

Document of  
The World Bank

**FOR OFFICIAL USE ONLY**

Report No: PADxxx

PROJECT PAPER  
FOR  
SMALL RETF GRANT  
(US\$ 3.62 MILLION EQUIVALENT)  
TO THE  
PACIFIC POWER ASSOCIATION  
FOR A  
SUSTAINABLE ENERGY INDUSTRY DEVELOPMENT PROJECT (P152653)

April 2015

Energy & Extractives Global Practice  
East Asia and Pacific Region

This document has a restricted distribution and may be used by recipients only in the performance of their official duties. Its contents may not otherwise be disclosed without World Bank authorization.

## CURRENCY EQUIVALENTS

(Exchange Rate Effective April 17, 2015)

Currency Unit = FJD  
FJD 1 = USD 0.49

## FISCAL YEAR

January 1 – December 31

## ABBREVIATIONS AND ACRONYMS

|       |   |
|-------|---|
| ACS   | Administrative and Client Support                     |
| ADB   | Asian Development Bank                                |
| AUD   | Australian Dollar                                     |
| BP    | Bank Procedure  |
| CAS   | Country Assistance Strategy                           |
| CIF   | Consolidated Investment Fund                          |
| CPI   | Consumer Price Index                                  |
| CQS   | Selection Based on Consultant's Qualifications        |
| DA    | Designated Account                                    |
| DC    | Direct Current  |
| DP    | Development Partner                                   |
| DSM   | Demand-side Management                                |
| EA    | Environmental Assessment                              |
| EE    | Energy Efficiency                                     |
| EIRR  | Economic Internal Rate of Return                      |
| EMP   | Environmental Management Plan                         |
| EOCK  | Economic Opportunity Cost of Capital                  |
| ESDP  | Energy Sector Development Project                     |
| ESMAP | Energy Sector Management Assistance Program           |
| ESMF  | Environmental and Social Management Framework         |
| ESWG  | Energy Sector Working Group                           |
| EU    | European Union  |
| FEP   | Foreign Exchange Premium                              |
| FIRR  | Financial Internal Rate of Return                     |
| FNPV  | Financial Net Present Value                           |
| FM    | Financial Management                                  |
| GAP   | Gender Action Plan                                    |
| GDP   | Gross Domestic Product                                |
| GHG   | Greenhouse Gas  |
| GPSA  | Global Partnership for Social Accountability          |
| IBRD  | International Bank for Reconstruction and Development |
| ICB   | International Competitive Bidding                     |

|                 |  |
|-----------------|--|
| IDA             | International Development Association                          |
| IEA             | International Energy Agency                                    |
| IFC             | International Finance Corporation                              |
| IFR             | Interim Financial Report                                       |
| IRENA           | International Renewable Energy Agency                          |
| IRR             | Internal Rate of Return  |
| IUCN            | International Union for Conservation of Nature                 |
| JICA            | Japan International Cooperation Agency                         |
| KB              | Kilobyte   |
| KBps            | Kilobytes per second   |
| KEMA            | Keuring van Elektrotechnische Materialen te Arnhem             |
| km              | Kilometer  |
| KPMG            | Klynveld Peat Marwick Goerdeler                                |
| kV              | Kilovolts  |
| kW              | Kilowatts  |
| kWh             | Kilowatt-hour  |
| kWp             | Kilowatts-peak   |
| LCS             | Least-cost Selection   |
| LED             | Light-emitting Diode   |
| M&E             | Monitoring and evaluation                                      |
| MB              | Megabyte   |
| MDG             | Millennium Development Goals                                   |
| MOF             | Ministry of Finance  |
| MW              | Megawatts  |
| MWh             | Megawatt-hour  |
| NGO             | Nongovernmental Organization                                   |
| NO <sub>x</sub> | Nitrogen Oxide   |
| NPV             | Net Present Value  |
| NZ              | New Zealand  |
| NZAID           | New Zealand Aid  |
| NZMFAT          | New Zealand Ministry of Foreign Affairs and Trade              |
| O&M             | Operation and Maintenance                                      |
| OMMP            | Operational Monitoring and Maintenance Plan                    |
| OP              | Operational Policy   |
| OTEC            | Ocean Thermal Energy Conversion                                |
| PAD             | Project Appraisal Document                                     |
| PCO             | Pacific Region Infrastructure Facility Coordination Office     |
| PCR             | Physical Cultural Resources                                    |
| PEAR            | Preliminary Environmental Assessment Report                    |
| PDO             | Project Development Objective                                  |
| PIB             | Project Information Bulletin                                   |
| PICs            | Pacific Island Countries                                       |
| PICTs           | Pacific Island Countries and Territories                       |
| PIGGAREP        | Pacific Island Green Gas Abatement of Renewable Energy Project |
| PLC             | Power-line communication                                       |

|           |  |
|-----------|--|
| PMU       | Project Management Unit  |
| PNA       | Parties to Nauru Agreement                                     |
| PPA       | Pacific Power Association                                      |
| PV        | Photovoltaic   |
| QBS       | Quality-based Selection  |
| QCBS      | Quality and Cost-based Selection                               |
| RE        | Renewable Energy   |
| s         | Second   |
| SAIDI     | System Average Interruption Duration Index                     |
| SAIFI     | System Average Interruption Frequency Index                    |
| SEIAPI    | Sustainable Energy Industry Association of the Pacific Islands |
| SI        | Sensitivity Indicator  |
| SIDS      | Small Island Developing States                                 |
| SIDS DOCK | Small Island Developing States Initiative                      |
| SOE       | State-Owned Enterprise   |
| SPC       | Secretariat of the Pacific Community                           |
| SPREP     | South Pacific Regional Environment Programme                   |
| SREP      | Scaling Up Renewable Energy Program                            |
| SSS       | Single-source Selection  |
| SV        | Switching Value  |
| TJ        | Terajoules   |
| TORs      | Terms of Reference   |
| TTL       | Task Team Leader   |
| UAE       | United Arab Emirates   |
| UK        | United Kingdom   |
| UNDP      | United Nations Development Programme                           |
| USD       | United States Dollar   |
| V         | Volt   |
| VPN       | Virtual Private Network  |

|                                 |                        |
|---------------------------------|------------------------|
| Regional Vice President:        | Axel van Trotsenburg   |
| Country Director:               | Franz R. Drees-Gross   |
| Global Practice Senior Director | Anita M. George        |
| Global Practice Director:       | Charles M. Feinstein   |
| Practice Manager                | Julia M. Fraser        |
| Task Team Leader:               | Roberto Gabriel Aiello |

**PACIFIC ISLAND COUNTRIES**  
**Sustainable Energy Industry Development Project (P152653)**

**TABLE OF CONTENTS**

|   | <b>Page</b> |
|---|-------------|
| <b>I. STRATEGIC CONTEXT .....</b>                                 | <b>1</b>    |
| A. Country Context.....   | 1           |
| B. Sectoral and Institutional Context.....                        | 1           |
| C. Higher-Level Objectives to which the Project Contributes ..... | 5           |
| <b>II. PROJECT DEVELOPMENT OBJECTIVE .....</b>                    | <b>6</b>    |
| A. PDO.....   | 6           |
| B. Project Beneficiaries .....                                    | 6           |
| C. PDO-Level Results Indicators .....                             | 6           |
| <b>III. PROJECT DESCRIPTION .....</b>                             | <b>7</b>    |
| A. Project Components .....                                       | 7           |
| B. Project Financing .....  | 8           |
| C. Project Cost and Financing .....                               | 8           |
| D. Lessons Learned and Reflected in the Project Design.....       | 9           |
| <b>IV. IMPLEMENTATION .....</b>                                   | <b>9</b>    |
| A. Institutional and Implementation Arrangements .....            | 9           |
| B. Results Monitoring and Evaluation .....                        | 9           |
| C. Sustainability.....  | 10          |
| <b>V. KEY RISKS .....</b>   | <b>10</b>   |
| A. Overall Risk Rating and Explanation of Key Risks.....          | 10          |
| <b>VI. APPRAISAL SUMMARY .....</b>                                | <b>11</b>   |
| A. Economic Analysis .....  | 11          |
| B. Technical.....   | 12          |
| C. Financial Management.....                                      | 12          |
| D. Procurement .....  | 12          |
| E. Social (including Safeguards).....                             | 12          |
| F. Environment (including Safeguards).....                        | 12          |

|  |           |
|--|-----------|
| <b>Annex 1. Results Framework and Monitoring</b> .....                                     | <b>13</b> |
| <b>Annex 2. Detailed Project Description</b> .....   | <b>17</b> |
| <b>Annex 3. Implementation Arrangements</b> .....  | <b>21</b> |
| <b>Annex 4. Implementation Support Plan</b> .....  | <b>28</b> |
| <b>Annex 5: Gender Analysis, Action Plan and Monitoring and Evaluation Framework</b> ..... | <b>30</b> |
| <b>Annex 6: Scaling Up Renewable Energy Program (SREP)</b> .....                           | <b>34</b> |

## DATA SHEET

*Pacific Island Countries*

Sustainable Energy Industry Development Project (P152653)

### Small RETF Grant Project Paper

*East Asia and the Pacific*

GEEDR

| Basic Information                                     |   |                                |  |
|---|---|--------------------------------|--|
| Date:   | April 2015                                | Sectors:                       | Energy and Mining  |
| Country Director:                                     | Franz R. Drees-Gross                      | Themes:                        | Environment and Natural Resources Management               |
| Practice Manager:                                     | Julia M. Fraser                           | EA Category:                   | C  |
| Project ID:   | P152653                                   |                                |  |
| Instrument:   | RETF                                      |                                |  |
| Team Leader(s):                                       | Roberto Gabriel Aiello                    |                                |  |
|   |   |                                |  |
| Recipient: Pacific Power Association                  |   |                                |  |
| Executing Agency: Pacific Power Association           |   |                                |  |
| Contact:  | Mr Andrew Daka                            | Title:                         | Executive Director   |
| Telephone No.:  | 679 3306 022                              | Email:                         | <a href="mailto:andrewd@ppa.org.fj">andrewd@ppa.org.fj</a> |
|   |   |                                |  |
| Project Implementation Period:                        | Start Date: 1 July 2015                   | End Date:                      | 30 June 2019   |
| Expected Effectiveness Date:                          | 1 July 2015                               |                                |  |
| Expected Closing Date:                                | 30 June 2019                              |                                |  |
| Project Financing Data (USD million)                  |   |                                |  |
| <input type="checkbox"/> Loan                         | <input checked="" type="checkbox"/> Grant | <input type="checkbox"/> Other |  |
| <input type="checkbox"/> Credit                       | <input type="checkbox"/> Guarantee        |                                |  |
| For Loans/Credits/Others                              |   |                                |  |
| Total Project Cost :                                  | 3.62                                      | Total Bank Financing :         | 3.62   |
| Total Cofinancing :                                   | 0.00                                      | Financing Gap :                | 0.00   |
| Financing Source                                      | Amount(US\$M)                             |                                |  |
| BORROWER/RECIPIENT                                    | 0.00                                      |                                |  |
| Scaling Up Renewable Energy Program (SREP)            | 1.92                                      |                                |  |
| Small Island Developing States Initiative (SIDS DOCK) | 1.70                                      |                                |  |
| Financing Gap   | 0.00                                      |                                |  |
| Total   | 3.62                                      |                                |  |
| Expected Disbursements (in USD Million)               |   |                                |  |

|             |      |      |      |      |      |  |  |  |  |
|-------------|------|------|------|------|------|--|--|--|--|
| Fiscal Year | 2015 | 2016 | 2017 | 2018 | 2019 |  |  |  |  |
| Annual      | 0.02 | 1.50 | 1.30 | 0.58 | 0.22 |  |  |  |  |
| Cumulative  | 0.02 | 1.52 | 2.82 | 3.40 | 3.62 |  |  |  |  |

### Project Development Objective(s)

The project development objective (PDO) is to increase the data availability and capacity in Pacific island power utilities to enhance their readiness to accelerate the adoption of renewable energy sources of power generation and manage renewable energy technologies.

