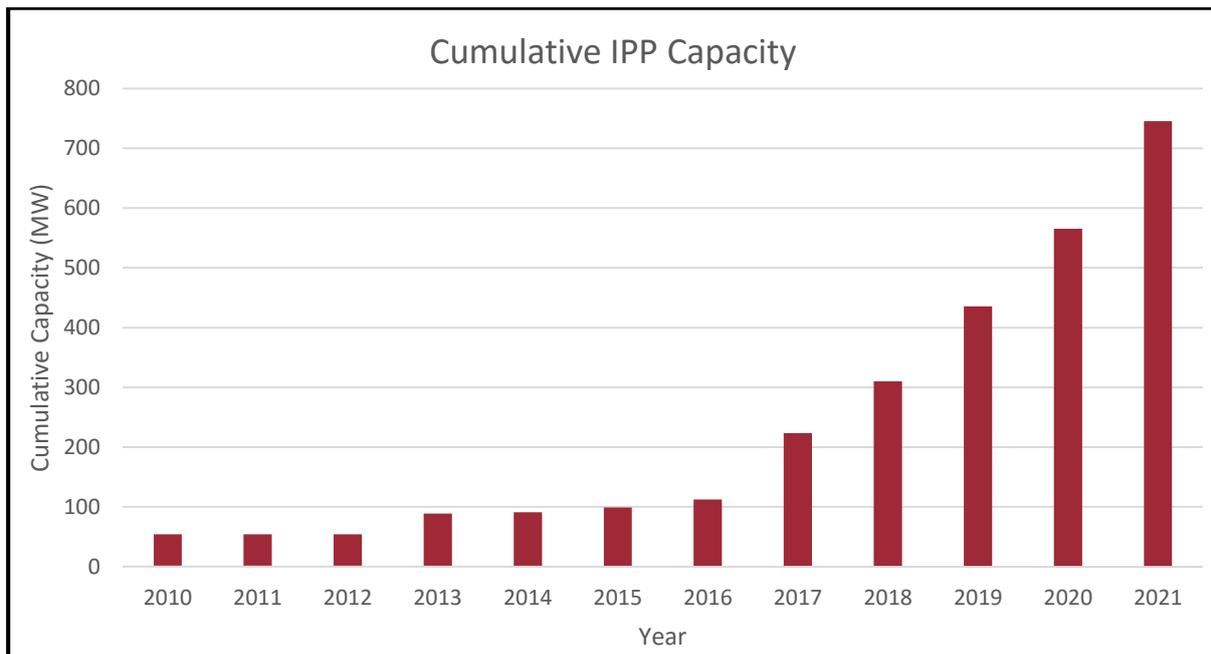
Table 1: IPPs Statistics in PICs

	<u>Number</u>	<u>Capacity, (MW)</u>	<u>Estimated Cost (USD million)</u>
Existing IPPs	21 (8)	114 (54)	404 (127)
Selected IPPs	23 (8)	429 (137)	1,670 (397)
Planned IPPs	16 (13)	202 (384)	594 (1446)
Total	60 (29)	745 (575)	2,668 (1,970)

2014 data shown in parentheses

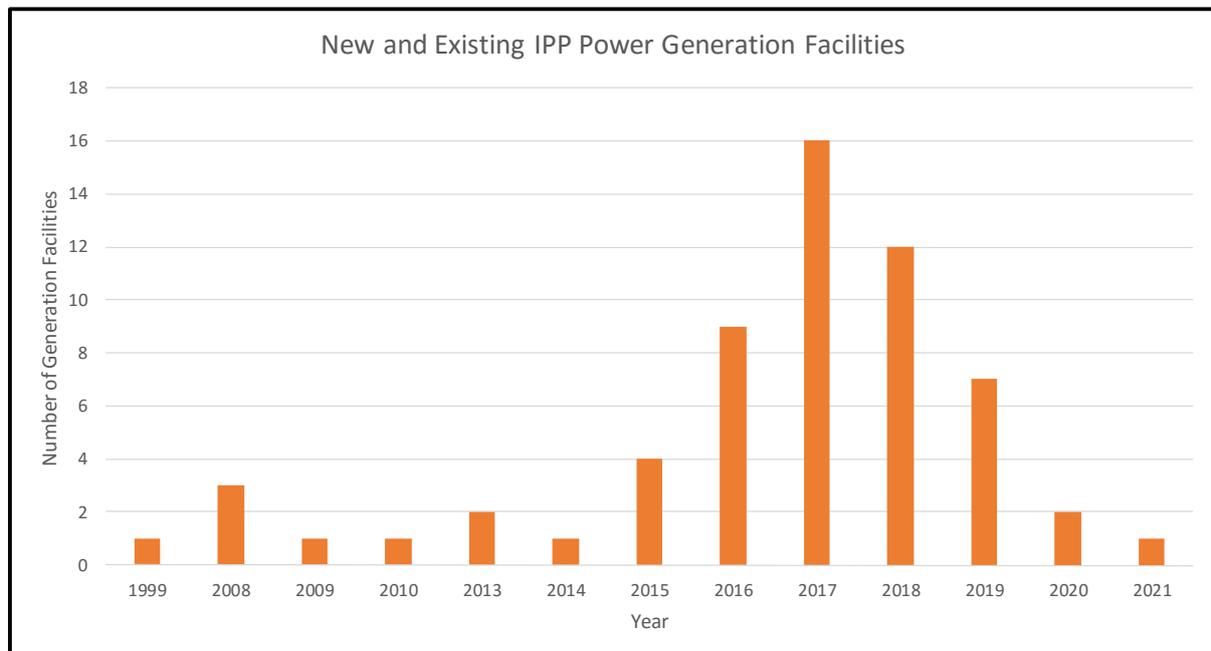
The cumulative total power generation capacity (in MW) requiring private sector investments for the period 2010-2021 is shown in Figure 2. From 2010 to 2016 there was a gradual increase in IPP investments from about 50 MW to 112 MW. However, for forecast period 2016-2021, there is expected to be a significant and rapid increase in capacity from 112 MW in 2016 to 745 MW in 2021, an almost seven-fold increase. Obviously these are indicative investments based on planning data and the actual increase may turn out to be more moderate.

Figure 2: Cumulative total generation capacity for IPPs (MW)



The number of systems coming on by year is shown in Figures 3. A large number of projects are expected to be completed over the next 3 years from 2017 to 2019, with the largest number in 2017 and declining thereafter. The decline in the later years may be due to many potential projects not being identified yet.

Figure 3 : Number of IPP generation facilities coming on by year



3 Sector and Country Analysis

The analysis of the sector indicates that the most number of power projects are solar followed by biomass. These are low capacity projects mostly ranging from 1-4 MW capacities, which partly explain the large number of these projects. See Figure 4.

Figure 4 : Number of IPP power generation facilities by technology type

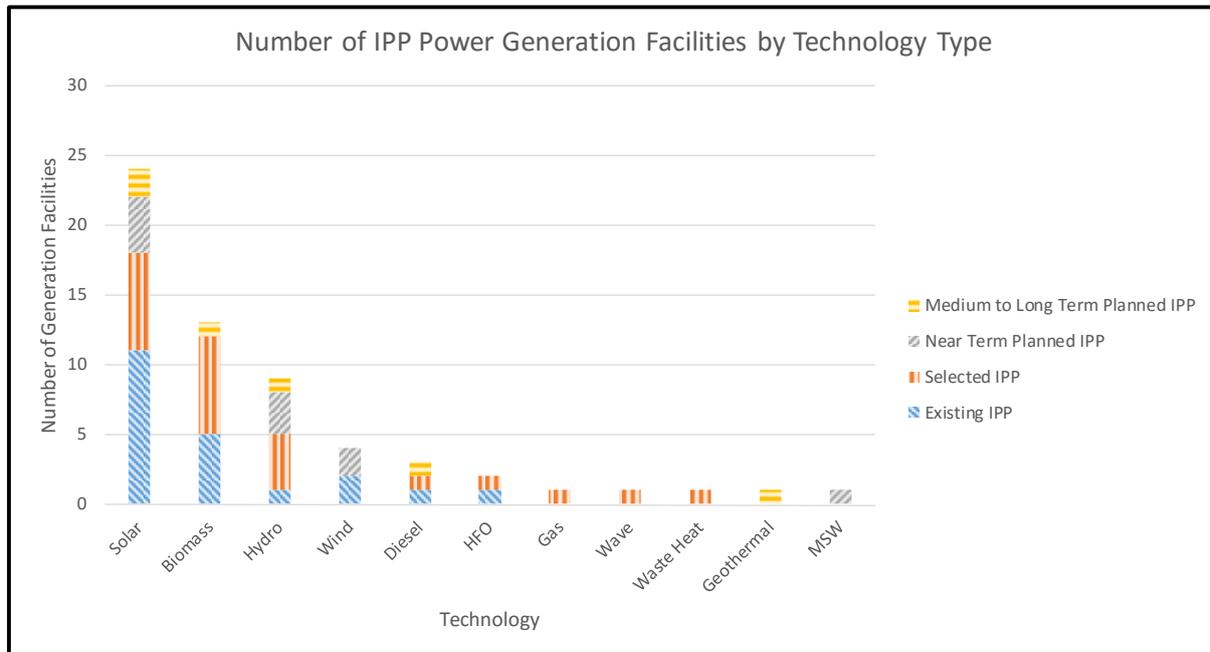
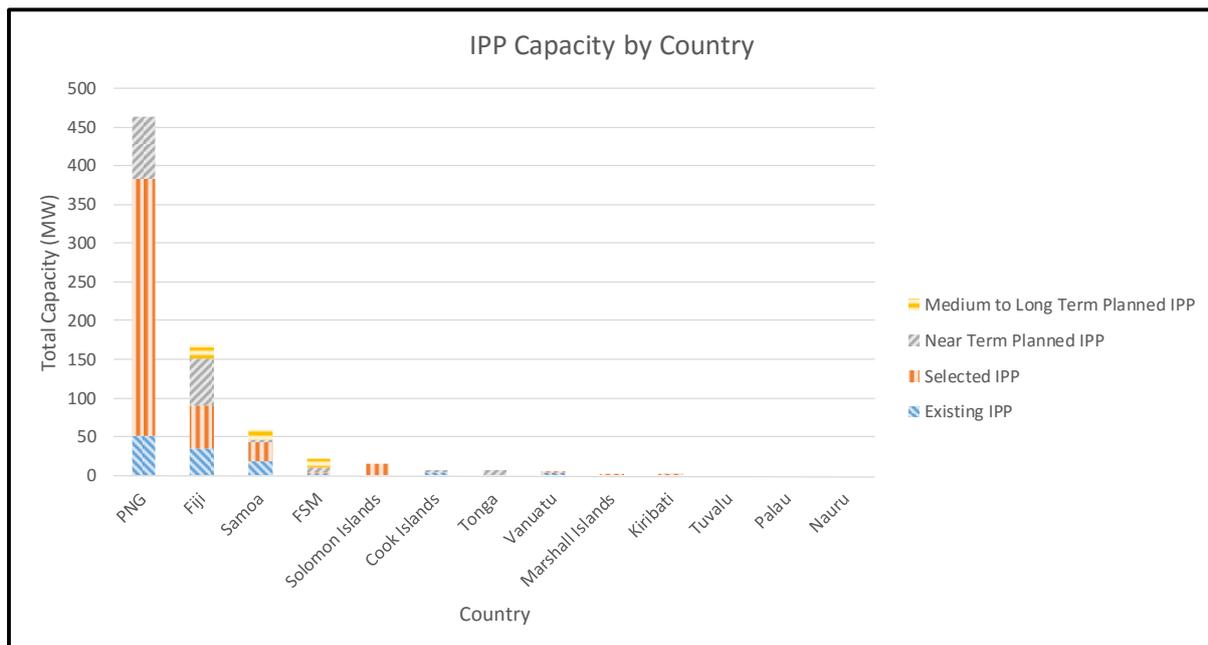


