

REG (49450-028): Preparing Floating Solar Plus Projects under the Pacific Renewable Energy Investment Facility

TERMS OF REFERENCE FOR CONSULTING FIRM

A. Background and Rationale

1. Overcoming economic, energy and food insecurity, is an increasingly complex challenge, particularly for those living in remote low-lying small island developing states, such as Pacific island countries (PICs). PICs rely heavily on imported fossil fuels for energy and transport, and on imported food given their extreme land and natural resource constraints. Climate change and extreme geophysical and meteorological events pose additional threats to these fragile economies and worsen existing development challenges such as deterioration of infrastructure, water shortages, rise in communicable diseases, population pressures on limited resources, and fuel and food supply disruptions. But these small island states are large ocean states and have critical freshwater resources that need to be conserved and protected.

2. To enable sustainable, resilient, and low-carbon development in the region, infrastructure investments must shift to regional and cross-sectoral approaches beyond business as usual, using available indigenous resources, advanced technologies, new business models and innovative designs. Consistent with ADB Strategy 2030, investments in the power sector need to incorporate other sustainable value-added end-uses beyond electricity to deliver multiple benefits that address critical vulnerabilities of countries such as the PIC-11.¹ These applications include solar-powered water supply (desalination and rainwater collection, pumping and storage from solar plants) and sanitation, greenhouses, agriculture/vertical farming, aquaculture, alternative fuels, solar charging stations, clean electricity mobility, and other value-added outputs.

3. The emerging floating photovoltaic (FPV) technology is well-placed to tap their enormous water surface and solar resource potential. FPV addresses their unique challenges and vulnerabilities while limiting climate impacts.² Though FPV requires stricter standards than land-based PV given its exposure to water, it has added advantages in that it (i) frees up land for other use and saves on land acquisition and preparation costs; (ii) allows higher yields due to the cooling effect of water; (iii) conserves water through reduced evaporation; (iv) has readily available water for module cleaning; (v) is quick to install; and, (vi) addresses energy-water-food-climate nexus. The cost for the floating, anchoring and mooring system is offset by both the reduced land acquisition and preparation costs and the higher energy yield. FPV includes PV panels built on stilts above water.

4. While PICs are most vulnerable and least responsible for climate change, these countries have set ambitious mitigation targets. Kiribati aims to increase renewable energy penetration from 9% to 36% in its capital South Tarawa by 2025. Tonga envisions 50% renewable by 2020 and 70% by 2030, while Tuvalu aims for 100% (from 32%) renewable in its capital Funafuti by 2025.³

¹ The 11 countries are the Cook Islands, the Federated States of Micronesia, Kiribati, Nauru, Palau, the Marshall Islands, Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu. Small refers to population.

² As of June 2020, close to 500 FPV projects totaling 1.8 GW have been installed compared to over 505 GW global PV installed capacity. Nearshore marine FPV technology is nascent but large plants are being constructed in 2020 including 180 MW in Taiwan, 5 MW in Singapore and 4 MW in Seychelles. Austria, France, Japan, Netherlands, Norway, People's Republic of China, USA, Singapore, and Switzerland are among the leaders in FPV technology.

³ For Kiribati, over 50% (~56,000) of the population lives on the main island of the Tarawa atoll with only 16 square kilometers (km²) of land and 500 km² of lagoons. Over 50% (~6,000) Tuvaluans live in Fongafale on the Funafuti

B. The Technical Assistance

5. The TA has three components: **Component 1**: Assessment of theoretical and technical floating solar potential in the Pacific region, development of the floating solar roadmap and project pipeline for the 11 smaller Pacific Island Countries (PIC-11), **Component 2**: Analyses of tariff structures and recommendations for business models and conduct of all required due diligence including assistance to procurement and pre-implementation works to prepare floating solar projects in Kiribati, Tonga and Tuvalu, and conduct pre-feasibility studies for the next three ensuing FPV priority projects in the roadmap; **Component 3**: Institutional capacity building for all stakeholders, including support for private sector investments.

C. Objective

6. The proposed regional Transaction Technical Assistance (TA) facility (F-TRTA) aims to assist the PIC-11 achieve ambitious renewable energy targets, reduce reliance on diesel, reduce power generation costs and put downward pressure on tariffs, avoid greenhouse gas emissions, and build institutional capability. The F-TRTA supports the objectives, outcomes and priorities of the Pacific Renewable Energy Investment Facility and will follow its programmatic approach and streamlined processing procedures.⁴ The TA underpins ADB's Strategy 2030 and Pacific Approach. To this end, the TA will support the development of the emerging solar energy application known as floating solar photovoltaic (FPV) technology in the Pacific region starting with the PIC-11.⁵ The TA and the ensuing projects aims to use innovative approaches in project design and implementation and will address cross-sectoral challenges through incorporation of value-added end-uses and applications.

D. Scope of work

7. The proposed TA will assess the potential and feasibility of FPV and develop a roadmap and pipeline of priority FPV projects in the PIC-11 to address unique vulnerabilities and needs, considering energy sector plans and strategies, current and planned interventions and utility reforms, and including demand-side management and efficiency measures as well as value-added end-uses beyond electricity.⁶ The TA will conduct feasibility studies and all required due diligence to prepare FPV projects in Kiribati, Tonga and Tuvalu for approval within 2022-2023

atoll, with only 2.8 km² of land and 252 km² of lagoons. Both islands are less than three meters above sea level and less than 500 meters wide. The current installed PV capacity in Funafuti is 735 kW compared to 1800 kW of diesel (16% penetration). For South Tarawa, installed PV is 1.5 MW compared to 5.5 MW diesel (9% penetration). Funafuti needs 7.6 MW PV and 14 MWh of BESS while South Tarawa needs 25 MW PV and 32 MWh of BESS to reach their target of 100% renewable energy penetration by 2025 and 2030, respectively. Tonga aims to achieve 70% renewable energy penetration by 2030, needing around 30 MW more PV. Tonga is open to private sector investments in renewable energy, particularly in the main island of Tongatapu where 75% of the population lives. Tongatapu has 260 km² of land and several bays and large lagoons.