### Components

| Component Name                            | Cost (USD Millions) |
|---|---------------------|
| Renewable Energy Resource Mapping Phase 1 | 0.70                |
| Technical Assistance                      | 2.20                |
| Project Management Support                | 0.72                |

### Compliance

#### Policy

|   |         |        |
|---|---------|--------|
| Does the project depart from the CAS in content or in other significant respects? | Yes [ ] | No [X] |
| Does the project require any exceptions from Bank policies?                       | Yes [ ] | No [X] |
| Have these been approved by Bank management?                                      | Yes [ ] | No [ ] |
| Is approval for any policy exception sought from the Board?                       | Yes [ ] | No [X] |
| Does the project meet the Regional criteria for readiness for implementation?     | Yes [ ] | No [X] |

#### Safeguard Policies Triggered by the Project

|   | Yes | No |
|---|-----|----|
| Environmental Assessment OP/BP 4.01         |     | X  |
| Natural Habitats OP/BP 4.04                 |     | X  |
| Forests OP/BP 4.36                          |     | X  |
| Pest Management OP 4.09                     |     | X  |
| Physical Cultural Resources OP/BP 4.11      |     | X  |
| Indigenous Peoples OP/BP 4.10               |     | X  |
| Involuntary Resettlement OP/BP 4.12         |     | X  |
| Safety of Dams OP/BP 4.37                   |     | X  |
| Projects on International Waters OP/BP 7.50 |     | X  |
| Projects in Disputed Areas OP/BP 7.60       |     | X  |

### Legal Covenants

| Name                                     | Recurrent | Due Date                        | Frequency      |
|--|-----------|---------------------------------|----------------|
| (i) Project Operations Manual            |           | Two months after Effective Date | Dated Covenant |
| (ii) ToR for Resource Mapping Consultant |           |                                 |                |

#### Description of Covenants

(i) The Recipient shall prepare, by not later than two months after Effectiveness Date, and thereafter adopt a Project



- (ii) Operations Manual.  
The ToR for Resource Mapping Consultant hired under Component 1 will take into account World Bank safeguards policies when making recommendations.

### Team Composition

#### Bank Staff

| Name                   | Title                           | Specialization                  | Unit  | UPI |
|------------------------|---------------------------------|---------------------------------|-------|-----|
| Roberto G. Aiello      | Senior Energy Specialist        | Task Team Leader                | GEEDR |     |
| Kim Dagmar Baverstock  | Team Assistant                  |                                 |       |     |
| Cris Nunes             | Senior Procurement Specialist   | Senior Procurement Specialist   | GGODR |     |
| Marjorie Mpundu        | Senior Counsel                  | Legal                           | LEGES |     |
| Silvia Martinez Romero | Senior Energy Specialist        | Sr. Renewable Energy Specialist | GEEES |     |
| Natsuko Toba           | Senior Economist                | Senior Economist                | GEEDR |     |
| David Whitehead        | Financial Management Specialist | Financial Management Specialist | GGODR |     |

#### Non Bank Staff

| Name               | Title                             | Office Phone       | City         |
|--------------------|-----------------------------------|--------------------|--------------|
| Katherine Baker    | Operations Analyst Consultant     | +61 (0)401 428 829 | Wollongong   |
| Ross James Butler  | Social Safeguards Consultant      | +61 2 9235 6511    | Sydney       |
| Penelope Ferguson  | Environment Safeguards Consultant | +64 21 277 3632    | Christchurch |
| Paul Thomas Fulton | Renewable Energy Consultant       | +61 (0)439 338 288 | West Hobart  |

#### Locations

| Country  | First Administrative Division | Location | Planned | Actual | Comments  |
|--|-------------------------------|----------|---------|--------|---|
| Fiji, FSM, Kiribati, Marshall Islands, Palau, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu | -                             | -        | -       | -      | These countries are the 10 World Bank member PICs |

## I. STRATEGIC CONTEXT

### A. COUNTRY CONTEXT

1. The Pacific Island Countries (PICs) in East Asia and the Pacific (EAP) comprise 10 countries with a total population of about 3.4 million people.<sup>1</sup> Fiji accounts for over 40 percent with a population of 881,100 in 2013.<sup>2</sup> Seven PICs have populations well below 200,000 people (e.g., Tuvalu with approximately 10,000 people, the World Bank Group's smallest member).<sup>3</sup>

2. These populations are scattered over an area equivalent to 15 percent of the globe's surface.<sup>4</sup> The PICs are all relatively small, open but narrowly based economies and limited institutional capacity. They are vulnerable to external economic and environmental shocks and have limited or nonexistent access to global capital markets. Size and remoteness are strong defining characteristics of the ten island members with the total land area of only some 64,000 square kilometers<sup>5</sup> (equivalent to twice the size of Belgium<sup>6</sup>), while the exclusive economic zones they control is over 14 million square kilometres, roughly twice the land area of Australia.<sup>7</sup>

3. These are also some of the most vulnerable countries in the world to the effects of climate change and natural disasters. According to a World Bank study in 2012, of the 20 countries in the world with the highest average annual disaster losses scaled by gross domestic product, 8 are Pacific island countries.<sup>8</sup>

4. The PICs have continued to benefit from a number of regional projects in the areas of economic management and governance, climate change, and support from the Pacific Region Infrastructure Facility Coordination Office (PCO) in the energy and utilities sectors.

### B. SECTORAL AND INSTITUTIONAL CONTEXT

5. *Main electricity sector challenges.* The major issues that PICs face in relation to the power sector include (a) high dependency on costly imported fuels; (b) insufficient revenues from tariffs to meet operating and maintenance (O&M) costs (thus requiring additional subsidies from the government); (c) lack of adequate capacity and reliable data for energy planning and management, (d) the high maintenance cost of generation and distribution systems in a marine environment; and (e) the need for capital to finance the power infrastructure requirements on outer islands/remote locations.

---

<sup>1</sup> The World Bank's 10 Pacific island member countries are: Federated States of Micronesia; Fiji; Kiribati; Marshall Islands; Palau; Samoa; Solomon Islands; Tonga; Tuvalu and Vanuatu (<http://www.worldbank.org/en/country/pacificislands/overview>).

<sup>2</sup> Source: World Bank Data. <http://data.worldbank.org/country/fiji>

<sup>3</sup> Solomon Islands, Fiji and Vanuatu had more than 200,000 people in 2013. Source: World Bank Data. <http://data.worldbank.org/region/PSS>

<sup>4</sup> Source: World Bank Pacific Islands. <http://www.worldbank.org/en/country/pacificislands/overview>

<sup>5</sup> Source: World Bank Data. <http://data.worldbank.org/region/PSS>

<sup>6</sup> Source: The Government of United States Central Intelligence Agency:

<https://www.cia.gov/library/publications/the-world-factbook/geos/be.html>

<sup>7</sup> Source: <http://www.searoundus.org/eez/> and <http://data.worldbank.org/indicator/AG.LND.TOTL.K2>

<sup>8</sup> Vanuatu, Niue, Tonga, the Federated States of Micronesia, the Solomon Islands, Fiji, the Marshall Islands, and the Cook Islands. Data source: World Bank Feature Stories. <http://www.worldbank.org/en/news/feature/2012/06/04/acting-today-for-tomorrow-a-policy-and-practice-note-for-climate-and-disaster-resilient-development-in-the-pacific-islands-region>

6. *Broader challenges impacting on the sector.* To differing degrees, all PICs face a broader set of challenges in providing energy for sustainable development, namely (i) often small, isolated population centers, (ii) small and dispersed markets which are difficult to serve, and without significant economies of scale, (iii) extreme vulnerability to oil supply and price shocks (iv) high vulnerability to the impacts of natural disasters and expected climate change, and (v) weak legislative, regulatory and institutional arrangements.

7. *Electricity access rates.* The rate of access to electricity in SIDS of the Pacific is low by international standards, being equivalent to access rates in sub-Saharan Africa and slightly below the average for low income countries.<sup>9</sup> Overall the region has relatively low access rates to electricity (about 48.9 percent of households in PICs have access to electricity<sup>10</sup>), although this average is highly skewed by very low rates in Papua New Guinea (13%), Solomon Islands (19 percent) and Vanuatu (24 percent).<sup>11</sup> Energy poverty in the region is concentrated in these three countries which account for 84 percent of the population of all 14 independent SIDS in the Pacific, and have very low levels of access to electricity. The electrification rate in all three countries is lower than that of other countries with similar levels of GDP per capita.<sup>12</sup>

8. *Electricity prices.* Expenditure on petroleum imports can account for 10%-25% of GDP in small PICs.<sup>13</sup> This heavy reliance on imported petroleum fuel results in extreme vulnerability to oil supply and price shocks in most PICs. It also contributes to some of the highest electricity prices in the world with grid electricity prices range between 18–79+ USc/kWh in 2011.<sup>14</sup> The high costs of electricity are also due in some instances to operational inefficiencies, particularly high network losses<sup>15</sup> and high unit fuel consumption rates.

9. *Regional peak body for support in the energy sector.* The Pacific Power Association (PPA) is the key regional organization that provides support to utilities in Pacific Island Countries and Territories (PICT) utilities. The PPA is a non-governmental regional organization, established in 1992 under the Companies Act of Fiji as a company limited by guarantee. The active membership of the PPA consists of any electric power utility operating in the following 22 PICT member countries: American Samoa, Commonwealth of the Northern Marianas, Cook Islands, Federated States of Micronesia, Fiji, French Polynesia, Guam, Kiribati, Maldives, Marshall Islands, Nauru, New Caledonia, Niue, Palau, Papua New Guinea, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu, Wallis and Futuna, and Western Samoa. Active members shall include public or private electric power corporations, government departments, statutory bodies or other agencies whether incorporated or unincorporated which are directly responsible for public power supply within a member country.

---

<sup>9</sup> UNDP, Energy and Poverty in the Pacific Island Countries, United Nations Development Programme, Bangkok, 2007

<sup>10</sup> Source: World Bank Data: <http://data.worldbank.org/region/PSS>

<sup>11</sup> Source: World Bank Data for 2011 the latest data available.

<http://databank.worldbank.org/data/views/reports/tableview.aspx>

<sup>12</sup> UNDP, Energy and Poverty in the Pacific Island Countries, United Nations Development Programme, Bangkok, 2007

<sup>13</sup> Source: World Bank Engagement Note for the Energy Sector in the Pacific April 2014

<sup>14</sup> Source: Pacific Power Utilities Benchmarking Report 2012, Pacific Power Association March 2013.

<sup>15</sup> Overall system losses and technical losses are almost identical for the Pacific and Caribbean utilities. However, non-technical losses (such as theft or bad metering) are significantly higher in the Pacific.

## Key Issues and Country Strategies

10. *Energy policy and the Renewable Energy (RE) targets.* Increasing energy security and lowering energy usage costs are becoming increasingly important within the region and are providing motivation for these governments to accelerate investments in renewable energy and energy efficiency. PICS are addressing these issues through the formulation of long-term energy policies and plans for implementing the policy targets. Most PICs have very ambitious goals and timescales for the percentage of electricity to be generated from renewable energy as demonstrated in [Table 1](#) below. However, in general, there is a lack of clear priorities, no detailed costing of renewable energy (RE) options and likely costs relative to diesel based generation, and sometimes only limited dialogue between energy planning authorities and the power utilities.

**Table 1: RE Targets in Pacific Island Countries**

| Pacific Island Countries | Renewable Energy Electricity Generation | Renewable Energy Electricity Targets (Primary Energy) |             |
|--------------------------|---|---|-------------|
|                          | Approx % of Total                       | % of Total  | Year        |
| Fiji                     | 67% (2010)                              | 90%   | 2015        |
| FSM                      | -                                       | 20%   | 2020        |
| Kiribati (unofficial)    | <1%                                     | 10% - 30%   | unspecified |
| Marshall Islands         | 1%                                      | 20%   | 2020        |
| Palau                    | 3%                                      | 20%   | 2020        |
| Samoa                    | 42%                                     | + 20  | 2030        |
| Solomon Islands          | <1%                                     | 50%   | 2015        |
| Tonga                    | <1%                                     | 50%   | 2020        |
| Tuvalu                   | 2%                                      | 100%  | 2020        |
| Vanuatu                  | 19%                                     | 65%   | 2020        |

Source: IRENA Islands Initiative Presentation (Herbert Wade; Vanuatu, 15 July 2012)

11. Coordinated energy planning, strong institutions, clear regulations, and enabling policies, including for leveraging private sector participation, are fundamental elements for enhancing energy security, increasing electricity access and achieving the abovementioned RE targets.