Figure 5 shows the total capacity by country, with PNG³ not unexpectedly having the largest capacity due to the country’s size, followed by Fiji. The other countries, with much smaller populations have correspondingly lower capacities.

³ PNG’s 1,800 – 2,500 MW Purari Hydropower PPP project, with estimated cost of US\$ 5 billion and which is projected to be completed in 2023, is not included in the statistics as it would grossly skew the results.

Figure 5 : IPP Capacity by Country



A complete list of the Existing, Selected and Planned IPPs, and management contracts based on inputs from the 13 utilities is shown in Attachment 1 and under the following tables:

- Table 1: Existing IPPs
- Table 2: Selected IPPs
- Table 3: IPPs in Planning, split into
 - Near Term IPPs
 - Medium-Long Terms IPPs
- Table 4: Existing Long Term Management Contracts

4 Project Proposals (Investors Prospectus)

The *Near Term Planned IPPs* were selected from the above-mentioned list of IPP projects for further discussions with utilities to consider developing Project Proposals (or Investors Prospectuses) for presenting at the Pacific Power Association Annual Conference. Based on the recommendations of the utilities, Project Proposals were developed for those projects that were at a sufficiently mature stage

to be presented to potential investors. The Project Proposals are shown in Attachment 2. The projects selected are:

1. Savai'i 2 MW/8GWh p.a. Hydropower Project, Samoa;
2. Savai'i 2.75 MW Wind Farm Project; and
3. 1.5 MW Pohnlangas Solar IPP, Pohnpei FSM.
4. Naoro Brown 80 MW Hydropower Project, PNG

Several of the other near-term projects were assessed by the utilities to be unlikely to be investor-ready within the next 6 to 18 months and Project Proposals were not developed for these projects.

5 Private Sector Investment Issues

5.1 Overview

This section discusses issues and barriers relating to private sector investments in the power sector in PICs and steps that could be taken to overcome some of the barriers. It is mainly based on discussions with several public utilities and local private sector IPP players in the Pacific island countries (PICs) during the Consultant's field trip and telephone/skype discussions. During the field trip the consultant visited 5 PICs and met with the utilities and some domestic IPPs. It was encouraging to note that many of the utilities were keen to engage with the private sector and are generally aware of many of the issues relating to private sector investing in public assets. The consultant also met with a few domestic IPP players who appeared very keen and indeed passionate about investing in renewable energy projects based on environmental and financial motivations. This section discusses some of the observations of the consultant based on these discussions.

5.2 Barriers to Private Sector Investment in the Pacific

Some of the barriers or issues relating to private sector investment in the Pacific region are well-recognized and these include:

- (i) high cost environment for doing business mainly due to remoteness to markets and suppliers, small economies that lack scale and widely dispersed islands within the country;
- (ii) land rights issues with customary ownership of land constraining its use as collateral for obtaining financing or for constructing a power generation facility;
- (iii) aspects of regulatory environment that are not conducive to private sector investments;
- (iv) difficulty in obtaining financing, particularly local currency financing due to the less mature banking sector; and
- (v) financial weakness of many PIC's utilities and the associated longer term payment risk perceived by IPPs and potential investors.

It should be noted that the above are general issues that apply to varying degrees to different countries. For example, bigger countries like PNG and Fiji with relatively larger populations and more developed economies, generally face these issues to a lesser extent.

Other barriers or issues that were highlighted in the course of discussions with Pacific public and private sectors on the ground include:

- (vi) Low diesel prices. The current low diesel prices reduce viability of renewable energy projects for IPPs. The tariff that utilities are willing to pay in PICs are generally bench marked to

avoided diesel generation cost and is often not financially viable for the private sector investor.⁴

- (vii) High IPPs financing cost. IPPs tariff expectations are high partly due to relatively high financing cost charged by domestic commercial banks.
- (viii) Domestic IPPs while keen generally lack capacity. Domestic IPPs generally lack the commercial sophistication to appreciate the complexities of negotiating a PPA, particularly in the smaller PICs.⁵
Many of the domestic IPPs may lack an appreciation of the long term risks and commitments associated with PPA contracts, which prolongs contractual negotiations as they are reluctant to take on longer term risks and commitments with a mindset of quick payback.⁶
- (ix) Utilities strong preference for grant or low interest donor funding over IPP arrangement. Many utilities have expressed this preference as it will reduce their project costs and this tends to result in IPP arrangements taking a lower priority.
- (x) Government bureaucracy and red tape. Application and approval of permits and licenses can often take a long time to process.
- (xi) Capacity of governments and utilities to negotiate and undertake PPAs (and Interconnection Agreements).
- (xii) Some distrust of foreign investors due to bad experiences in dealing with some foreign companies resulting in reluctance to enter into IPP arrangements with foreign companies.

6 Recommendations

Overcoming some of the barriers to private sector investments in the Pacific would not only contribute towards accelerating investments in the power sector it would also encourage new IPP players to enter and enhance the competitiveness that would further reduce tariffs. Governments and utilities would also be more inclined to consider IPPs to finance, build and operate more of their generation facilities. The following action steps are recommended to reduce barriers to private sector investment in the Pacific power sector:

1. *Capacity building support through a Technical Assistance (TA) for IPP transactions.* Provide training to utilities and interested IPP players, particularly for domestic EPC contractors trying to move into the IPP space, to improve knowledge and appreciation of IPP and PPA contractual obligations and risks. Supporting these home grown entrepreneurial businesses is needed from both government and donors in order to develop capacity within the Pacific, particularly

⁴ Some utilities have IPP contracts that state that the energy sale price at any time during the term of agreement shall not exceed Avoided Cost of Diesel Generation at that time, which effectively passes not only the current but the long term diesel price risk to the IPP.

⁵ For example, one local solar power IPP was not prepared to meet the flat tariff expectation of the utility in the first 7 years, but was prepared to reduce the tariff significantly below the flat tariff after the first 7 years when it would have met its debt servicing obligations. The IPP could have looked at other financing options such as increasing its equity contribution, bringing in the panel manufacturer or other investors as equity partners, negotiating the loan repayment over a longer etc. These actions could have helped the IPP to overcome its cash flow constraint in the initial years and at the same time meet the flat tariff expectation of the utility, but these were not considered.

⁶ Many of these so called IPPs are EPC contractors that are wishing to move into the IPP space but without an appreciation of the long term risks and contractual commitments, and understanding of structuring appropriate JV arrangements with diverse corporate entities that could strengthen the IPP entity. Other typical IPPs are based on family connections with panel suppliers or equity partners that have the relevant external connections.

in the smaller PICs. Alternatively, a forum or brainstorming discussion could be initiated for PIC utilities and investors to exchange ideas and learn from each other's experience to support the development of IPPs.