12. Hydro and geothermal RE sources can offer non-intermittent energy supplies but only Solomon Islands and Fiji have potential for both with Samoa having only hydro and Vanuatu geothermal. For the remaining PICs the primary potential for RE is from solar and wind sources, both of which produce intermittent supplies which pose significant challenges for network integration when high levels of intermittent generation is installed.

13. The energy sector capacity of PICs is under constant challenge for a number of reasons, including: (i) energy ministries, where they exist, comprise a handful of staff that are expected to cover a very broad range of activities, often in fragile political environments; (ii) there can be a high turnover of staff in energy ministries as good professionals move to better paid jobs in other countries or in the private sector, retires, or shifts to other areas within government; (iii) power utilities in most PICs have a shortage of engineers, and those engineers that are in place are more focused on operating existing systems and less on longer term planning; and (iv) public owned power utilities generally lack a program to train and develop management staff across the

organization and certified apprenticeship schemes are not in place in most small PICs.

14. Comprehensive data sets for high quality planning and existing systems are not readily available, despite nearly 30 years of technical assistance to develop and maintain such data sets. There remains an ongoing need to support improved data collection, analysis and dissemination in the region.

### **Initiatives Underway and Rationale for Bank Involvement**

15. A number of other donors, including New Zealand, the European Union (EU), Japan, and the United Arab Emirates (UAE), have various activities already underway to assist PICs in their energy sectors. (see Annex 2). Most of these activities are focused on the replacement of diesel generation with RE technologies, primarily providing funds for the installation of grid-connected solar PV.

16. There is a clear rationale for World Bank involvement to address a serious gap in information and capacity on RE technologies and integration management in close coordination with activities supported by other development partners. There have been some instances in PICs where intermittent generation, in particular wind power, has been installed without sufficient resource assessments being carried out by independent parties (rather than vendors) and there being insufficient capacity within PIC utilities to critically assess the merits of proposed projects and the impact on existing grids. This has led to less than forecast energy output from these installations, and economic and financial returns on the investment being less than projected. In capital constrained economies, and in a highly capital intensive industry such as energy, investment decisions and their performance need to be very carefully scrutinized – in particular those which are financed using concessional finance. This project should assist PICs in having the independent data, knowledge and tools to subject proposals for intermittent generation to proper scrutiny. This proposed project also supports the Bank's energy sector strategy for the Pacific Islands, supports the Bank's twin goals, and helps addresses important known gaps in the capacity of PIC power utilities to effectively assess and plan for increased use of intermittent generation.

17. This project will complement existing work being undertaken by other development partners in the sector, including the EU's Technical and Vocational Education and Training for Sustainable Energy and Climate Change Adaptation (TVET SECCA) project being led by the Secretariat of the Pacific Community (SPC) and the University of South Pacific (USP), USAID's Pacific Vocational Training and Education for Clean Energy (VOCTEC) led by Arizona State University in close partnership with USP, grid stability studies and training programs being undertaken by IRENA, training programs being run by IUCN and the IFC's P600131 Pacific RE Gen focused on developing business models for private sector engagement in the sector. The preparation of this project is being done in close coordination with these partners to ensure there is complementarity not overlap.

18. The World Bank has worked closely with the PPA in its capacity as the peak regional body in the energy sector. Given the increasing support that the PPA is being asked to provide to its member utilities, particularly in their integration of RE technologies in both on-grid and off-grid scenarios, there is a need to build capacity within PPA in order for them to better provide advice in this area. To date there have been few regional energy sector projects and none which provide for the level of capacity building and sharing of information across jurisdictions as this

project aims to provide. Having the PPA as the Project Implementation Agency provides for effective dissemination of knowledge because it has previously played a central role in building capacity across PIC power utilities in areas such as technical standards, training of staff, and staff exchanges between utilities. It also provides a unique opportunity to allow the PPA to build its capacity not only through assisting with the delivery of specific tools for the use of PPA and its members but also through direct capacity building of PPA itself which will have benefits extending beyond the project implementation period.

19. The Bank's involvement will bring a longer-term perspective on RE investments from all sources by including capacity building, technical expertise, the development of critical data for RE planning all of which are critical for long-term grid stability. Thus, this project will facilitate the planned and other future incremental RE additions without leading to grid instability and other system problems that would seriously set back PICs plans toward achieving their RE goals.

### **C. HIGHER-LEVEL OBJECTIVES TO WHICH THE PROJECT CONTRIBUTES**

20. The Bank's Energy Engagement Strategy in the Pacific at present prioritizes the following two areas:

- i. Strengthening energy planning and enabling policy, institutional and regulatory development including private sector involvement in Pacific countries. Examples of World Bank support include: implementation of energy roadmaps in Tonga and Vanuatu; technical assistance in Tuvalu and FSM; hydropower in Solomon Islands; and development of business models for private sector investment in PICs.
- ii. Improving utilities performance/capacity. Examples of World Bank support include: efficiency measures in FSM, Samoa, Solomon Islands, Vanuatu, and Tuvalu and utilities service reform in Kiribati.

21. These two areas help underpin other objectives of the Bank's assistance including the facilitation of least-cost power supply (generation, transmission, distribution) and increased access to affordable, reliable and sustainable electricity services.

22. With a focus on building the capacity of utilities to improve their performance and support them in encouraging private sector involvement in RE investment, this proposed Project supports the Bank's priority areas in the sector. The Pacific power utilities do not have sufficient budget for capacity building as 70-75 percent of many of these utilities' budget goes to paying for the costs of fuel.<sup>16</sup> Performance of power utilities has a direct influence on the economic development of the Pacific Islands, and a good performing power utility contributes to poverty alleviation.

23. The project is also in line with the Bank's twin goals of ending extreme poverty and promoting shared prosperity by facilitating PICs efforts to improve the efficiency of electricity use in the short term, and to provide cleaner and less expensive electricity in the medium term. This will benefit the extreme poor by increasing the system's efficiency and sustainability and reducing dependence on imported fuels that not only affect electricity-connected households and businesses, but also the price of all goods and services linked to the high cost of retail energy

---

<sup>16</sup> Pacific Power Utilities Benchmarking Report 2012, Pacific Power Association, March 2013.

products. Moreover, the increase in the share of RE and a more efficient use of electricity will result in immediate fuel savings and reduced greenhouse gas and other harmful gas emissions while enhancing the reliability of electricity supply, especially for the poor who are least able to protect themselves against outages. A strong and lasting correlation exists between access to electricity services and core human development measures including poverty reduction, improved health, and education. Electricity is also an important enabler in terms of driving gender equity and equality.

## II. PROJECT DEVELOPMENT OBJECTIVE

### A. PDO

24. The project development objective (PDO) is to increase the data availability and capacity in Pacific island power utilities to enhance their readiness to accelerate the adoption of renewable energy sources of power generation and manage renewable energy technologies.

25. The high level outcomes of the project are: (i) increased publicly available information on renewable energy resources and its variability (ii) increased available planning tools and people who know how to use these, and (iii) improved institutional and technical capacity within PPA and utilities for planning and management for successful integration and long-term management of power systems with higher levels of renewables once renewable projects become operational.

### B. PROJECT BENEFICIARIES

26. The project’s potential beneficiaries are:

- All power sector utilities in PICs who will benefit from demand-driven training in RE integration, grid stability modelling software, online resource mapping tool, online benchmarking tool, the development of competency standards and guidelines for the sector and increased capacity within PPA to provide advice as required.
- All electricity customers in PICs, including residential, commercial and government users, who will obtain improved service as a result of the improved capacity within utilities as a result of the project.
- PPA, whose capacity will increase through investment in appropriate training of existing staff.

### C. PDO-LEVEL RESULTS INDICATORS

27. The following indicators will be used to measure progress toward PDO-level results:

**Table 2: Indicators to Measure PDO Results**

| <b>PDO Result</b>   | <b>Indicator</b>  |
|---|---|
| Increased publicly available information on renewable energy resources and variability. | Increased availability of data on RE resources and its variability in targeted project areas.       |
| Increased available planning tools and people who know how to use these                 | Increased available planning tools and training to both PPA and utilities in the use of these tools |

|  |   |
|--|---|
| Improved institutional and technical capacity within PPA and utilities for planning and management for successful integration and long-term management of power systems with higher levels of renewables once renewable projects become operational. | Improvement in technical and institutional capacity of PPA and PIC power utilities. |
|--|---|

### III. PROJECT DESCRIPTION

#### A. PROJECT COMPONENTS

28. The proposed project, which is estimated to cost a total of USD 3.62 million, will include the following three components to be implemented by PPA.

#### **Component 1. Renewable Energy Resource Mapping Phase 1. Estimated Cost: USD 0.7 million (SIDS DOCK)**

29. This component will carry out a resource mapping assessment of solar and/or wind capacity across 10 PICs.<sup>17</sup> The objective of this component is to enhance awareness and knowledge of the governments, utilities and the private sector of the resource potential for renewable technologies (solar and/or wind), and provide the governments with a spatial planning framework to guide investment in the renewable energy sector. These resource maps will (i) provide a detailed assessment for solar and potentially also wind and other renewable energy resources in the islands, (ii) increase the awareness and knowledge of the Governments and other energy sector players on renewable energy potential, (iii) provide baseline information for potential new public and private sector investments projects and (iv) serve as input for grid integration studies.

#### **Component 2. Technical Assistance. Estimated Cost: USD 2.2 million (SIDS DOCK US\$0.6m, SREP US\$1.6m)**

30. This component will carry out a program of activities designed to increase capacity within the utilities in 10 PICs on planning for and management of the integration of variable RE in their systems, data collection and management and the sharing of knowledge across jurisdictions. This program of activities is to include the following sub-components:

- A grid stability modelling
- A Power Benchmarking
- An industry guidelines and competency standards
- A training/workshops
- A career development
- A citizen engagement

#### **Component 3. Project Management Support. Estimated Cost: USD 0.72 million (SIDS DOCK US\$0.4 m, SREP US\$0.32 m)**

31. This component will carry out a program of activities designed to enhance the capacity of PPA for overall project coordination, management and monitoring. These activities include

---

<sup>17</sup> These 10 PICs are: Fiji, FSM, Kiribati, Marshall Islands, Palau, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu.



coordination, administration, technical operation, procurement, financial management, environmental and social management, monitoring, evaluation and reporting. The project’s incremental operating costs will also be financed through this component (up to USD0.1 million). This program of activities is to include: (i) a project management support sub-component (USD 0.62 million) and (ii) incremental operating costs sub-component (USD 0.1 million).

## B. PROJECT FINANCING

32. The project will be financed using a USD 1.92 million grant from the Scaling Up Renewable Energy Program (SREP) and a USD 1.70 million grant from the Small Island Developing States Initiative (SIDS DOCK).

## C. PROJECT COST AND FINANCING

**Table 3. Project Financing by Component and Source**

| Components                                       | Subcomponents  | Total Cost<br>USD million | Financing Source |           |
|--|--|---------------------------|------------------|-----------|
|  |  |                           | SREP             | SIDS DOCK |
| Component 1:<br>RE Resource<br>Mapping           | Renewable Energy Resource<br>Mapping Phase 1                                   | 0.70                      | 0.00             | 0.70      |
| Component 2:<br>Technical<br>Assistance          | Grid Stability Modelling<br>software and support from<br>PPA                   | 0.30                      | 0.30             | 0.00      |
|  | Power Benchmarking tool<br>and support from PPA                                | 0.40                      | 0.40             | 0.00      |
|  | Industry Guidelines and<br>Competancy Standards and<br>support                 | 0.50                      | 0.10             | 0.40      |
|  | Training/Workshops for<br>PPA members and training<br>for PPA in running these | 0.75                      | 0.75             | 0.00      |
|  | Career Development<br>initiative   | 0.25                      | 0.05             | 0.20      |
|  | Citizen Engagement*  | 0.00                      | 0.00             | 0.00      |
| Component 3:<br>Project<br>Management<br>Support | Project Management<br>Support  | 0.62                      | 0.22             | 0.40      |
|  | Incremental Operating Costs  | 0.10                      | 0.10             | 0.00      |
| TOTAL  |  | 3.62                      | 1.92             | 1.70      |

\*This sub-component will be financed via bank-executed support from the Global Partnership on Social Accountability (GPSA).