2. *Low level transaction advisory support.* Provide access, through a donor-funded TA, to practical (not high level/investment banker type) transaction advisory consultants that have good understanding of the Pacific power sector, to assist in negotiating the contractual arrangements and suggest innovative solutions to overcome any hurdles. This could also help utilities to verify the bona fides of foreign companies and weed out any unscrupulous ones. This support could be made available at a cost, albeit nominal cost, to the utilities (and IPPs) that are having difficulty closing an IPP arrangement.⁷
3. *Donor funding support for IPPs.* Donors could consider providing a commercial funding pool and/or guarantees to facilitate financing of IPPs, particularly the smaller domestic IPPs, that are likely to be financially viable, have the right technical skills and the ability to deliver sustainable power projects. If available this should be well-publicized in PICs.
4. *Support the development of a standardized PPA.* This should be specifically tailored to the Pacific particularly for the smaller renewable energy projects using solar, wind or biomass. If widely accepted this standardized PPA contract(s) will help to increase the efficiency of contract negotiation and also in obtaining financing if financial institutions also endorse its use.
5. *Strengthen the financial capacity of utilities.* PIC governments and the utilities need to work together to ensure that tariff levels and if necessary legislated subsidy are adequate to maintain financial viability of the utilities and to give confidence to investors, particularly IPPs. Utilities also need to be regulated and/or competition introduced to ensure that they operate efficiently and cost-effectively manage operating and capital expenditures.
6. *Other longer term recommendations: Review regulations and customary land ownership law.* These are longer term measures that are being gradually updated and further improvements could be made in many PICs to create a more enabling environment for private sector investments.

The above recommendations if implemented could significantly remove many of the barriers faced by investors in the Pacific. The actions to be taken will obviously need to be tailored to the conditions and situation of each country. While some of the recommendations could be undertaken at a regional level e.g. standard PPA template and transaction advisory support, others will require more detailed review at each country's level to determine the specific action steps that need to be taken that are appropriate to that country's situation.

⁷ It is crucial that utilities and/or IPPs share some cost to ensure cost-effective and efficient use of the consultants.

List of Private Sector Investment (PSI) Projects in Pacific Island Countries

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Table 1: Existing IPPs (Operational IPPs)

Table 2: Selected IPPs (Selected but not Commissioned Yet)

Table 3: IPPs in Planning

Table 4: Existing Long Term Management Contracts

Table 1: Existing IPPs (Projects in operation)

Country/ Location	Company/ Project Name	Technology	Total Capacity (MW)	Quantity Sold to Grid	Est. Investment (US\$ million)	Commissioning Date	PPA end date	Comments
Cook Islands (Rarotonga)	Grid tied solar generation	Solar	3.3MW	100%	\$8m (NZD11.0m)	2009-2016	Rolling 5 year agreements	Net or gross metered, very small distributed IPPs.
Fiji (Western, Viti Levu)	Tropik Wood Industries (TWI)	Biomass (woodchips)	9MW	Surplus exported	N/A	March 2008	25 Years	Not operational - boilers caught fire twice. TWI is a state-owned entity.
Fiji (Lautoka, Viti Levu)	Fiji Sugar Corporation (FSC)	Biomass (bagasse)	5MW	100%, during crushing season only	N/A	2009	No PPA – FEA takes surplus.	FSC is a state-owned entity
Fiji (Labasa, Vanua Levu)	Fiji Sugar Corporation (FSC)	Biomass (bagasse)	20MW (2 x 10MW)	6MW	N/A	FSC has not been able to supply as per the PPA.	15 years from June 2013 for year round supply.	FSC is a state-owned entity
FSM/Pohnpei (Pohnpei)	FSM Petroleum Corporation "Vital"	Diesel	2MW	100%	N/A	N/A	Short-term PPA	2MW emergency containerized diesel generation. Assets currently undergoing maintenance.
Kiribati (Tearoaereke, Tarawa)	USP solar system	Solar PV	9 kW	Nil	N/A	N/A	N/A	System is grid connected but intended for self-consumption.
Kiribati (London)	ANZ solar system	Solar PV	18kW	N/A	N/A	2008	N/A	Excess sold to grid.
PNG (Port Moresby Grid)	Pasco Daewoo Hanjung Power/Kanudi HFO IPP	HFO Thermal	24MW	100%	N/A	Jan 1999	15 + 5 years	PPA expired in 2014 and was extended by 5 years.
PNG (Bulolo, Morobe Province)	PNG Forest Products/Baiune Hydro IPP	Hydro	15MW	Export Surplus 10 MW	\$50m	Mar 2013	N/A	3 hydros. Mostly captive power.

Country/ Location	Company/ Project Name	Technology	Total Capacity (MW)	Quantity Sold to Grid	Est. Investment (US\$ million)	Commissioning Date	PPA end date	Comments
PNG (Two locations)	New Britain Palm Oil Ltd/Biogas IPP	Biogas (POME)	10-15MW cumulated	Export Surplus 2 MW	N/A	2010	N/A	Mostly captive power
Samoa (Upolu Airport)	Green Power Samoa	Solar	2MW	100%	\$6m	2015	2035	IPP (3.5 GWh p.a.)
Samoa (Upolu Airport)	Sun Pacific Energy	Solar	2MW	100%	\$6m	2015	2035	IPP (3.5 GWh p.a.)
Samoa (Upolu Airport)	Solar for Samoa	Solar	2MW	100%	\$6m	2016	2036	IPP (3.6 GWh p.a.)
Samoa (Upolu Racecourse)	Green Power Samoa	Solar	2MW	100%	\$6m	2016	2036	IPP (3.5 GWh p.a.)
Samoa (Upolu Racecourse)	Solar for Samoa	Solar	1.5MW	100%	\$4.5m	2016	2036	IPP (3.6 GWh p.a.)
Samoa (Mt. Lepue, Upolu)	Shanghai E Power	Wind & hydro pump storage	7.5MW	100% as needed	Est. \$80m	2017	2036	IPP (48 GWh p.a.)
Samoa (Piu Village, Upolu)	Piu Village biomass	Biomass	0.025MW	100%	\$0.2m	2016	N/A	IPP (0.046 GWh p.a.)
Samoa (Salelologa, Savai'i)	Louis Berger	Solar IPP	2.0MW	100%	\$6m	2017	N/A	IPP (3.48 GWh p.a.)
Tonga (Tongatapu/ Vava'u)	Solar Island Technologies	Solar	0.06MW	100%	\$0.150m	Varying dates	2017	Distributed generation from multiple sources of generation.
Vanuatu (Devil's point – Efaté)	Unelco (utility) – Devil's point farm	Wind farm	3. 5MW	100%	\$8.15m	December 2008	N/A	The Utility is a private company
Vanuatu (Undine Bay – North Efaté)	Unelco (utility) - Efate Solar IPP	Solar	0.5MW	100%	\$1.14m	April 2016	N/A	The Utility is a private company

Table 2: Selected IPPs (Investor selected but project not commissioned yet)

Country/ Location	Company/Project Name	Technology	Total Capacity (MW)	Quantity Sold to Grid	Est. Investment (US\$ mil.)	PPA in place (yes/no)	Estimated COD	Comments
Fiji (Centre of Viti Levu Island)	Hawkins Infrastructure/Qaliwana & Upper Wailoa Diversion Hydro Scheme	Hydro	36MW	100%	\$250m	Under negotiation	Still under discussion, pending finalization of commercial model.	Hawkins got selected by FEA through tender - awaiting finalization of commercial model.
Fiji (Nabou, Sigatoka, Viti Levu)	Nabou Green Energy Ltd	Biomass (Wood Chip)	10MW	100%	N/A	Signed 2014 (25 years)	Q2, 2017	Backed up by GIMCO, Korea - plant currently under construction.
Fiji (Vuda, Lautoka, Viti Levu Island)	Pacific Renewable Energy Ltd (PRE) / Fuel Wood Industries Limited (FWI)	Biomass (Wood Chip)	10MW	100%	N/A	25 years	Awaiting financial closure.	AJYNK is the Project Manager. PRE will own the plant and sell power to FEA. FWI will manage a plantation to provide wood.
FSM/Kosrae (Kosrae)	Ocean Energy Kosrae/Wave Energy IPP	Wave Energy	1.5MW	100%	\$4m	Yes (20 years + \$0.20/kWh)	Looking for funding	Private sector led PPP proposal. Plant not built yet. JV between Ocean Energy Industries, IDEA and the Kosrae Utility Authority.
Kiribati (Eita, Tarawa)	Moroni High School solar backup system	Solar PV with storage	150kW	Excess exported to grid	N/A	N/A	Completed	Small quantity of excess exported to grid.
Marshall Islands (Majuro Stn2)	GE/Waste Heat recovery	Waste heat recovery from exhausts	0.24MW	100%	\$2.0m	Yes. 10 years, ending 2027 with buyout clause for early exit	Pending modifications to improve efficiency.	Currently shutdown pending manufacturing of parts and system modifications.
PNG (Ramu Grid)	Ramu 2 Hydro PPP	Hydro	180MW	100%	\$735m	25 years	2020	Public Private Partnerships Transaction Advisors appointed and 3 firms shortlisted. Under Kumul Consolidated Holdings. RfP close Oct 2016, preferred bidder Dec 2016.
PNG (Port Moresby Grid)	Moitaka modular Power station	Diesel	25MW	100%	\$40m	5-year lease with option to	2017	20-foot 1MW modular stations. 45 tenderers, only 15 complied and 3 tenderers shortlisted. Final evaluation