## **D. LESSONS LEARNED AND REFLECTED IN THE PROJECT DESIGN**

33. Based on the experience of other countries<sup>18</sup> that are rapidly transitioning to very high penetration of renewables, it is critical that PICs receive the necessary support to ensure the maintenance of grid stability—voltage and frequency regulation—as generation from intermittent energy sources increasingly becomes the dominant portion of their power mix. A large proportion of this project therefore relates to supporting PICs, through the PPA, to manage the integration of RE into their systems.

## **IV. IMPLEMENTATION**

### **A. INSTITUTIONAL AND IMPLEMENTATION ARRANGEMENTS**

34. The project will be implemented by the Pacific Power Association (PPA), with PPA's Executive Director serving as the project manager. The project will fund a full-time Project Coordinator to support the project manager on day-to-day implementation, monitoring and reporting of project activities, including the completion of the project's financial management (FM) requirements; coordination with relevant national government institutions and development partners; procurement of goods and consultancies under the guidance of the Bids Administrator (BA) and the Finance and Contracts Manager (FCM); and monitoring and reporting on results achieved by activities financed under the project. A part-time procurement advisor will be hired to assist with procurement activities. A full-time engineering advisor will also be hired to assist the project manager with the technical aspects of the project, namely the online benchmarking tool and support to PICs for both this and the grid stability software. All project staff will be jointly located within the PPA's office in Suva.

35. Although they have not previously worked with the Bank, PPA, are aware of the Bank's safeguard policies and are supportive, especially with reference to effective public consultation aimed at managing environmental and social risks, resettlement principles, and impact monitoring. The Bank will provide support to PPA through their internal safeguards advisors as required.

### **B. RESULTS MONITORING AND EVALUATION**

36. The implementing agency will conduct overall monitoring and coordination of project activities in accordance with the indicators included in the Results Framework (Annex 1), including the monitoring of compliance with safeguard policies. No later than 45 days after the end of each semester, the implementing agency will submit biannual progress reports to the Bank, covering all project activities, including a procurement and financial summary report. Quarterly financial reports will also be provided to the Bank no later than 45 days after the end of each quarter. Biannual reviews, the first one to take place six months after grant effectiveness, will provide a detailed analysis of implementation progress toward achievement of the PDO and will include an evaluation of financial management and a post review of procurement.

---

<sup>18</sup> The countries referred to are island countries that have transitioned or are on the way toward achieving close to 100 percent renewables, such as Tokelau (PV, batteries), Aruba (wind), and Cape Verde (wind, PV). Such projects were not financed by the World Bank.

37. The implementing agency will (a) not later than two years after the effectiveness date (or such other date as agreed with the Bank), carry out a midterm review of the project, and prepare and furnish to the Bank a midterm report documenting progress achieved in the implementation of the project during the period preceding the date of such report, taking into account the monitoring and evaluation activities performed and setting out the measures recommended to ensure the continued efficient implementation of the project and the achievement of its objectives during the period following such date; and (b) review with the Bank said midterm report, on or about one month after its submission, and thereafter take all measures required to ensure the continued efficient implementation of the project and the achievement of its objectives.

### **C. SUSTAINABILITY**

38. *Sustainability.* The project's sustainability is supported by the PPA's strong commitment to achieving its mission to support power utilities in the provision of high quality, secure, efficient and sustainable electricity services.

39. *Improvements in PPA's capacity.* The project aims to support PPA in building its capacity to provide support to its members by providing both technical support as well as financing a number of online tools (resource mapping, benchmarking, grid stability modelling) to facilitate data available to PPA and utilities to work together on a range of issues in the sector.

## **V. KEY RISKS**

### **A. OVERALL RISK RATING AND EXPLANATION OF KEY RISKS**

40. *Overall risk rating is substantial.* This is mainly due to the implementing agency's limited capacity for executing the project and the technical coordination challenge due to the multiple projects of development partners in the sector.

41. *Political and governance risk is moderate.* The PPA is a non-governmental regional organization, established in 1992 under the *Companies Act of Fiji* as a company limited by guarantee. As such, its operations will be unaffected by the political environments in PICs. PPA has a Board which consists of the chief executive officers (CEOs) from all Active Members<sup>19</sup> and a member elected from Allied members.<sup>20</sup> The PPA Board of Directors meet annually at the annual conference. An Executive Committee of the Board guides the Secretariat between Board meetings and has the authority to make decisions on behalf of the Board between Board meetings. The Executive Committee comprising the Chairman, the Secretary, the Treasurer, the elected Allied member representative is elected from the members of the Board. There is an Alternate to all positions in the Executive Committee. PPA has managed a number of other development partner projects including USDOJ, EU, GSEP, IRENA, NZAid and UNIDO.

42. *Technical design project risk is low.* The project has been designed in close coordination with other development partners in the sector including the Pacific Energy Sector Working Group (ESWG).

---

<sup>19</sup> There are currently 25 Active members. Quorum for Board meetings is 10 active members.

<sup>20</sup> There are currently 85 Allied members.

43. *Institutional capacity for implementation and sustainability risk is substantial.* The capacity building of PPA staff to manage the project will be conducted during project implementation as part of the execution of the respective components. Work on the Resource Mapping, Benchmarking and Grid Stability Modelling tools will help build capacity and keep it current after project implementation.

44. *Fiduciary risk is moderate.* PPA's lack of procurement experience and use of Bank guidelines and standard bidding documents will be addressed through the provision of Bank support in all stages of the bidding process as well as PPA hiring a procurement advisor to assist them throughout the project implementation period. Under the Bank's OP/BP 10 with respect to projects financed by the Bank, the borrower and implementing agency are required to maintain adequate FM systems—including accounting, financial reporting, and auditing systems—to ensure that they can provide the Bank with accurate and timely information regarding the project resources and expenditures. Overall, the FM arrangements meet the FM requirement as stipulated in OP/BP 10, subject to the successful implementation of agreed actions and mitigating measures.

45. *Environmental and social risk is low.* Screening has identified low risk of environmental and social impact, from indirect implementation of recommendations from Component 1 desk-based research. No environmental assessment or other safeguards instrument is required. Component 1 (Phase 1 of the ESMAP process) only comprises desk-based research of data across the 10 PICs. There are no aspects of this project that involve land use, building of infrastructure or other activities that will have direct environmental and / or social impacts or benefits. The desk-based research work undertaken under Component 1 will produce recommendations which may result in future commissioning of ground-based data collection and assessment in any or all of the 10 PIC's. Because of the influence this project may have on future ESMAP activities (not funded by this project), the Terms of Reference for the consultant responsible for Component 1 will take into account of the World Bank safeguard policies when making recommendations.

46. *Stakeholder risk is low.* All aspects of the project align with PPA's strong commitment to achieving its mission to support power utilities in the provision of high quality, secure, efficient and sustainable electricity services. All of PPA's members will have access to the benefits produced from the project including the resource mapping tool, online benchmarking tool, grid stability modelling software, guidelines and competency standards and training/workshops.

## **VI. APPRAISAL SUMMARY**

### **A. ECONOMIC ANALYSIS**

47. The proposed project has the potential to create economic benefits by enabling power utilities to make better informed decisions about the integration of renewable energy resources into their systems which could lead to fuel cost-saving and improving efficiency and effectiveness of power sector performance with more skilled staffs and improved regulation and competition with better incentives for the utilities and the private sector participation. Economic analysis requires specific quantitative data and as such further analysis is yet to be undertaken once data is available on PPA member plans for renewable energy investment over the next 10 years (including investment sources, renewable energy sources, capacity and potential

generations), utility staff capability, salary levels, qualifications and retention rates.

#### **B. TECHNICAL**

48. No technical issues are expected with the project. All activities will involve established technologies and practices on which substantial experience has already been accumulated in past projects.

#### **C. FINANCIAL MANAGEMENT**

49. A financial management assessment was carried out in accordance with the “Financial Management Practices in World Bank-Financed Investment Operations,” issued by the Financial Management Sector Board on November 3, 2005 and further rationalized in the “Principles Based Financial Management Practice Manual” issued by the Board on March 1 2010. Overall, the financial management arrangements satisfy the financial management requirement as stipulated in OP/BP 10.00 subject to implementation of agreed actions and mitigating measures. The financial management (FM) risk for this Project before mitigation is assessed as moderate (refer Annex 3 for details of the financial management and disbursement arrangements

#### **D. PROCUREMENT**

50. As an implementing agency, PPA will be responsible for project implementation. PPA, with the assistance of the procurement advisor and the project officer to be hired under the project, will be responsible for procurement activities.

51. PPA has prepared a draft procurement plan which has been discussed with the Bank.

#### **E. SOCIAL (INCLUDING SAFEGUARDS)**

52. OP/BP 4.12-Involuntary Resettlement is not triggered as a result of this project. Being TA in nature, this project does not have an impact on any social safeguards.

53. PPA have given attention to gender mainstreaming in the energy sector in the PICs including through their work on the Pacific Power Utilities Benchmarking Report produced annually. This report will disaggregate utilities’ job level by gender. In addition, 3 utilities’ staff (Samoa, Vanuatu and Cook Islands) who are contributing to the production of this benchmarking report are women.

54. In both developed and developing countries, there are typically less women in engineering roles compared to men. Currently women who work within PIC utilities tend to be employed in non-engineering roles such as financing and administration. PPA would like to encourage more women to work in engineering roles. A proposed Gender Action Plan for this project is provided in Annex 5.

#### **F. ENVIRONMENT (INCLUDING SAFEGUARDS)**

55. The screening of environmental and social risks and issues has been based on the preliminary information currently available on proposed technical advisory studies. The project is considered Category C under Safeguard Policy OP/BP 4.01-Environmental Assessment.

56. No other environmental policies are triggered.

## ANNEX 1. RESULTS FRAMEWORK AND MONITORING

### Pacific Island Countries

**Project Name: Sustainable Energy Industry Development Project (P152653)**

#### **Project Development Objectives**

PDO Statement

The project development objective (PDO) is to increase the data availability and capacity in Pacific island power utilities to enhance their readiness to accelerate the adoption of renewable energy sources of power generation and manage renewable energy technologies.

**These results are at** | Project Level

#### **Project Development Objective Indicators**

| Indicator Name  | Baseline                         | Cumulative Target Values |   |   |  |
|---|----------------------------------|--------------------------|---|---|--|
|   |                                  | YR1                      | YR2   | YR3   | End Target   |
| Increased public information available on RE resources and variability                              | Limited public data              | 0                        | Availability of public data on PPA website including RM, guidelines, studies, etc.            | Availability of public data on PPA website including RM, guidelines, studies, etc.    | Increased availability of data on RE resources and its variability in targeted project areas on PPA website. |
| Increased available planning tools and training to both PPA and utilities in the use of these tools | Limited available planning tools | 0                        | Availability of planning tools (grid stability software and benchmarking tool) to PPA members | Availability of planning tools (grid stability software and benchmarking tool) to PPA | Availability of planning tools (grid stability software and benchmarking tool) to PPA                        |

|  |                                      |                                  |   |  |  |
|--|--------------------------------------|----------------------------------|---|--|--|
|  |                                      |                                  |   | members                                  | members                                  |
| Improved technical and institutional capacity of PPA and power utilities | Limited capacity building activities | Capacity building plan developed | 50% of capacity building plan completed | 100% of capacity building plan completed | 100% of capacity building plan completed |

### Intermediate Results Indicators

| Indicator Name  | Baseline   | Cumulative Target Values   |   |   |   |
|---|--|--|---|---|---|
|   |  | YR1  | YR2   | YR3   | End Target                                  |
| Resource mapping assessment of solar and/or wind capacity across all across 10 PICs completed and available | 0  | Technical consultancy contracted                                     | Resource mapping assessment underway        | All 10 PICs completed                       | All 10 PICs completed and available online  |
| Training courses/workshops provided   | 0  | 2  | 2   | 2   | 6   |
| Planning tool available   | 0  | Planning tool software purchased                                     | Planning tool software available online     | Planning tool software available online     | Planning tool software available online     |
| Reports on industry guidelines and competency standards available through PPA                               | 4 guidelines currently available (Off Grid Power Systems-Design; Off Grid Power systems-Install; Grid connect PV Systems-Design; Grid connect PV systems-Installation) | Consultants recruited to develop guidelines and competency standards | 4 additional guidelines/standards available | 4 additional guidelines/standards available | 8 additional guidelines/standards available |