Country/ Location	Company/Project Name	Technology	Total Capacity (MW)	Quantity Sold to Grid	Est. Investment (US\$ mil.)	PPA in place (yes/no)	Estimated COD	Comments
						extend or buyout		and submission to the PPL Board in 3Q 2016.
PNG (Lae Grid)	Pasco Daewoo	HFO	30 MW	100%	N/A	Yes	March 2017	Plant under construction. Expected C.O.D. 1Q 2017.
PNG (Kavieng)	Kavieng Biomass IPP	Biomass	1.6MW	100%	\$10-\$15m	Yes	Q3 2017	PNG Power Ltd already selected Clean Energy Solutions (CES) but no progress for last 12 months. Project on hold as CES failed to reach financial close. PPL following up with CES.
PNG (Brown River - Port Morseby Grid)	Edevu Hydro	Hydro	50 MW	100%	N/A	Yes	2020	Transmission Line design, land/easement acquisition in progress following which PPL will negotiate a Transmission Line commercial lease agreement (a Condition Precedent in the PPA).
PNG (Makam Valley)	Oil Search	Biomass	15MW	100%	N/A	N/A	Q1 2019	Oil Search and PPL are currently working on an Implementation Agreement with the State that will relieve PPL from the LoC obligations.
PNG (Highlands)	Oil Search	Scaling up Gas generation	30-60MW	100%	N/A	N/A	Q4 2017	Gas engine plant. Initially 2MW with incremental expansion over 10 years up to minimum 30MW and maximum 60MW.
Samoa (Upolu Island)	Green Power Samoa Ltd.	Solar	4MW	100%	\$13-15m	PPA signed	Q1 2015	Chinese company
Samoa (Upolu Island)	Green Power Samoa Ltd (additional)	Solar	1MW	100%	\$3-4m	Negotiating terms of additional capacity	Q3 2017	Chinese company
Samoa (Upolu Island)	Sun Pacific Energy	Solar	2MW	100%	\$6-7m	PPA signed	Q4 2014	Australian company
Samoa (Upolu Island)	Sun Pacific Energy	Solar	200KW	100%	\$3-4m	negotiating	Q2 2017	Australian company; extra modules financed by ADB loan

Country/ Location	Company/Project Name	Technology	Total Capacity (MW)	Quantity Sold to Grid	Est. Investment (US\$ mil.)	PPA in place (yes/no)	Estimated COD	Comments
Samoa (Upolu Island)	Solar for Samoa	Solar	4MW	100%	\$13-15m	PPA signed	Q3 2016	Australian company plus local shareholders
Samoa (Upolu Island)	BIOGEN3	Biogen	4MW	100%	\$5m	PPA signed	Q4 2017	Has not started, funding not approved
Samoa (Upolu Island)	Village Life Energy	Biomass	4MW	100%	\$5m	PPA signed	Q4 2017	Has not started, funding not approved
Samoa (Upolu Island)	Samoa Tyre Recycle	Biomass	4MW	100%	\$5m	PPA signed	Q4 2017	Has not started, funding not approved
Solomon Islands (Guadalcanal/ Honiara Grid)	Tina River Hydro IPP	Hydro	15MW	100%	\$200m	No	Q1 2018	The bidder has been selected. This is a proposed project, PPA not executed as yet and at the stage of finalizing finances, due diligence, least cost generation studies etc.
Vanuatu (Port Vila – Irririki island)	Irririki Resort & Casino	Solar + batteries + Genset	0.7MW Solar + 2X 0.5MW Gensets	In discussion	N/A	In discussion	N/A	

Table 3: IPPs in Planning

Country/ Location	Company/ Project Name	Technology	Total Capacity (MW)	Quantity Sold to Grid	Est. Investment (US\$ million)	Feasibility Study	Expected Tender Date	Bid Deadline	Selection Date	PPA Terms	Comments
<u>IPPs in Planning- Near Term Projects (Expected Tender Date before 31st Dec 2017)</u>											
Cook Islands (Rarotonga)	Wind generation	Wind	1-2MW	100%	N/A	N/A	N/A	N/A	N/A	N/A	Pending power system modeling study to be completed November 2016. Project is not ready for Investor Prospectus.
Cook Islands (Rarotonga)	Solar generation	Solar	1-2MW	100%	\$2.3m - \$4.9(NZD3.3m -NZD7.0m)	N/A	N/A	N/A	N/A	N/A	Pending power system modeling study to be completed November 2016. Project is not ready for Investor Prospectus.
Fiji (Viti Levu)	Naboro Waste to Energy Potential IPP	Pyrolysis (MSW)	10MW	Expected - 100%	\$25-30m	Yes	Q1 2016	N/A	August 2016	N/A	EOI are yet to be evaluated. Project is not ready for Investor Prospectus.
Fiji (Various)	Solar IPPs	Solar	3MW	100%	Not available – several IPPs.	None – for IPP to undertake.	EOIs Called in June 2016	Closed in July 2016	Aug- Sept 2016	Varies for differed IPPs.	Likely 3MW capacity for each IPP.
Fiji (Central Viti Levu)	Navua Hydro IPP	Hydro	48MW	100%	N/A	To be undertaken by IPP	N/A	N/A	Q4 2016	25 years	Unsolicited bid. FEA and IPP discussing details of PPA.
FSM Pohnpei (Pohnpei Island)	Pohlongas Solar IPP	Solar	1.5MW phase 1 (6MW Total)	100%	\$4-6m phase 1 (\$16-24m total)	Yes	2017	2017	2017	20 years	Investor Prospectus prepared
PNG (Port Moresby Grid)	Naoro Brown Hydro IPP	Hydro	80MW	100%	\$200m	Yes	N/A	N/A	N/A	25 years	Transaction Advisors, Multi Consult appointed – looking into PPP arrangement
Samoa (Sava'i'i)	Savii 2MW Hydropower Project	Hydro	2MW	100%	\$14m	Complete, but to be revised	Q4 2016	Q1 2017	Q1 2017	N/A	Investor Prospectus to be developed

Country/ Location	Company/ Project Name	Technology	Total Capacity (MW)	Quantity Sold to Grid	Est. Investment (US\$ million)	Feasibility Study	Expected Tender Date	Bid Deadline	Selection Date	PPA Terms	Comments
Samoa (Savai'i)	Wind Development	Wind	2MW	100%	N/A	To prepare on Q4 2016	Q1 2017	Q1 2017	Q2 2017	N/A	Investor Prospectus to be developed
Tonga (Tongatapu)	6 MW of Solar PV	Solar	6 MW	100%	\$10m	N/A	N/A	N/A	N/A	20 to 25 Years	Likely to be in 1.3-2.0 MW size systems distributed around the island. Could be tendered out in phases. Project is premature for preparation of investor prospectus.

IPPs in Planning- Medium to Long Term Projects (Expected Tender Date after 1st January 2018)

Cook Islands* (Rarotonga)	Pumped Hydro	Storage	Up to 9 MW	100%	\$180m	Pre- Feasibility Completed	N/A	N/A	N/A	N/A	Detailed feasibility required including the identification of specific sites – <i>Note: Excluded from list as this is likely to be an EPC not IPP.</i>
Fiji (Western, Viti Levu)	Lower Ba	Hydro	18MW	Expected – 100%	\$90m to \$100m.	Pre- feasibility – Completed	N/A	N/A	N/A	N/A	Full feasibility is being pursued by EIB.
Fiji* (Western (Ba), Viti Levu)	Virara to Rarawai 132kV Transmission Network Development	Transmission Line	132kV – 30kV	N/A	\$24m(FJ\$50M) (estimate)	Yes	Subject to funding	N/A	N/A	N/A	Grid extension for reliability and security of supply. Project is not ready for Investor Prospectus. <i>Note: Excluded from stats as this is likely to be EPC.</i>
FSM/Chuuk (Tonoas, S. Namoneas)	FSM Petroleum Corporation (VITAL)	Diesel/Solar hybrid	0.75 MW	0.25 MW	\$1.5m	Complete	Complete	Complete	Complete	Final terms of PPA pending ⁸	Land issues hindering the project and may cause VITAL to pull out. If VITAL pulls out, CPUC looking at Plan B - to secure state

⁸ The agreement with VITAL would include provision for future expansion of generation capacity to supply the other two main islands Fefan and Uman via new 1.5km and 2.5 km cables respectively. This is concept only.

Country/ Location	Company/ Project Name	Technology	Total Capacity (MW)	Quantity Sold to Grid	Est. Investment (US\$ million)	Feasibility Study	Expected Tender Date	Bid Deadline	Selection Date	PPA Terms	Comments
											funds to install diesel gensets. ⁹
FSM/Kosrae (Kosrae)	Indian Energy Co, USA/ Solar PV Grid Connected System with Energy Storage	Solar with Energy Storage	1 MW	1 MW	\$7m (estimated)	Initial Survey conducted	N/A	N/A	N/A	N/A	
FSM/Pohnpei (Pohnpei Island)	Diesel IPP	Diesel	10MW	100%	\$6m	N/A	N/A	N/A	N/A	N/A	PUC under discussion with VITAL. 6MW of new high speed diesel generators and 4MW of medium speed diesel generators.
Marshall Islands * (Majuro)	Generator supply	Diesel fuel, dual fuels blended	5-7 MW ¹⁰	As peaking units	Unknown	Likely N/A	Unknown	Unknown	Unknown	Unknown	Concept idea at present <i>Note: Excluded from statistics as it is only concept idea.</i>
PNG * (Simbu Province, Highlands region)	Purari Hydro PPP	Hydro	1800-2500MW	N/A	\$5,000m	Completed, Jan 2016 by Salini Impregilo	N/A	N/A	N/A	N/A	Under Kumul Consolidated Holdings. Construction to commence in 2017 and completed by 2023. <i>Note: Excluded from stats as it will skew results.</i>
Samoa* (Upolu-Savai'i)	Submarine cable tie between Upolu and Savai'i	Submarine cable	10MVA	100%	\$15m	Prepared on Q4 2016	Q1 2017	Q1 2017	Q2 2017	N/A	<i>Note: Excluded from stats as this is likely to be EPC.</i>
Samoa (Savai'i)	Geothermal Investigation	Geothermal	8.5MW	100%	\$5m	To prepare on Q4 2016	Q4 2016	Q1 2017	Q1 2017	N/A	

⁹ There may then be potential for IPP to takeover and expand the facility to supply the other 2 main islands. Based on the current scenario there is no opportunity for new IPP, but if Plan B eventuates, there may be IPP opportunity in the medium to long term. May require investor prospectus later on.

¹⁰ Combination of 1.5 MW, 2.0 MW and 2.5 MW units with total

Country/ Location	Company/ Project Name	Technology	Total Capacity (MW)	Quantity Sold to Grid	Est. Investment (US\$ million)	Feasibility Study	Expected Tender Date	Bid Deadline	Selection Date	PPA Terms	Comments
Samoa (Upolu)	BIOMASS	Biomass	4MW	100%		To prepare on Q3 2016	Q4 2016	Q1 2017	Q2 2017	N/A	
Solomon Islands * (Savo Island/ Honiara Grid)	Geodynamics/ Savo Geothermal IPP	Geothermal	10MW phase 1 (30MW total)	100%	\$80-100m phase 1	No	N/A	N/A	N/A	N/A	Private sector led proposal. No feasibility study undertaken so far. Project delayed indefinitely <i>Note: Excluded from stats as project progress is uncertain.</i>
Vanuatu * (Efaté)	Geodynamics/ Takara Geothermal IPP	Geothermal	4	100%	\$40-45m phase 1	Yes	N/A	N/A	N/A	N/A	The company pulled out in June 2016, as project is not as viable, partly due to low diesel prices. <i>Note: excluded from stats as project progress is uncertain.</i>

* One of seven projects excluded from statistics – see comments column for explanation

Table 4: Existing Long Term Management

Country/ Location	Utility	Assets	Total Capacity (MW)	Est. Contract Date	Comments
Fiji (Viti Levu)	FEA (Contract with PERNIX)	Kinoya (50MW) and Vuda (20MW) Diesel Power Plants	70MW	2003 (20 years)	Ongoing O&M
Fiji (Kinoya (New), Viti Levu)	FEA (Contract with PERNIX)	35MW Kinoya HFO/Diesel Power Plants	35MW	November 2015	Ongoing O&M

Attachment 2: Investors Prospectus

INVESTORS PROSPECTUS

PACIFIC POWER SECTOR

Pacific Power Sector Investment Opportunities

PROJECT PROPOSALS

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1. Savai'i 2 MW/8GWh p.a. Hydropower Project, Samoa	25
2. Savai'i 2.75 MW Wind Farm Project, Samoa	30
3. 1.5 MW Pohnlangas Solar IPP, Pohnpei FSM	35
4. Naoro Brown 80 MW Hydropower Project, PNG	40

Project Proposal

Savai'i 2 MW / 8 GWh p.a. Hydropower Project

Samoa



Asaasa Falls
18/10/06



Diversion Weir Site
18/10/06

Electric Power Corporation (EPC), Samoa

August 2016

1. THE INVESTMENT OPPORTUNITY

Project Name	Savai'i 2 MW / 8 GWh p.a. Hydropower Project
Power Utility	Electric Power Corporation, Samoa
Project Sponsors/Parties	Local or foreign private sector investors to operate as an IPP. EPC may also consider owning and operating the project if funding from international donor agencies is available.
Purpose	The purpose of the project is to develop Samoa's indigenous renewable energy resources in a sustainable manner and reduce the country's dependence on imported fossil fuels for electricity generation.
Benefits	<p>The benefits of the project are:</p> <ul style="list-style-type: none">• New hydro capacity of 2 MW in Savai'i with expected production of 8 GWh per year.• achieve cost and efficiency improvements while reducing the trade deficit and foreign exchange risk by displacing expensive imported fossil fuels;• diversification of sources of electricity generation and improvement of energy security; and• annual emissions reduction of 3,200 tCO₂, by displacing diesel generation, based on 0.8kg kg CO₂/kWh.
Project Location	<p>The proposed hydropower scheme will be located in Savai'i, which is on the southern side of Savai'i Island. Savai'i is Samoa's largest island with an area of 1,700 sq. km and is the second most populated island with a population of 45,000 and electricity demand of 13 GWh/year and energy demand growing at 2% per year.</p> <p>The project site is located near the south coast of Savai'i Island. The hydro power scheme utilizes the flow of the Asaasa River, which is on the eastern branch of the Vaita'i Stream which is a tributary of the Lata River joining it at Sili village.</p>
Project Capacity/Production	<p>Based on feasibility studies undertaken by Electric Power Corporation this site has been identified to have the island's largest hydro potential for a 2 MW hydro scheme. The estimated hydrological water would be able to support an annual energy production of 8 GWh and would meet about 60% of Savai'i's total energy demand and 70% of island peak demand of 2.8 MW.</p> <p>The hydropower production capacity is based on 156 meters head, average flow rate of 1.5 cu.m./second, 2.5 Km of penstock and plant capacity factor of 45%. The estimated dam storage capacity is 10,000 cu. m. with flooded surface area of 2,000 sq. m.</p> <p>EPC has about 5,000 electricity customers in Savai'i, comprising mainly domestic and commercial customers. They account for nearly 80 percent of total electricity consumption.</p>
Project Technology	<p>Savai'i's 2016 peak power demand of 2.8 MW is expected to grow at 2% p.a. to 3.36 MW by 2025.</p> <p>Run of river hydropower scheme.</p>

Project and Assets description	<p>The Vaita'i Hydropower project comprises the following components:</p> <ul style="list-style-type: none"> an intake structure to be constructed in Asaasa river to divert part of the stream flow into a penstock; a penstock to convey water with gravity flows to a power house; a powerhouse equipped with two 1.0 MW turbines, and electric and mechanical control systems; a 30 metre long tailrace channel for the water discharged from the power house, back to the Vaita'i stream; a 2.6 kilometre (km) 22 kilovolts (KV) transmission line to be built along the existing access road from the power house to Savai'i power network; and the extension of the existing road to the Asaasa Falls for construction access and future maintenance.
Feasibility Study status	A feasibility study of the hydropower scheme was funded by the Asian Development Bank and was carried out for EPC in 2007 by Tonkin and Taylor International. The report is available for review by interested parties and will need to be updated to reflect more current conditions.
Investment Cost estimate/breakdown	The estimated cost of the project is USD 15 million, excluding land acquisition costs.
Percent of power production sold to grid	100%
Key PPA/Contract terms	The PPA is expected to be for a period of 20 years with option to renew with minimum purchase of electricity, subject to availability of 8GWh per year. Other terms of the PPA will include: business partnership with land owners, and village council of chiefs to provide security and safekeeping of project and plant and more important enforcement of protection of river catchment forest from being cut down which will ensure high river flow at all times.
Phases, if any	-
Financing	The IPP will need to arrange its own financing.
Ownership	The scheme will be owned by the IPP for the term of the PPA after which it will be transferred to EPC at a nominal price of USD 1.
Transaction Advisors appointed, if any	Not appointed yet.
Government support or incentives, if any	There is unlikely to be any government guarantee. However, Government will assist with consultations with villages and land owners for acquisition of land and developing of partnership with village council of chiefs.
Project progress to-date	Completed initial feasibility study, to be updated.
Environmental/Social	<p>Environmental and resettlement constraints are limited and will not hinder the implementation of the project.</p> <p>The Initial Environmental Evaluation conducted in April 2007, concluded that adverse environmental impacts arising from the location, design, construction and operation and maintenance of the hydropower project can be minimized to insignificant levels and that a full Environmental Impact Assessment is not considered warranted.</p>

2. SAMOA

The Country

Samoa is located in the Oceania group of islands in the South Pacific Ocean, about halfway between Hawaii and New Zealand. Samoa, the Polynesian group of islands, consists of two main islands Upolu and Savai'i and seven smaller islets. Three-quarters of the population of the country are located in Upolu on which the capital city, Apia, is located. The total area of the country is 2,931 sq. km. The currency is Tala or Samoan

dollar (2.55 Tala/USD in June 2016). The languages of the country are Samoan (Polynesian) and English. As per World Bank, the population of Samoa was 193,228 in 2015 with 80% of the population living in rural areas.

Economy

The economy of the country is mainly dependent on tourism, agriculture, fisheries, remittances and external development assistance. Two-thirds of labour force of the country is engaged in subsistence agriculture and fishing. The major industries are food processing, building materials and auto electrical harnesses production. The manufacturing sector mainly processes products of agriculture. The natural resources that are found in the country are coconut products, timber, fish, taro and hydropower. According to World Bank, GDP of Samoa in 2015 was US\$ 761.0 million (current US\$) and has an average income per capita of US\$3,938.

Political/Legal

Samoa gained independence from New Zealand in 1962, the first Pacific island country to become independent. The government of Samoa operates as a parliamentary democracy mirrored on the British system of government.

In December 2014 the cabinet approved a new Public Private Partnership (PPP) Policy for guidelines on identifying and implementing PPPs. In January 2015 the cabinet approved a new State Owned Enterprise (SOE) Ownership, Performance and Divestment Policy and it is expected that its implementation will result in reforms of SOEs and more privatizations.

3. ELECTRICITY SECTOR

Capacity

Samoa had total installed grid-connected power capacity of 42 MW in 2016. The electricity consumption in Samoa is around 125 gigawatt-hours (GWh) per year and total energy generation of 145 GWh pa. During 2014, the contribution of hydro in the total production was 24% while diesel contributed around 75.8%. The balance was contributed by solar power.

Electrification

Currently 100% of the population has access to electricity. The total number of electricity consumers as on June 30, 2014 was 35,227.