### Indicator Description

### Project Development Objective Indicators

| Indicator Name  | Description (indicator definition etc.)   | Frequency | Data Source / Methodology | Responsibility for Data Collection |
|---|---|-----------|---------------------------|------------------------------------|
| Increased public information on RE resources and variability  | This indicator will measure the increase of public information on RE resources and variability available on the PPA website                                 | Annual    | Project reports           | PPA                                |
| Increased available planning tools and training to both PPA and utilities in the use of these tools | This indicator will measure the increase in available planning tools for use by PPA members and training of PPA and utility staff in the use of these tools | Annual    | Project reports           | PPA                                |
| Improved technical and institutional capacity of power utilities                                    | This indicator will measure the improved technical and institutional capacity of power utilities  | Annual    | Project reports           | PPA                                |

### Intermediate Results Indicators

| Indicator Name  | Description (indicator definition etc.)  | Frequency | Data Source / Methodology | Responsibility for Data Collection |
|---|--|-----------|---------------------------|------------------------------------|
| Resource mapping assessment of solar and/or wind capacity across all across 10 PICs completed and available | This indicator will measure completion and availability of resource mapping assessment of solar and/or wind capacity across all across 10 PICs | Annual    | Project reports           | PPA                                |
| Training/workshops provided   | This indicator will measure the number of workshops provided under the project   | Annual    | Project reports           | PPA                                |
| Planning tool available   | This indicator will measure the availability of a grid stability modeling planning tool available to power utilities through the PPA           | Annual    | Project reports.          | PPA                                |
| Reports on industry guidelines and competency standards available through                                   | This indicator will measure number of reports on industry guidelines and competency standards for the selected                                 | Annual    | Project reports           | PPA                                |



|     |  |  |  |  |
|-----|--|--|--|--|
| PPA | PICs to consider, which will available through PPA |  |  |  |
|-----|--|--|--|--|

## **ANNEX 2. DETAILED PROJECT DESCRIPTION**

### **Pacific Island Countries: Sustainable Energy Industry Development Project (P152653)**

1. The project development objective (PDO) is to increase the data availability and capacity in Pacific island power utilities to enhance their readiness to accelerate the adoption of renewable energy sources of power generation and manage renewable energy technologies. Given the importance and potential for RE in PICs it is important for utilities to learn about integration of RE in their power systems and be able to critically assess the merits of proposed RE projects and the impact on existing grids. This project aims to: (i) increase the information publically available on renewable energy resources and its variability, (ii) increase available planning tools and people who know how to use these, and (iii) improve institutional and technical capacity within PPA and utilities for planning and management for successful integration and long-term management of power systems with higher levels of renewables once renewable projects become operational.
2. To achieve this PDO, the project will be supported by a USD 1.92 million SREP grant and a USD 1.70 million grant from SIDS DOCK. The project contains three components: (i) Renewable Energy Resource Mapping Phase 1; (ii) Technical Assistance; and (iii) Project Management Support. The three components of the project support the achievement of the PDO by: (i) enabling resource mapping of wind and solar energy across 10 PICs; (ii) building capacity across PIC utilities in the area of power system planning, in particular on the integration of intermittent generation; and (iii) providing implementation support to the Project Implementation Agency.

#### **Component 1. Renewable Energy Resource Mapping Phase 1. Estimated Cost: USD 0.7 million (SIDS DOCK)**

3. This component will carry out a resource mapping assessment of solar and/or wind capacity across all 10 PICs. The objective of this component is to enhance awareness and knowledge of the governments, utilities and the private sector of the resource potential for renewable technologies (solar and/or wind), and provide the governments with a spatial planning framework to guide investment in the renewable energy sector. These resource maps will (i) provide a detailed assessment for solar and potentially also wind and other renewable energy resources in the islands, (ii) increase the awareness and knowledge of the Governments and other energy sector players on renewable energy potential, (iii) provide baseline information for potential new public and private sector investments projects and (iv) serve as input for grid integration studies.
4. The above mentioned Phase 1 of the resource mapping will be undertaken with support by Energy Sector Management Assistance Program (ESMAP). The activity will ensure the sharing of knowledge of the current existing information and it will avoid duplication of data collection. Following the ESMAP approach will allow continuing with the next phases under a different project if additional funds become available.<sup>21</sup>

---

<sup>21</sup> Phase 2: commissioning of ground-based data collection and assessment, Phase 3: production of a validated atlas for the RE resource in question and dissemination of commissioned data, Phase 4: carrying out geospatial planning

5. The contract for implementation of this component will be awarded using the Bank's standard bidding document for consultancy firms. Bidders will be responsible for the delivery of this component.

**Component 2. Technical Assistance. Estimated Cost: USD 2.2 million (SIDS DOCK US\$0.6m, SREP US\$1.6m)**

6. This component will carry out a program of activities designed to increase capacity within the utilities in the 10 PICs on planning for and management of the integration of variable RE in their systems, data collection and management and the sharing of knowledge across jurisdictions. This program of activities is to include:

- A grid stability modelling sub-component including: (i) purchase of modelling software and tools to support utilities with network expansion planning, variable renewable interconnection studies and grid stability and protection coordination studies (building on the work started by IRENA in 2013/14), (ii) training of PPA staff in the use of the software in order to support utilities with undertaking independent grid stability studies.
- A Power Benchmarking sub-component including: (i) development of an online Power Benchmarking data submission tool to support PPA's coordination of the annual Power Benchmarking Report with input from member utilities, (ii) training of PPA staff in the use of the tool in order to support utilities with their independent data collection/entry using the tool
- An industry guidelines and competency standards sub-component including: (i) Hiring of a consultant to develop solar and wind grid codes to establish the minimum interconnection standards for renewable energy systems, (ii) development of industry guidelines (design, installation, operations and maintenance) and competency standards to support certified technical training in RE technologies.
- A training/workshops sub-component for PPA members including (i) support for training courses in a range of demand-driven RE technologies, industry guidelines, standards and other relevant industry issues in each PIC (reducing the cost of bringing people from multiple PICs to a single location and reaches more staff within utilities, system planning (including energy efficiency considerations) and demand-side management, (ii) support for PPA to undertake an online training needs assessment amongst its members to identify training and skills-enhancement needs at the individual utility level to then draw common issues/themes for multi-utility staff training sessions, and (iii) support for PPA's management of workshops focused on developing utilities' understanding of frameworks for private sector involvement in the sector (links with IFC's P600131 Pacific RE Gen focused on developing business models for private

---

and Strategic Environmental Assessment (SEA), whereby RE resource mapping outputs are analyzed alongside other geospatial and environmental data to determine zones most appropriate for development, Phase 5: development of policy recommendations to help guide commercial investment in a way that is consistent with economic, social and environmental objectives.

- sector engagement in the sector).
- A career development sub-component for PPA to hire a consultant to assist with the development of career development initiatives for attracting and retaining talented staff within utilities (e.g., staff development and training, performance incentives etc.). PPA will also join PIC university career fairs to encourage both female and male high school students to study engineering and other energy-related studies at universities and provide internship opportunities for them.
- A citizen engagement sub-component to build the capacity of the utility staff on grievance redress mechanisms (GRMs) to collect information on customer satisfaction/complaints and to close the beneficiary feedback loop by responding. This sub-component's activities will be executed via bank-supported technical assistance to be provided by the World Bank's Global Partnership for Social Accountability (GPSA) program. The GPSA supports governments, civil society and private sector to work together to solve critical governance challenges in developing countries. The GPSA's Capacity-Building area will support utilities for the design of GRMs. Additionally, once PICs "opt-in" to the GPSA Program, PPA will be able to submit a grant proposal for supporting the implementation of GRMs in PICs, opening the channel for additional resources to be directed to this sub-component.

7. This component will complement Component 1 by providing training and workshops to power sector utility staff on technical skills related to renewable energy integration so that they can better use the information that is obtained through the Resource Mapping component.

**Component 3. Project Management Support. Estimated Cost: USD 0.72 million (SIDS DOCK US\$0.4 m, SREP US\$0.32 m)**

8. This component will carry out a program of activities designed to enhance the capacity of PPA for overall project coordination, management and monitoring. These activities include coordination, administration, technical operation, procurement, financial management, environmental and social management, monitoring, evaluation and reporting. The project's incremental operating costs will also be financed through this component (USD0.1 million). This program of activities is to include:

- A project management support sub-component (USD 0.62 million) including: (i) hiring of a full-time Project Implementation Officer to support the PPA throughout project implementation, (iii) hiring of a part-time Procurement Support Officer to assist with procurement processes throughout project implementation, (iv) provision of technical assistance to support mainstreaming of gender dimensions in the Project, (v) purchase of VC equipment to support enhanced interaction and training support between PPA and utilities, (vi) support for PPA to organise training courses and workshops on RE technologies and key issues facing utilities, and (vii) support for PPA to update its website to facilitate links to Resource Mapping Online tool, Online Grid Stability Software, Online Benchmarking tool and other resources generated throughout project implementation.
- An incremental operating costs sub-component (USD 0.1 million).

9. Project costs, totaling USD 3.62 million, are summarized in Table 1.

**Table 1. Summary of Project Costs**

| Components                                       | Subcomponents  | Total Cost<br>USD million | Financing Source |           |
|--|--|---------------------------|------------------|-----------|
|  |  |                           | SREP             | SIDS DOCK |
| Component 1:<br>RE Resource<br>Mapping           | Renewable Energy Resource<br>Mapping Phase 1                                   | 0.70                      | 0.00             | 0.70      |
| Component 2:<br>Technical<br>Assistance          | Grid Stability Modelling<br>software and support from<br>PPA                   | 0.30                      | 0.30             | 0.00      |
|  | Power Benchmarking tool<br>and support from PPA                                | 0.40                      | 0.40             | 0.00      |
|  | Industry Guidelines and<br>Competancy Standards and<br>support                 | 0.50                      | 0.10             | 0.40      |
|  | Training/Workshops for<br>PPA members and training<br>for PPA in running these | 0.75                      | 0.75             | 0.00      |
|  | Career Development<br>initiative   | 0.25                      | 0.05             | 0.20      |
|  | Citizen Engagement*  | 0.00                      | 0.00             | 0.00      |
| Component 3:<br>Project<br>Management<br>Support | Project Management<br>Support  | 0.62                      | 0.22             | 0.40      |
|  | Incremental Operating Costs  | 0.10                      | 0.10             | 0.00      |
| TOTAL  |  | 3.62                      | 1.92             | 1.70      |

\*This sub-component will be financed via bank-executed support from the Global Partnership on Social Accountability (GPSA).

### Other Related Projects

10. These activities will complement existing work being undertaken by other development partners in the sector, including the EU's Technical and Vocational Education and Training for Sustainable Energy and Climate Change Adaptation (TVET SECCA) project being led by the Secretariat of the Pacific Community (SPC) and the University of South Pacific (USP), USAID's Pacific Vocational Training and Education for Clean Energy (VOCTEC) led by Arizona State University in close partnership with USP, grid stability studies and training programs being undertaken by IRENA, training programs being run by IUCN and the IFC's P600131 Pacific RE Gen focused on developing business models for private sector engagement in the sector. The preparation of this project is being done in close coordination with these partners to ensure there is complementarity not overlap.

## **ANNEX 3. IMPLEMENTATION ARRANGEMENTS**

### **Pacific Island Countries: Sustainable Energy Industry Development Project (P152653)**

#### **Project Institutional and Implementation Arrangements**

1. The project will be implemented by the Pacific Power Association (PPA), with PPA's Executive Director serving as the project manager. The project will fund a full-time Implementation Officer to support the project manager on day-to-day implementation, monitoring and reporting of project activities, including the completion of the project's financial management (FM) requirements; coordination with relevant national government institutions and development partners; procurement of goods and consultancies under the guidance of the Bids Administrator (BA) and the Finance and Contracts Manager (FCM); and monitoring and reporting on results achieved by activities financed under the project. A part-time procurement advisor will be hired to assist with procurement activities. A full-time engineering advisor will also be hired to assist the project manager with the technical aspects of the project, namely the online benchmarking tool and support to PICs for both this and the grid stability software. All project staff will be jointly located within the PPA's office in Suva.