Tariff

The electricity tariff is mid-range of all Pacific island countries and is likely to become lower as the country reduces its dependence on imported fuel for production of electricity. Dependence on diesel fuel will greatly reduce at the end of 2017, when the country's electricity generation is expected to be from 100% renewable energy sources. The total tariff charge per kWh (for domestic consumption in excess of 100 kWh/month and non-domestic consumption) is ST\$ 0.79. For prepayment meters, domestic consumption from 1-100 kWh usage tariff is about \$0.50 per kWh. There is potential to reduce tariffs with a shift to renewable energy and more importantly with the great drop in diesel price.

Policy & Plans

The Electricity Act 2010 established the role of the Electricity Regulator and has opened opportunities for Independent Power Producers (IPPs) to generate and sell electricity to EPC. In order to reduce dependence upon imported fossil fuel, the country is targeting to increase the capacity of renewable energy sources and is promoting partnership with international organizations and IPPs. The Government's and Utility's goal is to increase use of renewable energy at much lower tariff.

Electric Power Corporation has committed to 6 renewable energy generating IPPs, some already in operation and rest under construction, and the utility's own funded renewable energy program which includes rehabilitation of old hydropower plants and construction of new hydropower plants and solar and wind farms.

4. ELECTRIC POWER CORPORATION, SAMOA

Background

EPC is a wholly government-owned corporation and the sole utility that is responsible for managing the electricity sector in the country. It has necessary powers and legislations to carry out the functions of generation, transmission, distribution and selling of electricity. It was established in 1972 by the Electric Power Corporation Act 1972. The corporation is governed by an eight-member board of directors with its own chairman appointed by Cabinet. The Board includes the Chief Executive Officer of the Ministry of Finance as ex-officio.

Financial Performance

During 2013-14 EPC recorded a net operating loss of ST\$ 0.85 million on total income of ST\$ 119.76 million out of which income generated from electricity sales was ST\$ 106.3 million. Out of total expenses of ST\$ 117.1 million, imported fuel contributed ST\$ 70.4 million or 60% of total expenses. As on June 30, 2014 the corporation had gross fixed assets of ST\$ 396.4 million. The total equity of the corporation was ST\$ 207.5 million as against borrowings of \$183.8 million resulting in a debt to equity ratio of 0.89. The Utility introduced a Debt Charge ST\$0.17 per kWh in 2014 as part of its tariff to support servicing of loans. This Charge will be reduced to ST\$0.10 per kWh in 2016-17.

HIGHLIGHTS OF TRANSACTION

- 2 MW and expected production of 8 GWh and capacity factor of 45% Hydropower Project
- Promote a strong community, IPP and Government partnership on development of project
- Strong government of Samoa commitment for development of renewable energy to meet goal of 100% on renewable energy at end of 2017.
- Electricity purchase by national utility company: Electric Power Corporation (EPC), Samoa under a 20 years long PPA
- Feasibility study completed
- Environmental and resettlement constraints are limited and will not hinder the project implementation

Contact information

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Project Proposal

Savai'i 2.75 MW Wind Farm Project
Samoa



Safotu, Savai'i Wind Monitoring Site

Electric Power Corporation (EPC), Samoa

August 2016

1. THE INVESTMENT OPPORTUNITY

Project Name	Savai'i 2.75 MW (10 X 275 KW) Wind Farm Project
Utility	Electric Power Corporation (EPC), Samoa
Investors	Local or foreign private sector investors to operate as an IPP.
Project Background/Purpose	To develop Samoa's indigenous renewable energy resources in a sustainable manner and reduce the country's dependence on imported fossil fuels for electricity generation.
Benefits	<ul style="list-style-type: none">• Achieve cost and efficiency improvements while reducing the trade deficit and foreign exchange risk by displacing expensive imported fossil fuels.• Diversification of sources of electricity generation and improvement of energy security.
Project Location, Land Availability	Savai'i island on a few possible locations to be determined by investor.
Project Capacity/Production	The capacity of the wind farm is estimated to be 10 X 275 KW with an output to grid of 2 GWh per year.
Project Technology	Wind turbines
Project and Assets Description	All assets required to produce and sell electricity which include wind generators, storage units, circuit breakers, cabling, switchboards and the necessary electrical cabling to connect to the Point of Delivery, transformers and meters.
Investment Cost Estimate/Breakdown	Approximate cost \$17.5 million for the wind turbines.
Feasibility Study	Wind data collected from Safotu on Savai'i island is available to the investor. On a preliminary basis there is sufficient capacity for 10 X 2.75 MW turbines to be installed at this site to generate 2.0 GWh of energy. But investors need to conduct their own analysis to determine feasibility of that and other sites on Savai'i island.
Financial/Economic Viability	Private investor to conduct own financial viability analysis
Environmental/Social Assessment	Environmental and resettlement constraints are likely to be limited and unlikely to hinder the implementation of the project.
Key PPA Terms	The PPA is expected to be for a period of 20 years with minimum purchase of electricity, subject to availability of 2 GWh per year. Other key terms of the PPA will include penalty clauses for delivery shortfall (unless beyond the control of IPP) and electricity price in local currency/kWh delivered at grid.
Purchaser of Electricity	Electric Power Corporation, Samoa
Phases, if any	Not applicable.
Financing	The IPP will need to arrange its own financing.

Ownership/Equity Investor(s)	The scheme will be owned by the IPP for the term of the PPA after which it will be transferred to EPC at a nominal price of one USD.
Government/Donor Support/Incentives	Currently none.
Transaction Advisors	Not yet appointed.
Other Relevant Information	This document provides preliminary information on the investment. It should be noted that some of the information may change when the EOI and tender documents are developed.

2. SAMOA

The Country

Samoa is located in the Oceania group of islands in the South Pacific Ocean, about halfway between Hawaii and New Zealand. Samoa, the Polynesian group of islands, consists of two main islands Upolu and Savai'i and seven smaller islets. Three-quarters of the population of the country are located in Upolu on which the capital city, Apia, is located. The total area of the country is 2,931 sq. km. The currency is Tala or Samoan dollar (2.55 Tala/USD in June 2016). The languages of the country are Samoan (Polynesian) and English. As per World Bank, the population of Samoa was 193,228 in 2015 with 80% of the population living in rural areas.

Economy

The economy of the country is mainly dependent on tourism, agriculture, fisheries, remittances and external development assistance. Two-thirds of labour force of the country is engaged in subsistence agriculture and fishing. The major industries are food processing, building materials and auto electrical harnesses production. The manufacturing sector mainly processes products of agriculture. The natural resources that are found in the country are coconut products, timber, fish, taro and hydropower. According to World Bank, GDP of Samoa in 2015 was US\$ 761.0 million (current US\$) and has an average income per capita of US\$3,938.

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Samoa gained independence from New Zealand in 1962, the first pacific island country to become independent. The government of Samoa operates as a parliamentary democracy mirrored on the British system of government.

In December 2014 the cabinet approved a new Public Private Partnership (PPP) Policy for guidelines on identifying and implementing PPPs. In January 2015 the cabinet approved a new State Owned Enterprise (SOE) Ownership, Performance and Divestment Policy and it is expected that its implementation will result in reforms of SOEs and more privatizations.

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Capacity

Samoa had total installed grid-connected power capacity of 42 MW in 2016. The electricity consumption in Samoa is around 125 gigawatt-hours (GWh) per year and total energy generation of 145 GWh pa. During 2014, the contribution of hydro in the total production was 24% while diesel contributed around 75.8%. The balance was contributed by solar power.

Electrification

Currently 100% of the population has access to electricity. The total number of electricity consumers as on June 30, 2014 was 35,227.

Tariff

The electricity tariff is mid-range of all Pacific island countries and is likely to become lower as the country reduces its dependence on imported fuel for production of electricity. Dependence on diesel fuel will greatly reduce at the end of 2017, when the country's electricity generation is expected to be from 100% renewable energy sources. The total tariff charge per kWh (for domestic consumption in excess of 100 kWh/month and non-domestic consumption) is ST\$ 0.79. For prepayment meters, domestic consumption from 1-100 kWh usage tariff is about \$0.50 per kWh. There is potential to reduce tariffs with a shift to renewable energy and more importantly with the great drop in diesel price.

Policy & Plans

The Electricity Act 2010 established the role of the Electricity Regulator and has opened opportunities for Independent Power Producers (IPPs) to generate and sell electricity to EPC. In order to reduce dependence upon imported fossil fuel, the country is targeting to increase the capacity of renewable energy sources and is promoting partnership with international organizations and IPPs. The Government's and Utility's goal is to increase use of renewable energy at much lower tariff.

Electric Power Corporation has committed to 6 renewable energy generating IPPs, some already in operation and rest under construction, and the utility's own funded renewable energy program which includes rehabilitation of old hydropower plants and construction of new hydropower plants and solar and wind farms.

4. ELECTRIC POWER CORPORATION, SAMOA

Background

EPC is a wholly government-owned corporation and the sole utility that is responsible for managing the electricity sector in the country. It has necessary powers and legislations to carry out the functions of generation, transmission, distribution and selling of electricity. It was established in 1972 by the Electric Power Corporation Act 1972. The corporation is governed by an eight-member board of directors with its own chairman appointed by Cabinet. The Board includes the Chief Executive Officer of the Ministry of Finance as ex-officio.