2. PPA is a non-governmental regional organization, established in 1992 under the Companies Act of Fiji as a company limited by guarantee. The active membership of the PPA consists of any electric power utility operating in the following 22 PICT member countries: American Samoa, Commonwealth of the Northern Marianas, Cook Islands, Federated States of Micronesia, Fiji, French Polynesia, Guam, Kiribati, Maldives, Marshall Islands, Nauru, New Caledonia, Niue, Palau, Papua New Guinea, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu, Wallis and Futuna, and Western Samoa. Active members shall include public or private electric power corporations, government departments, statutory bodies or other agencies whether incorporated or unincorporated which are directly responsible for public power supply within a member country.

3. There are 3 other membership categories: (i) Allied members – any organisation or individual wishing to be affiliated with the PPA who are not eligible for active membership but whose affiliation with PPA would be of benefit to the PPA; (ii) Affiliate members – any organisation that will not seek to gain a financial benefit from the PPA including multilateral and bilateral agencies, non-utility government entities and various international standards associations; (iii) Honorary members – chosen by the Board on the basis of outstanding service to the power industry in member countries or for outstanding service to the PPA.

4. The PPA has a Secretariat Office of 5 staff members located in Suva, Fiji. PPA currently has a membership of 25 electricity utilities from 20 PICs (Active Members) and 114 commercial members (85 Allied Members and 29 Affiliate Members) world-wide with interest in the development of the power industry in the Pacific region.

5. The main objective of PPA is to create an environment of “co-operative partnership” with the private sector, funding institutions, and others with interest in the development of the power industry and to enhance the role of the power sector in the Pacific Island Countries. PPA aims to improve the quality of power in the region through a cooperative effort among the utilities in the region. It has a mandate to assist the utilities in resolving problems including the integration of

renewable energy and encourage them to be efficient and accountable in their operation.

6. PPA is directly funded through annual subscriptions from the members. There are four categories of membership – Active Membership, Allied Membership, Affiliate Membership and Honorary Membership. Active members pay an annual membership fee based on their size US\$9,000 (peak load >30MW), US\$8,500 (peak load 5MW-30MW) and US\$3,500 (peak load <5MW). Allied Members pay an annual membership fee of US\$2,500. There are no membership fees for Affiliate Members or Honorary Members and they are not financial members of the PPA.

7. PPA has a Board which consists of the chief executive officers (CEOs) from all Active Members and a member elected from Allied members. The PPA Board of Directors meet annually at the annual conference. An Executive Committee of the Board guides the Secretariat between Board meetings and has the authority to make decisions on behalf of the Board between Board meetings. The Executive Committee comprising the Chairman, the Secretary, the Treasurer, the elected Allied member representative is elected from the members of the Board. There is an Alternate to all positions in the Executive Committee.

8. PPA has managed a number of other development partner projects including USDOJ, EU, GSEP, IRENA, NZAid and UNIDO.

9. PPA will be working closely with the SEIAPI on this proposed project and there will be a Memorandum of Understanding (MoU) (satisfactory to the Bank) between the two agencies outlining the responsibilities of each organization.

10. SEIAPI is a non-profit industry association established in 2010 with the mission to create an enabling environment for the growth of sustainable energy business entities and sustainable energy equipment and/or energy services in the Pacific Islands. It is currently running as a volunteer and member funded organization. Currently the fees for SEIAPI are US\$200 per year.

11. PPA and SEIAPI have complementary objectives and they have already partnered for the training of technicians for the installation and maintenance of RE generators to grids and the publication of standards and training guidelines for grid connected sustainable energy systems. In addition, PPA currently provides office space and support to SEIAPI, as well as invaluable networking and linkage to stakeholders within the energy utilities sector in the Pacific region.

12. Although they have not previously worked with the Bank, PPA, are aware of the Bank's safeguard policies and are supportive, especially with reference to effective public consultation aimed at managing environmental and social risks, resettlement principles, and impact monitoring. The Bank will provide support to PPA through their internal safeguards advisors as required.

13. A project coordinator will support PPA during the project implementation and will provide inputs on TORs, studies and expert technical guidance as needed.

## **Financial Management, Disbursements, and Procurement**

### ***Financial Management***

14. *Risks and Mitigating Strategies.* The existing financial management systems appear adequate to meet the financial management requirements as stipulated in OP/BP 10.00, subject to implementation of the agreed actions and mitigating measures. The project's overall financial management risk is rated as "Moderate". No FM effectiveness or disbursement conditions are recommended.

15. *Budgeting arrangements.* PPA will prepare a total budget for the life of the project, broken down into annual budgets. PPA will review this document periodically as required, minimum annually, with analysis of budget versus actual expenditure.

16. *Accounting arrangements.* PPA will perform the accounting functions of the Project using PPA's accounting software (MYOB), and either ensure adequate set up of MYOB to provide the required level of Project reporting, or maintain adequate support systems (Excel Spreadsheets) to provide the required level of reporting, e.g. contracts registers, financial reporting, Withdrawal Applications.

17. *Internal controls.* The project will adopt the financial management procedures and processes as per PPA's Accounts Policy and Procedures Manual combined with the various World Bank manuals and guidelines (eg. Disbursement Manual, Procurement Guidelines). These procedures and processes are considered adequate. A brief FM section will be included in the Operations Manual to provide guidelines on the project's internal controls and procedures, with elaboration of any details not adequately addressed in PPA's Policies and Manuals and World Bank manuals and guidelines.

18. *Financial reporting.* Unaudited interim financial reports (IFRs) will be prepared by the PPA on a calendar semester basis. The IFRs will include an analysis of actual expenditure for the current semester, year to date and project to date, outstanding commitments, compared to the total project budget. The format will be developed and agreed to by the World Bank prior to submission of the first IFR. The IFRs will be forwarded to the World Bank within 45 days of the end of each calendar semester

19. *External audit.* Annual audit of the Project Financial Statements will be required. PPA contracts out audits to private auditors. The audited financial statements will be required to be submitted to the Bank no later than 6 months after the end of each fiscal year. The project audit must be received by the Bank within six months of the end of each reporting period.

### ***Disbursements***

20. *Flow of funds.* The Designated Account (DA) will be opened in the ANZ Bank in Suva, Fiji, in Fiji Dollars (FJD) and will be managed by the PPA, and there will be monthly reconciliations of the account. The ceiling of the DA will be specified in the Disbursement Letter.

21. *Disbursement Methods.* The project will utilize three disbursement methods of advance,



reimbursement, and direct payment. Disbursements will be against Lists of Payments, Statements of Expenditure and records evidencing eligible expenditures.

### ***Procurement***

22. *Procurement arrangements.* Procurement for the proposed project will be carried out in accordance with the World Bank's Guidelines: Procurement under IBRD Loans and IDA Credits, dated January 2011 and revised July 2014 (Procurement Guidelines); Guidelines: Selection and Employment of Consultants by World Bank Borrowers, dated January 2011 and revised July 2014 (Consultant Guidelines); and the provisions stipulated in the financing agreement. The description of various items under different expenditure categories is summarized below. For each contract to be financed by the grant, different procurement or selection methods, estimated costs, prior-review requirements, and a time frame will be agreed by the recipient and the Bank in the Procurement Plan.

23. *Procurement of goods and non-consulting services.* Procurement under the proposed project includes (a) consultancy firm to undertake Resource Mapping Phase 1 component (b) online benchmarking tool (c) grid stability modelling software; (d) a consultant project coordinator, (e) a consultant engineer, and (f) a consultant procurement advisor. International competitive bidding (ICB) procedures shall be used for procurement of goods estimated to cost USD 500,000 or more per contract. Shopping may be used to procure goods and non-consulting services estimated to cost less than USD 500,000 per contract. Direct contracting may be used in circumstances that meet the criteria set out in paragraph 3.7 of the Procurement Guidelines.

24. *Selection of consultants.* Consultants will be selected in accordance with the following procedures.

- *Selection of consulting firms.* Consulting contracts expected to cost more than USD 300,000 equivalent per contract will use Quality- and Cost-based Selection (QCBS) or Quality-based Selection (QBS) in accordance with the Consultant Guidelines. Consulting services estimated to cost under USD 300,000 equivalent per contract will follow Selection Based on Consultant's Qualifications (CQS). Under the circumstances described in paragraph 3.9 of the Consultant Guidelines, consultants may be selected and awarded contracts on the basis of a Single-source Selection (SSS), subject to the Bank's prior approval.
- *Selection of individual consultants (ICs).* ICs will be selected and contracts awarded in accordance with the provisions of paragraphs 5.1 through 5.5 of the Consultant Guidelines. Under the circumstances described in paragraph 5.6 of the Consultant Guidelines, ICs may be selected and awarded on a single-source basis, subject to the Bank's prior approval.

25. *Prior-review thresholds.* Prior-review and procurement thresholds for the proposed project are shown in Table 4.

**Table 1. Prior-review and Procurement Thresholds**

| Procurement Methods   | Procurement Thresholds   | Prior-Review Thresholds  |
|---|--|--|
| <b>Goods</b>  |  |  |
| ICB   | ≥USD 500,000   | All contracts subject to prior review  |
| Shopping  | <USD 500,000   | None   |
| Direct contracting  | Meet the criteria set out in paragraph 3.7 of Procurement Guidelines | All contracts subject to prior review  |
| <b>Consultant Selection Methods</b>                         |  |  |
| Firms (QCBS, QBS, Least-cost Selection [LCS], CQS, and SSS) | In accordance with the Bank's Consultant Guidelines                  | ≥USD 200,000, and all SSS contracts  |
| IC  |  | ≥USD 50,000 (exception made for SSS, legal- and procurement-related assignments, in which all contracts are subject to prior review) |

26. *Implementation arrangements.* As an implementing agency, PPA will be responsible for project implementation. PPA, with the assistance of the procurement advisor and the project coordinator to be hired under the project, will be responsible for procurement activities.

27. *Procurement risks and mitigation actions.* A procurement-capacity assessment was conducted by the Bank. The main risk mitigation actions include (a) hiring of a procurement advisor to assist PPA in handling procurement; (b) hiring of a consultant engineer to assist PPA in preparing technical specifications, in bid evaluations and in contract supervision; (c) use of the procurement database system developed for the Pacific; and (d) sharing with PPA a standard procurement checklist of records for procurement recordkeeping purposes.

28. *Frequency of procurement supervision.* In addition to the prior review to be carried out by the Bank, procurement supervision missions will visit the field to carry out post reviews of procurement activities every 12 months. The post-review sampling ratio will be one out of five contracts.

29. *Procurement plan.* A procurement plan for the proposed project has been prepared. This plan will be available in the project's database and on the Bank's external website once it is approved by the Bank. The procurement plan will be updated in agreement with the Bank annually, or as required, to reflect project implementation needs and improvements in institutional capacity. A summary of the Procurement Plan is presented in Tables 5 and 6.