Financial Performance

During 2013-14 EPC recorded a net operating loss of ST\$ 0.85 million on total income of ST\$ 119.76 million out of which income generated from electricity sales was ST\$ 106.3 million. Out of total expenses of ST\$ 117.1 million, imported fuel contributed ST\$ 70.4 million or 60% of total expenses. As on June 30, 2014 the corporation had gross fixed assets of ST\$ 396.4 million. The total equity of the corporation was ST\$ 207.5 million as against borrowings of \$183.8 million resulting in a debt to equity ratio of 0.89. The Utility introduced a Debt Charge ST\$0.17 per kWh in 2014 as part of its tariff to support servicing of loans. This Charge will be reduced to ST\$0.10 per kWh in 2016-17.

HIGHLIGHTS OF TRANSACTION

- 2.75 MW and expected production of 2.0 GWh
 - Promote a strong community, IPP and Government partnership on development of project
 - Strong government of Samoa commitment for development of renewable energy to meet goal of 100% on renewable energy at end of 2017
 - Electricity purchase by national utility company: Electric Power Corporation (EPC), Samoa under a 20 years long PPA
 - Wind data collected from various sites on Savai'i island that would be made available to the investor
 - Environmental and resettlement constraints are limited and unlikely to hinder the project implementation
-

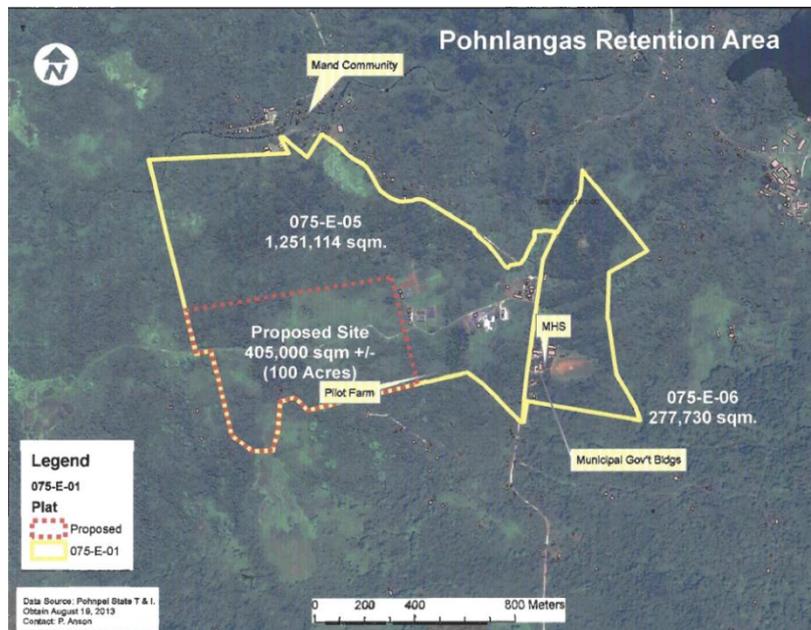
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Project Proposal

1.5 MW Pohnlangas Solar IPP (Part of 6 MW Solar Development)

Pohnpei – Federated States of
Micronesia



Pohnpei Utilities Corporation, Pohnpei, FSM

August 2016

1. THE INVESTMENT OPPORTUNITY

1. Project Name	1.5 MW Pohnlangas Solar IPP (Part of 6 MW Solar Development)
2. Power Utility	Pohnpei Utilities Corporation (“PUC”)
3. Project Sponsors/Parties	The Pohnpei Utilities Corporation (“PUC”) in the Federated States of Micronesia (“FSM”) wishes to select a private sector company to design, build, finance, operate and maintain the project. The private company will be selected via a competitive tender process.
4. Purpose	The purpose of the project is to increase the renewable energy supply in Pohnpei while helping to meet the rising demand of electricity.
5. Benefits	<p>The benefits include:</p> <ul style="list-style-type: none">• diversification of sources of electricity generation and improvement of energy security;• emissions reduction by displacing diesel generation; and• achieving cost and efficiency improvements while reducing the trade deficit by displacing imported fossil fuels.
6. Project Location	<p>The Project will be located at Pohnlangas in Madolenihmw municipality near the capital city of Kolonia in Pohnpei State. This will be adjacent to the first phase of 600kW.</p> <p>The Pohnpei State Government is making land available for the purposes of the Project. PUC will provide the winning bidder with a lease of the land for the Project on standard terms. That lease will be made available to bidders in the procurement process.</p>
7. Project Capacity/Production	1.5 MW
8. Project Technology	Solar PV
9. Project and Assets description	1.5 MW Solar PV plant and associated facilities to connect to the grid.
10. Feasibility Study status	<p>PUC has been advised by Castalia Strategic Advisors, which undertook studies in 2014 that identified a strong rationale for solar power in Pohnpei and found that the Project was financially and economically viable. These findings have been affirmed by PUC. The findings and recommendations of Castalia’s work will be made available during the tendering process.</p> <p>An indication of the annual average solar insolation at the site for the Project is 4.849 kWh/m²/day. Bidders will be expected to conduct their own analysis to confirm the Project’s technical viability.</p> <p>The winning bidder is also expected to conduct its own grid interconnection studies, and bear the cost of any general infrastructure upgrades needed for the Project (such as roads), although little is expected to be required.</p>
11. Investment Cost estimate/breakdown	The estimated cost of the project is USD 5 million, excluding land acquisition costs.
12. Percent of power production sold to grid	100%

13. Key PPA/Contract terms	The winning bidder is expected to design, build, finance, operate and maintain the Project and sell energy to the PUC under a 20-year Power Purchase Agreement (PPA).
14. Phases	This is the second phase of a 6 MW planned solar development. Good progress has been made on the first 600kW phase which is currently under construction. (See "Project Progress to-date" below").
15. Financing	Multilateral institutions such as the Asian Development Bank (ADB), the International Finance Corporation (IFC) and the European Investment Bank (EIB) could possibly provide financing or a partial risk guarantee for the Project, however, these have not been discussed at this stage.
16. Ownership	A private sector investor to own and operate the facility until the end of the PPA and transfer the assets to PUC at a nominal cost at the end of the term of the PPA.
17. Transaction Advisors appointed, if any	Castalia Strategic Advisors
18. Government support or incentives, if any	PUC will also provide a lease of the land required for the Project. PUC is open to considering financial support arrangements for the Project, including a sovereign guarantee and/or an escrow arrangement.
19. Project progress to-date	A first phase of 600kW is currently under construction based on grant funding from the United Arab Emirates. The development will be part of a development of up to 6 MW of solar generation on Pohnpei.
20. Other relevant information	The Project will be tendered under FSM legislation while applying international best practices and transparency standards.

With the assistance of Castalia and the ADB, PUC has prepared a request for proposal (RfP) for the Project which is ready to be used, including a draft PPA which will form the basis of the PPA that PUC will enter into with the winning bidder. Interested parties will have the opportunity to comment on the RfP and the draft PPA as part of market sounding.

Bidders will be provided with copies of all documentation related to the project via a data room (physical and/or virtual).

The evaluation process PUC will use to select the winning bidder involves:

1. Bidders being required to meet defined financial and technical eligibility criteria;
2. PUC assessing qualified bidders' proposals for whether they meet the output specifications for the project (a technical threshold test); and
3. PUC ranking compliant proposals based on price, and entering into negotiations with the lowest-priced bidder with a compliant proposal.

2. FSM & POHNPEI STATE

The Country

The Federated States of Micronesia is a nation of islands comprised of four States: Pohnpei, Kosrae, Chuuk and Yap. These four states have a total of approximately 607 islands and islets, in which about sixty to seventy percent are regularly inhabited.

Pohnpei Island is the largest (347.1 km²), most populous (36,196 people), and most developed island in FSM. FSM's currency is the United States Dollar. English is FSM's common language and the official

language of the national government. FSM has a federal system of government, with three levels: federal, state and municipal. There are national and state constitutions, and a unicameral Congress.

Economy

The major economic activities in Federated States of Micronesia are subsistence farming and fishing and government, which employ two-thirds of the adult working population. The major natural resources are forests, marine products, phosphate and deep-seabed animals. The agricultural products include black pepper, tropical fruits and vegetables, coconuts and betel nuts. Estimated GDP (PPP) during 2015 was US\$ 306.5 million.

FSM's main national revenue source is the grants it receives from the United States through Compact of Free Association assistance. FSM negotiated a second Compact agreement with US that provides US\$2.1 billion assistance every year from 2004-2023.

Political/Legal

Through the Compact of Free Association with the United States, the US recognized the Sovereignty of FSM and, as an associated state, has continued to provide FSM with economic and technical assistance to foster good governance and economic self-reliance. The United States is also responsible for the military protection and security of FSM.

The national and state legal systems are based on common law. However, the FSM Constitution and each state's constitution also require the recognition of customs and traditions as law in some circumstances.

3. ELECTRICITY SECTOR

Capacity

Although PUC's total diesel generation capacity is 11.4 MW, the available capacity is de-rated to only 5.4 MW due to many of these assets being at or beyond their useful life or damaged. PUC has contracted with FSM Petroleum Corporation (trading as Vital FSM Petrocorp) for 2 MW of emergency containerized diesel generation under a short term PPA. These assets are currently undergoing maintenance.

PUC also owns the 750kW Nanpil River Hydro Power plant, which is now operational after rehabilitation following typhoon damage which made it non-operational since 2002. In addition, Pohnpei currently has 226kW of installed solar photovoltaic arrays, of which 180kW are grid connected.

Electrification

The current electrification ratio in Pohnpei is estimated at 96%, with almost all of Pohnpei's power currently being generated by diesel generators. The energy sector is experiencing challenges with low reliability and persistently high tariffs. These factors led the PUC to declare a state of energy emergency in 2009 which remains in effect today.

Measured peak demand is 6.35 MW, although with insufficient generation capacity currently, it is estimated that if suppressed demand is included, a more realistic estimate of peak demand is 7 MW. This is expected to increase to 7.6 MW by 2020. There are 33 commercial customers, with the largest two customers being FSM Telecommunications and the Pohnpei State Hospital.

Tariff

The average residential tariff in Pohnpei is US\$0.56 per kWh. PUC charges customers a base charge and fuel costs as a pass-through charge.

Policy & Plans

Aside from the Pohnlangas solar project, PUC is also procuring 6 MW of new high speed diesel generators and 4 MW of medium speed diesel generators through an IPP arrangement. PUC is also finalizing a JV for a 250 kW biomass gasifier power plant.

4. POHNPEI UTILITIES CORPORATION (PUC)

Background

The Pohnpei Utilities Corporation was established in 1991 as a state-owned corporation charged with providing electrical power and other utilities to the people of Pohnpei. Historically, PUC has operated all elements of the power system (generation, transmission, distribution and retail) as a vertically integrated entity. However, the Pohnpei Code was amended in 2012 to permit PUC to engage independent power producers to generate and provide electrical power under power purchase agreements. Outsourcing and management contracts are also allowed under the new law.

Financial Performance

PUC's main source of revenue is the tariffs that consumers pay for PUC's services. Currently there are 6,609 power customers. PUC also receives grants, subsidies and capital contributions from the Pohnpei State and FSM government and from foreign governments such as the United States and from international donor organizations. At the end of 2013, PUC's total assets were US \$36.6 million and total liabilities were \$12.8 million.

HIGHLIGHTS OF TRANSACTION

- Strong rationale for solar due to high current electricity tariffs
 - Bankable transaction structure; potential guarantees from multilaterals
 - Project documentation including RfP and draft PPA already prepared
 - Stable currency
 - Offers a point of entry into the Pacific Islands' solar IPP Market
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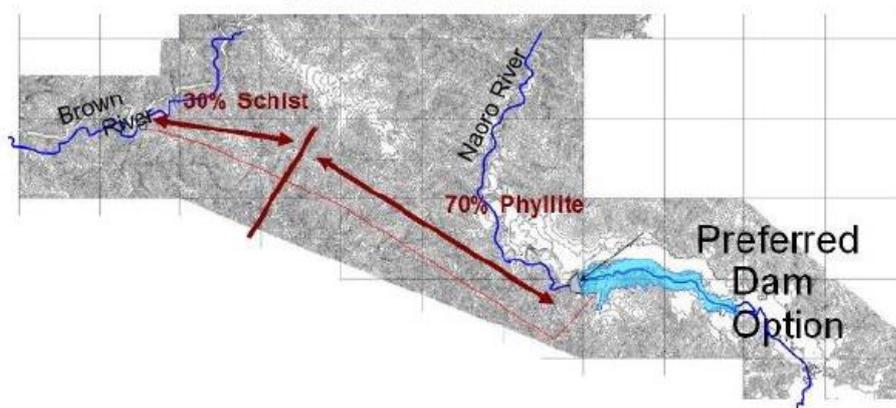
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Note: Information for this document is mainly sourced from Castalia Strategic Advisors' Project Note, July 2014.

Project Proposal

Naoro Brown 80 MW Hydropower Project PNG



Naoro Brown Hydropower Project Site

PNG Power Ltd, PNG
August 2016

1. THE INVESTMENT OPPORTUNITY

Project Name	Naoro Brown Hydropower Project
Utility:	PNG Power Limited
Investors:	Local or foreign private sector investors to operate as an independent power producer (IPP).
Project Background/Purpose	To develop PNG's hydropower resources in a sustainable manner.
Benefits	<ul style="list-style-type: none">• Diversification of sources of electricity generation• Improvement of energy security.• Increase electrification of PNG.
Project Location, Land Availability	The project will be located just outside of Port Moresby on the Naoro and Brown Rivers. Arrangements have been made with the land owners to make the site available for the project.
Project Capacity/Production	The installed capacity of the Project is expected 80 MW and annual electricity generation is estimated to be 560 GWh/year.
Project Technology	Hydropower with storage dam.
Project and Assets Description	The project assets will include a storage dam; catchment area of 274 km ² ; LTA flow of 16.9 m ³ /s; a 12 km headrace tunnel of approximate 4.25 m diameter with a net head of 548 m and a power house with 4 X 20 MW Francis turbines. Ancillary works include a transmission line to the substation.
Investment Cost Estimate/Breakdown	The estimated cost of the project is USD 200 million, excluding land acquisition costs.
Feasibility Study	A detailed feasibility study including geotechnical investigations was completed in August 2015.
Financial/Economic Viability	Financial analysis of the project has been carried out.
Environmental/Social Assessment	Environmental and social assessment is in progress.
Key PPA Terms	The term of the power purchase agreement (PPA) is expected to be 25 years. A government guarantee is expected to back stop the financial obligations of PNG Power under the PPA.
Purchaser of Electricity	PNG Power Limited.
Financing	The selected developer is expected seek its own financing without any PNG government assistance.
Ownership/Equity Investor(s)	The scheme will be owned by the IPP for the term of the PPA after which it is expected to be transferred to PNG Power at a nominal price.

Transaction Advisors	Multi Consult has been appointed as transaction advisors.
Project Schedule	PNG Power will begin marketing activities in November 2016. The forward schedule is currently being developed. Tender date is expected to be in Q1 2018.
Other Relevant Information	<p>The tendering of the Project will be carried under PNG legislation and will be transparent and follow international best practices.</p> <p>The hydropower project developer will be selected through a competitive tender process based on predetermined and objective criteria.</p> <p>The Licence will be provided by the Department of Energy after review of the proposed tariff by the independent Consumer and Competition Commission.</p> <p>The selected developer is expected design, finance, build and operate the Project during the term of the 25-year term of the PPA.</p>

2. PNG

The Country

Papua New Guinea (PNG) occupies the eastern half of the island of New Guinea and many outlying islands. It is located in Oceania, Group of Islands between the Coral Sea and the South Pacific Ocean, east of Indonesia. It covers a total area of 462,840 sq. km out of which 452,860 sq. km is land area. The capital city of the country is Port Moresby and other major cities are Lae and Mt. Hagen. The estimated population of the country in July 2015 was around 6.7 million. The official languages of PNG are English, Tok Pisin and Hiri Motu and more than 800 other languages are spoken. The currency of the country is Kina (PGK).

Economy

Agriculture land is 2.6% of total land area and major agricultural products of the country are coffee, cocoa, copra, palm kernels, sugar, tea, rubber, sweet potatoes etc. 85% of the people get subsistence livelihood from agriculture. The country is richly endowed with natural resources like copper, gold, silver, natural gas, oil, timber and fisheries. The industries of the country include copra crushing, palm oil processing, woodchip production, plywood production, crude oil production, mining of silver, gold and copper and tourism. The country had estimated GDP of US\$ 16.9 billion in 2014 with a GPD per capita of US\$1,784.

Political/Legal

The country gained independence from the Australian-administered UN Trusteeship on 16 September 1975. The Government of the country is Constitutional monarchy with parliamentary democracy. As a result of starting of exports of LNG, PNG GDP grew by 13.3% in 2014 and 9.9% in 2015. Medium-Term Development Plan (MTDP) of PNG for 2011-15 recognizes the need of private sector partnership in generation, transmission and distribution as investments required are beyond the capacity of PPL.

3. ELECTRICITY SECTOR

Capacity

The electricity generation capacity of PNG is 250 MW. Around half of the electricity is generated through hydropower and one third through diesel plants. The rest of generation is contributed by gas and geothermal energy plants. Installed power capacity of private sector mines is 250-280 MW.

Electrification

Less than 10% of the population of the country has electricity access¹¹. It is mainly in urban areas that people have access to grid electricity but in rural areas access to electricity is quite poor at around 4%. MTDP has objective of providing electricity access to 70% of the population by 2030.

¹¹ Government of Papua New Guinea, Department of National Planning and Monitoring. 2010. Papua New Guinea Medium Term Development Plan, 2011–2015. Port Moresby

Policy & Plans

The country needs large-scale investments to increase electricity access and to meet rising demand. The Papua New Guinea Development Strategic Plan (PNGDSP) for the period 2010-2030 estimates that peak demand for electricity will increase to 700 MW by 2021 and 1400 MW by 2030 from 290 MW in 2015 (excluding the demand from mining sector) currently. MDTP (2011-15) also targets making investments to upgrade and rehabilitate existing grid systems and reducing non-technical losses in the system. PNGDSP aims to increase generation from hydropower and gas based generation and phase out diesel power generation.

4. UTILITY

Background

PNG Power Ltd (PPL) is a fully integrated State Owned Entity (SOE) that is responsible for generation, transmission, distribution and retailing of electricity throughout PNG. PPL was corporatized under section 3(1) of the Electricity Commission (Privatization) Act 2002 as the successor company to the Papua New Guinea Electricity Commission (ELCOM). The Independent Public Business Corporation (IPBC) acts as shareholder on behalf of the Government. The Minister for State Enterprises appoints the Board which reports to IPBC. PPL operates three grid systems in the country: Port Moresby System, the Ramu System and the Gazelle Peninsula System.

Financial Performance

PPL had operating revenue of PGK 622m in 2011. The operating profit and net profit during that year were PGK 45m and PGK 12m respectively.

HIGHLIGHTS OF TRANSACTION

- Detailed feasibility study including geotechnical investigations completed
- Strong government backing with government guarantee expected to back stop the financial obligations of PNG Power under the PPA.
- Located close to Port Moresby, the capital city and largest power load center in PNG, with assured electricity demand growth.

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