**Table 2. Procurement of Goods, Works, and Non-consulting Services**

| Contract No. | Description                         | Estimated Cost (USD Million) | Procurement Method | Prequalification | Domestic Preference | Review by Bank |
|--------------|-------------------------------------|------------------------------|--------------------|------------------|---------------------|----------------|
| 1            | Purchase of grid stability modeling | 50,000                       | Shopping           | N                | N                   | Post           |

| Contract No. | Description                                  | Estimated Cost (USD Million) | Procurement Method | Prequalification | Domestic Preference | Review by Bank |
|--------------|--|------------------------------|--------------------|------------------|---------------------|----------------|
|              | software                                     |                              |                    |                  |                     |                |
| 2            | Purchase of VC equipment                     | 5,000                        | Shopping           | N                | N                   | Post           |
| 3            | Benchmarking Online Data Submission Platform | 190,000                      | Shopping           | N                | N                   | Post           |

**Table 3. Selection of Consultants**

| Contract No. | Description   | Estimated Cost (USD Million) | Selection Method | Bank Review | Expected Proposal Submission Date |
|--------------|---|------------------------------|------------------|-------------|-----------------------------------|
| 1            | Hiring of a Procurement Specialist (on an as needed basis for entire project duration)              | 20,000                       | ICS*             | Prior       | 1 June 2015                       |
| 2            | Hiring of a Project Coordinator   | 200,000                      | ICS              | Prior       | 1 June 2015                       |
| 3            | Hiring of an Engineering Specialist for grid stability studies and benchmarking support within PPA  | 184,000                      | ICS              | Prior       | 1 July 2015                       |
| 4            | Hiring of Resource Mapping consultant firm for Component 1  | 700,000                      | QCBS             | Prior       | 1 July 2015                       |
| 5            | Hiring of Consultant to train and support Project Coordinator for first 12 months                   | 36,700                       | ICS              | Prior       | 1 July 2015                       |
| 6            | Hiring of Consultant firm to Develop Guidelines and Competency Standards and conduct some workshops | 218,250                      | CQS              | Prior       | 1 August 2015                     |

\* *Competitive Individual Consultant Selection*

***Environmental and Social (including safeguards)***

30. As there are no significant environmental or social safeguards aspects to this project there is no need to include a safeguard implementation plan.

***Monitoring & Evaluation***

31. PPA will conduct overall monitoring and coordination of project activities, in accordance with the indicators included in the Results Framework (Annex 1), including the monitoring of compliance with safeguard policies. No later than 45 days after the end of each semester, the implementing agency will submit biannual progress reports to the Bank, covering all project activities, including a procurement and financial summary report. Quarterly financial reports will also be provided to the Bank no later than 45 days after the end of each quarter. Biannual reviews, the first one to take place six months after IDA grant effectiveness, will provide a detailed analysis of implementation progress toward achievement of the PDO and will include an

evaluation of FM and a post review of procurement.

***Role of Partners***

32. A number of development partners are currently assisting PIC’s in relation to renewable energy integration in the energy sector with the implementation or preparation of projects. Good communication and coordination among the development partners and with the PPA will remain necessary to ensure that overlaps are kept to a minimum and each project’s outcomes contribute to the energy sector’s overall goals. Table 8 shows current and proposed projects in the sector.

**Table 4. Key Related Activities Being Undertaken by Development Partners in PICs Renewable Energy Sector**

| <b>Funding Agency</b>  | <b>Description</b>  |
|--|---|
| IFC  | P600131 Pacific RE Gen focused on developing business models for private sector engagement in the sector.   |
| EU   | Technical and Vocational Education and Training for Sustainable Energy and Climate Change Adaptation (TVET SECCA) project being led by the Secretariat of the Pacific Community (SPC) and the University of South Pacific (USP) |
| USAID  | USAID’s Pacific Vocational Training and Education for Clean Energy (VOCTEC) led by Arizona State University in close partnership with USP   |
| IRENA  | Grid stability studies and training programs  |
| International Union for Conservation of Nature (IUCN), to be funded by the Government of Italy | RE training programs  |

## **ANNEX 4. IMPLEMENTATION SUPPORT PLAN**

### **Pacific Island Countries: Sustainable Energy Industry Development Project (P152653)**

#### **Implementation Support Plan**

1. The strategy for implementation support has been developed based on the nature of the project and its risk profile. The aim is to make implementation support to the client more flexible and efficient by focusing on implementing the risk-mitigation measures defined in the Systematic Operations Risk-rating Tool (SORT).
2. The Bank task team leader (TTL) will provide ongoing support by coordinating with the client and among World Bank staff who will provide implementation support on technical, fiduciary (FM and procurement), and safeguards aspects. Implementation will be supported by task team members based in the World Bank's Sydney and Washington, DC offices. This will ensure that field missions can be organized quickly should the need arise and that international expertise can also be mobilized to provide global best practices. Formal missions will be conducted at least three times during the first two years of implementation and at least biannually thereafter.
3. In conjunction with government counterparts, the Bank will monitor progress against the monitoring indicators in the Results Framework. The Bank will also monitor risks and update the risk assessment and risk management measures, as needed. A midterm review would encompass a more in-depth stocktaking of performance under the project. Based on the assessment of progress at the midpoint of the project, government counterparts and the Bank would consider recommendations for improvements or changes, and use of contingency funds assigned to the project.
4. The Bank's implementation plan is supported by a series of technical reviews and capacity-building activities. In addition to periodic reviews by the task team and inputs from procurement, FM and safeguard specialists, the plan identifies appropriate technical expertise to be retained during critical implementation periods.
5. It is important to note that the Bank team will be in close coordination with relevant development partners who are assisting with the energy sector in PICS, and will seek to coordinate supervision missions at the same time with those development partners.

**Table 1. Implementation Support Main Focus and Skills**

| <b>Time</b>         | <b>Focus</b>                    | <b>Skills Needed</b>        | <b>Resource Estimate (Staff Weeks)</b> |
|---------------------|---------------------------------|-----------------------------|--|
| First twelve months | Team leadership                 | TTL/Co-TTL                  | 10                                     |
|                     | Review of procurement documents | Procurement specialist      | 6                                      |
|                     | Review of FM                    | FM specialist               | 4                                      |
|                     | Technical reviews               | Renewable energy specialist | 4                                      |
| 12–48 months        | Team leadership                 | TTL/Co-TTL                  | 20                                     |
|                     | Review of procurement documents | Procurement specialist      | 10                                     |
|                     | Review of FM                    | FM specialist               | 8                                      |
|                     | Technical reviews               | Renewable energy specialist | 8                                      |

**Table 2. Skills Mix Required**

| <b>Skills Needed</b> | <b>Number of Staff Weeks</b> | <b>Number of Trips</b> | <b>Comments</b> |
|----------------------|------------------------------|------------------------|-----------------|
| TTL/Co-TTL           | 30                           | 8                      |                 |
| Procurement          | 15                           | 4                      |                 |
| FM                   | 12                           | 4                      |                 |
| ACS                  | 20                           | 8                      |                 |

## **ANNEX 5: GENDER ANALYSIS, ACTION PLAN AND MONITORING AND EVALUATION FRAMEWORK**

### **Gender Analysis**

1. Gender inequality remains a development challenge throughout the Pacific. The Pacific registers some of the worst gender indicators in the world, particularly in relation to political representation, gender based violence, economic opportunity, and country cases of high maternal mortality rates. In addition, non-communicable diseases are an emerging concern in the Pacific and women are disproportionately affected.
2. MDG outcomes are mixed. Whilst all Pacific Island Countries on track to achieve gender parity in education, except for Papua New Guinea, Solomon Islands, and Tonga,<sup>22</sup> and there are several countries on track for reaching MDG5 on maternal mortality ratio targets (Cook Islands, Fiji, Nauru, Niue, Palau, Republic of the Marshall Islands, Samoa, Tonga, and Tuvalu) there is still significant room for improvement in many of the PICs.
3. Overall, women's agency is limited and expressed through women's low representation in politics and widespread violence against women. Women's representation in parliament in the Pacific is the lowest of any region in the world. For example, The Federated States of Micronesia, Palau, and Vanuatu currently have no women in their parliaments. In Samoa, only individuals with the chiefly Matai title can be elected to parliament. While both women and men can receive the title, the percentage remains low at 10.5 percent. Women are therefore, significantly disadvantaged when wishing to enter politics. Similarly in Tonga, until 2010, of the 32 parliamentary seats, 14 were reserved for cabinet ministers appointed by the King, nine reserved for nobles and nine were elected by popular vote. Therefore, as only men can be nobles, the number of possible parliamentary seats available to women has been limited.
4. Lower levels of secondary school attainment and literacy pose barriers to women's equal participation in economic activity. Women also endure low levels of access to and control of economic resources, especially related to access to credit markets and land, despite the fact that women in the informal sector provide a significant part of the region's labor. Women are less represented in formal work with men outnumbering women in paid employment outside the agricultural sector by approximately two to one. There is also evidence to show that across the Pacific (except in Kiribati), young women are less likely to be employed than young men.<sup>23</sup>

---

<sup>22</sup> Pacific Island Forum Secretariat 2013. *2013 Pacific Regional MDGs Tracking Report*. Suva.

<sup>23</sup> United Nations Children's Fund (UNICEF Pacific) and Secretariat of the Pacific Community (SPC) 2011. *The State of Pacific Youth Report 2011: Opportunities and Obstacles*. Noumea.

5. Of the total female population of Pacific Island Countries, approximately 70% live in rural areas.<sup>24</sup> Subsistence economy predominates, as do strong gender roles determined by culture. Women are involved predominately in household chores including the rearing of children, caring of the sick or elderly, collection of water and firewood and, production of handicrafts for both household use and sale.

6. Violence against women in the Pacific is endemic, among the highest incidents rates in the world. For example, 68 percent of ever-married women ages 15 to 49 in Kiribati, 64 percent in the Solomon Islands, and 60 percent in Vanuatu have experienced physical and/or sexual violence by an intimate partner.<sup>25</sup> Violence against women significantly and negatively affects not only their health, well-being and agency, but also affects the public health system, business, and children's development, education, and nutrition levels. It is also self-perpetuating and women who have experienced intimate partner violence are seven times more likely to have children who are also abused than those who have not experienced partner violence. The development costs are significant with a recent World Bank study estimating the cost of intimate partner violence annually to be close to the average that development country governments spend on primary education. However, this may be higher in the Pacific and in 2009, it was calculated that the cost of domestic violence to the Fiji economy was around 6.6 percent of GDP.<sup>26</sup>

7. Women, especially in the Pacific, also have less control over their own earnings. Between 13 and 15 percent of women in Marshall Islands, Samoa, and Tuvalu report that their husbands have control over their cash earnings.<sup>27</sup> In addition, women's decision making power in the home is limited with the family structure placing household decision making traditionally with the male head of household.

8. Due to these inequalities, women and men have different opportunities to participate in discussions around the energy sector (grid and off grid), work in the energy sector and undertake training and professional development in the energy sector which is currently dominated by state-run utilities.

9. Furthermore, women and men are affected differently by access to reliable energy and electrification rates both for households and public services.

---

<sup>24</sup> Economist Intelligence Unit 2012: *Women's economic opportunity 2012, A global index and ranking from the Economist Intelligence Unit, Findings and methodology*. Retrieved from [http://www.juntadeandalucia.es/haciendayadministracionpublica/planif\\_presup/genero/documentacion/Women\\_Economic\\_index2012.pdf](http://www.juntadeandalucia.es/haciendayadministracionpublica/planif_presup/genero/documentacion/Women_Economic_index2012.pdf)

<sup>25</sup> World Bank. 2012. *Toward Gender Equality in the East Asia and the Pacific: A Companion to the World Development Report*. Washington, DC.

<sup>26</sup> Professor Biman Prasad, Dean, University of the South Pacific, Island Business 2012. Also see: [www.worldbank.org/en/news/opinion/2012/11/25/the-human-and-economic-cost-the-pacific-cannot-afford](http://www.worldbank.org/en/news/opinion/2012/11/25/the-human-and-economic-cost-the-pacific-cannot-afford).

<sup>27</sup> World Bank. 2012. *Toward Gender Equality in the East Asia and the Pacific: A Companion to the World Development Report*. Washington, DC.



10. The aim of this project is to mainstream gender equity/equality throughout project activities. To monitor potential benefits to women, indicators will be developed and tracked throughout project implementation as outlined in Table 1 below. Additionally, consultations will be undertaken to ensure the training needs of women are understood.

**Table 1: Gender Action Plan Framework**

|  | <b>Related Actions/Activities</b>   | <b>Measurable Outputs/Key Performance Indicator (KPI)</b>  | <b>Time Frame</b> | <b>Responsible Agency</b> | <b>Resources</b> | <b>Cost (USD)</b>           |
|--|---|--|-------------------|---------------------------|------------------|-----------------------------|
| <b>To assist PPA to promulgate messages to its members regarding the recognition that access to energy is a human right for men and women.</b> |   |  |                   |                           |                  |                             |
| Mainstream gender equity/equality throughout project activities  | Ensure PPA provides relevant website links on this issue on a separate page on its own website  | <ul style="list-style-type: none"> <li>• Number of visitors to webpages that include relevant information on gender in energy sector on the PPA website</li> </ul>   | 2015-2019         | PPA                       | Bank             | Included in cost of project |
| Increase women's representation in decision-making positions in the energy sector at the senior level  | PPA to advocate for affirmative action that encourages women in decision-making roles in the energy sector  | <ul style="list-style-type: none"> <li>• PPA to request annual data via the Benchmarking Report on the number of women employed within senior positions within utilities commencing 2016</li> </ul>  | 2015-2019         | PPA                       | Bank             | Included in cost of project |
| Encourage enhanced training of women within utilities  | PPA to encourage specific training for women working in utilities   | <ul style="list-style-type: none"> <li>• No. of Participants trained disaggregated by gender and/ or community group (e.g. community level women's group, community leaders, youth e.t.c)</li> <li>• Measured annually commencing 2015</li> </ul>                | 2015-2019         | PPA                       | Bank             | Included in cost of project |
| Encourage a gender-responsive operating environment to enable energy and gender-equity objectives  | PPA to advocate for its members to conduct gender mainstreaming training for all levels of staff and for utilities to train electricity consumers | <ul style="list-style-type: none"> <li>• PPA to survey utilities annually on number of staff trained in gender mainstreaming commencing 2016</li> <li>• Number of utilities that provided awareness campaigns to their consumers on gender and energy</li> </ul> | 2015-2019         | PPA                       | Bank             | Included in cost of project |

|   | <b>Related Actions/Activities</b>  | <b>Measurable Outputs/Key Performance Indicator (KPI)</b>  | <b>Time Frame</b> | <b>Responsible Agency</b> | <b>Resources</b> | <b>Cost (USD)</b>           |
|---|--|--|-------------------|---------------------------|------------------|-----------------------------|
| Encourage gender equality and equity in the energy sector | PPA to join universities career fair events to encourage more women to major engineering or energy related majors and provide internships within the energy sector | <ul style="list-style-type: none"> <li>• Number of university career fairs that PPA participated</li> <li>• Number of women and men that joined the internship in the energy sector work.</li> </ul> | 2015-2019         | PPA                       | Bank             | Included in cost of project |

## ANNEX 6: SCALING UP RENEWABLE ENERGY PROGRAM (SREP)

| Indicator   | Baseline   | Target   |
|---|--|--|
| <b>Project Development Objective</b>  |  |  |
| Increased public information on RE resources and variability  | Limited public data  | Increased availability of data on RE resources and its variability in targeted project areas on PPA website. |
| Increased available planning tools and training to both PPA and utilities in the use of these tools         | Limited available planning tools   | Availability of planning tools (grid stability software and benchmarking tool) to PPA members                |
| Improved technical and institutional capacity of PPA and power utilities                                    | Limited capacity building activities   | 100% of capacity building plan completed   |
| <b>Intermediate Results Indicators</b>  |  |  |
| Resource mapping assessment of solar and/or wind capacity across all across 10 PICs completed and available | 0  | All 10 PICs completed and available online   |
| Training courses/workshops provided   | 0  | 6  |
| Planning tool available   | 0  | Planning tool software available online  |
| Reports on industry guidelines and competency standards available through PPA                               | 4 guidelines currently available (Off Grid Power Systems-Design; Off Grid Power systems-Install; Grid connect PV Systems-Design; Grid connect PV systems-Installation) | 8 additional guidelines/standards available  |

### ***Project Description***

1. The objective of the proposed SREP-funded Sustainable Energy Industry Development Project is to increase data availability and capacity in Pacific Island power utilities to enhance their readiness to accelerate the adoption of renewable energy sources of power generation and manage renewable energy technologies. Given the importance and potential for RE in PICs it is important for utilities to learn about integration of RE in their power systems and be able to critically assess the merits of proposed RE projects and the impact on existing grids. This project aims to: (i) increase the information publically available on renewable energy resources and its variability, (ii) increase available planning tools and people who know how to use these, and (iii) improve institutional and technical capacity within PPA and utilities for planning and

management for successful integration and long-term management of power systems with higher levels of renewables once renewable projects become operational.

2. The project is comprised of three primary components, designed to manage knowledge and build capacity related to the deployment of renewable energy technologies in PICs. These components are: (1) Renewable Energy Resource Mapping Phase 1 (US\$0.7 million, without SREP funding support), (2) Technical Assistance (US\$2.2 million, of which US\$1.6 million from SREP), and Project Management Support (US\$0.72 million, of which US\$0.32 million from SREP). See Annex 2 for a detailed description of all project components.

3. ***Barriers/issues to be addressed.*** The proposed project will help address a number of important barriers to renewable energy integration and management in PICs. The project will help PICs build capacity in order to scale-up deployment of renewables in their power systems. Through better understanding of the integration of RE into systems, utilities will be able to better critically assess the merits of proposed projects and the impact on existing grids. This project will assist PICs in having the independent data, knowledge and tools to subject proposals for intermittent generation to proper scrutiny. The project will also contribute to more publicly available information about RE resources available and benchmarking tools that will also assist private investors in their decision-making processes and lead to potential increased investment in RE power systems which will lead to increased MW from renewables, as well as increased energy (in GWh) in the selected islands.

4. ***Transformation.*** The proposed SREP-funded project will help Pacific Island power utilities increase their capacity to better exploit the potential benefits of renewable energy technologies in a sustainable manner. The project will also support indirectly, inter-alia, the implementation of a broader set of SREP-funded activities in Solomon Islands and Vanuatu.

#### ***Assessment of the Proposed Program with SREP Investment Criteria***

5. ***Increased installed capacity from renewable energy sources.*** The project will help PPA's member utilities in PICs build capacity in order to scale-up deployment of renewables in their power systems. Through better understanding of the integration of RE into systems, utilities will be able to better critically assess the merits of proposed projects and the impact on existing grids. In capital constrained economies, and in a highly capital intensive industry such as energy, investment decisions and their performance need to be very carefully scrutinized – in particular those which are financed using concessional finance. This project should assist PICs in having the independent data, knowledge and tools to subject proposals for intermittent generation to proper scrutiny. The project will also contribute to more publicly available information about RE resources available and benchmarking tools that will also assist private investors in their decision-making processes and lead to potential increased investment in RE power systems which will lead to increased MW from renewables, as well as increased energy (in GWh) in the selected islands.

6. ***Increased access to energy through renewable energy sources.*** The rate of access to electricity in SIDS of the Pacific is low by international standards, being equivalent to access

rates in sub-Saharan Africa and slightly below the average for low income countries. Overall the region has relatively low access rates to electricity (about 48.9 percent of households in PICs have access to electricity ), although this average is highly skewed by very low rates in Papua New Guinea (13%), Solomon Islands (19 percent) and Vanuatu (24 percent). Energy poverty in the region is concentrated in these three countries which account for 84 percent of the population of all 14 independent SIDS in the Pacific, and have very low levels of access to electricity. The electrification rate in all three countries is lower than that of other countries with similar levels of GDP per capita.

7. Potential increases in RE investment as a result of this program will likely lead to increased rates of energy access as well as improved reliability and quality of power in the power systems of selected islands. This results from increased penetration of renewables in power systems currently running on diesel.

8. ***Low Emission Development.*** The project will support capacity building within PIC utilities of the integration and management of RE technologies for electricity generation and will assist to mainstream RE technologies into the overall energy system, replacing fossil fuel technologies and helping Pacific Island countries' efforts to achieve a low carbon development pathway.

9. ***Affordability and competitiveness of renewable sources.*** The project will help address cost barriers for the adoption of RE technologies (eg, connection costs for rural consumers, higher capital costs of RE technologies, risk-adjusted rates of return sought by investors) by making available free training in RE technologies for utility staff as well as assistance with the development of grid stability studies for RE integration. This will enable preliminary studies into RE integration as well as the building of capacity within utilities to critically assess the merits of proposed projects and the impact on existing grids. This will likely lead to more accurate forecasts of energy output from these installations, and more accurate estimates of economic and financial returns on the investment.

10. ***Productive use of energy.*** Integration of RE technologies provides extensive opportunities for productive energy use. In some cases, RE projects provide better reliability and security of supply, especially if they are able to be grid-connected, as well as access. There are significant spillovers from improved quality and reliability of power in PICs including improved social outcomes and potential for greater economic output based on industries which rely on reliable power.

11. ***Economic, social and environmental development impact.*** The project will lead to economic, social, and environmental benefits in PICs. The training for utility staff will include aspects of energy efficiency in system planning as well as gender mainstreaming aspects. The project will provide experience and lessons in scaling up renewable energy, promote sharing of lessons at the national, regional and international levels and increase public awareness of the opportunities for renewable energy.

12. ***Economic and financial viability.*** RE technologies can often be the most economically and financially viable options for electrifying many areas of PICs, because of geography, topography, population distribution, and the location of existing grids. Assisting PICs with the

integration of RE technologies within their systems therefore has huge potential to enhance the overall economic and financial viability of many utility operations, particularly where there is currently dependence on diesel power sources which are subject to large price variations.

13. The SREP-funded component of this project will also contribute to the economic and financial viability of the project by assisting with the training of utility staff in a range of RE technologies and key competencies as well as building capacity within the PPA to assist PICs with ongoing issues regarding the use of the resource mapping tool developed through ESMAP funding.

14. ***Leveraging of additional resources.*** The SREP funding provided for this project has leveraged additional financing from other sources including Small Island Developing States Initiative (SIDS DOCK), Global Partnership on Social Accountability (GPSA) and potentially additional World Bank Disaster Risk Management funding. Together these funds have created a comprehensive regional program of activities to support RE integration in PICs and necessary capacity building to support this. The activities within this project and the capacity that is built within utilities and the increased data that will become publicly available through the project has enormous potential to leverage further financing from other sources (e.g., private, MDB, government, development partners and further SIDS DOCK financing for Phase 2 of the resource mapping project).

15. ***Gender.*** The proposed SREP-funded project has been designed to mainstream gender equity/equality throughout project activities. To monitor potential benefits to women, indicators will be developed and tracked throughout project implementation. Additionally, consultations will be undertaken to ensure the training needs of women are understood. At a broader level, the increased knowledge of gender considerations within utilities will have great benefits for women. Furthermore, increased RE technology adoption has ample benefits for women including encouraging greater economic participation by women in the community. See Annex 5 for further information about the gender action plan for this project.

16. ***Co-benefits of renewable energy scale up.*** This project will support data availability and training to support RE investments. Such investments in RE could simultaneously address local air pollution reductions while reducing greenhouse gas emissions, contributing to climate resilience, and enhancing energy security. Reductions in dependence on diesel fuelled energy systems could have a positive impact on foreign exchange savings from reduced oil imports, enhanced reliability and quality of power, enhanced institutional capacity of selected utilities, reduced electricity prices, and health benefits from avoided local pollution.

### ***Stakeholder engagement***

17. This project will engage with all power sector utilities in PICs who will benefit from demand-driven training in RE integration, grid stability modelling software, online resource mapping tool, online benchmarking tool, the development of competency standards and guidelines for the sector and increased capacity within PPA to provide advice as required. The PPA, as implementing agency, will use its existing stakeholder engagement mechanisms to engage with utilities on their training needs and operations.

### ***Implementation Arrangements***

18. The project will be implemented by the Pacific Power Association (PPA), with PPA's Executive Director serving as the project manager. The project will fund a full-time Project Implementation Officer to support the project manager on day-to-day implementation, monitoring and reporting of project activities, including the completion of the project's financial management (FM) requirements; coordination with relevant national government institutions and development partners; procurement of goods and consultancies under the guidance of the Bids Administrator (BA) and the Finance and Contracts Manager (FCM); and monitoring and reporting on results achieved by activities financed under the project. A part-time procurement advisor will be hired to assist with procurement activities throughout project implementation. A full-time engineering advisor will also be hired to assist the project manager with the technical aspects of the project, namely the online benchmarking tool and support to PICs for both this and the grid stability software. All project staff will be jointly located within the PPA's office in Suva.

19. ***Monitoring and Evaluation.*** Overall monitoring and evaluation of project activities will be PPA's responsibility. A monitoring and evaluation (M&E) system will be established by PPA, in cooperation with the World Bank, for the purpose of tracking and reporting on progress in reaching SREP impacts and outcomes. PPA will follow the normal World Bank monitoring processes.