⁴ ADB. 2017. [Report and Recommendation of the President to the Board of Directors: Pacific Renewable Energy Investment Facility](#). Manila.

⁵ The priority country selection is based on the project pipeline and readiness, indicative financing/cofinancing, country and utility interest, and likelihood of timely implementation. The three countries identified the project sites, which represent a suitable variety of water characteristics for various configurations. This enables easy replication based on similarity with other PICs. The utilities have experience in land-based and rooftop PV and have policies and targets to reach up to 100% renewable energy grid penetration and have ongoing ADB-funded ground-mounted/rooftop PV and BESS projects. These ADB projects enable the grids to absorb the additional PV generation.

⁶ These include solar-powered water supply (desalination and rainwater collection, pumping and storage from solar plants), greenhouses, aquaculture, alternative fuels, solar charging stations, clean electricity mobility and other technologies identified in other related ADB TAs (such as regional Knowledge and Support TA on Marine Aquaculture, Renewable Energy, and Ecotourism for Ecosystem Services).

under the Pacific Renewable Energy Investment Facility (facility).⁷ The TA will also conduct pre-feasibility studies for the next three FPV projects for potential ADB and private sector financing.⁸ The TA will deliver three well-prepared projects for approval of cofinanciers and ADB. The TA will build on the experience from ADB-funded PV and BESS projects: [Tonga Renewable Energy Project](#),⁹ [Tuvalu Increasing Access to Renewable Energy Project](#)¹⁰ and the proposed [Kiribati South Tarawa Renewable Energy Project](#),¹¹ all under the Pacific Renewable Energy Investment Facility

8. The TA will conduct assessments and confirm the site, scope, design and configuration and prepare the following gender-sensitive, efficient and climate-resilient FPV projects under the facility that incorporate cost-effective value-added benefits. The TA will promote the use of innovative procurement and contracting approaches such as joint regional procurement of design-build-operate contracts for the public-sector funded projects.

9. **Project 1.** The proposed Kiribati South Tarawa Renewable Energy Project (Phase 2), for approval in 2022, will indicatively install 5 MW of FPV (and ground-mounted PV, as appropriate), a 2 MWh battery energy storage system (BESS), as needed, and associated grid infrastructure, subject to due diligence and available financing. The government seeks \$12 million from ADB's Asian Development Fund and cofinancing from the Australian Infrastructure Financing Facility for the Pacific (AIFFP). Depending on the available financing, potentially an additional 3 MW ground-mounted PV as extension to the Phase 1 project will be included in the scope.

10. **Project 2.** The proposed Tonga Floating Solar Project will indicatively install 5 MW of FPV and associated grid infrastructure in Tongatapu, close to the Popua Diesel Power Station, through private sector financing including through ADB's guarantee program. The TA will prepare the project and work with ADB's Private Sector Operations Department (PSOD) and the Office of Public-Private Partnership (OPPP) to provide support through advice on project financing and legal structuring and assistance for packaging the project for bidding, evaluating bids, and negotiating deals with project sponsors.

11. **Project 3.** The proposed Tuvalu Increasing Access to Renewable Energy Project (IAREP-Phase 2) aims to install indicatively 1-2 MW of FPV (and rooftop PV, as appropriate), BESS, as needed, and associated grid infrastructure and distribution system upgrade in the capital of Funafuti. The TA will work with the World Bank team recently engaged to study the feasibility of FPV on Fongafale's lagoon. Cofinancing of \$3 million each is being sought from the Global Environment Facility (GEF) and potentially from the AIFFP for this project for consideration in 2022. GEF is installing on the edge of Fongafale's pond a 100-kW PV system built on stilts to benefit from the water's cooling effect. A similar system has been built on a coastal sandy flat in Tuvalu's outer island of Nukufetau. The TA must consider existing studies for project siting and risk assessments, particularly the LIDAR mapping and data, and land reclamation plans for Funafuti under the Tuvalu Coastal Adaptation Project (TCAP) with support from the United Nations Development Programme (UNDP) and the Green Climate Fund (GCF).

⁷ ADB. [Regional: Pacific Renewable Energy Investment Facility \(formerly Pacific Renewable Energy and Energy Efficiency Investment Facility\)](#).

⁸ Indicatively Nauru, Republic of the Marshall Islands (RMI), and Samoa, the Federated States of Micronesia (FSM), or Solomon Islands subject to further assessments.

⁹ ADB. 2019. [Tonga Renewable Energy Project](#). Manila.

¹⁰ ADB. 2019. [Tuvalu Increasing Access to Renewable Energy Project](#). Manila.

¹¹ Proposed [Kiribati South Tarawa Renewable Energy Project](#)

12. **Institutional capacity building support.** The TA will supplement capacity building activities under the facility TAs on technical, governance, safeguards, climate and gender aspects specific to FPV. Up to two regional/international conferences, 2 seminars/workshops per country, and a study visit to a leading FPV country will be conducted, with at least 20-40% women among at least 100 participants in total from solar stakeholders including the executing and implementing agencies. The TA will draw lessons from experience in renewable energy projects funded by the Government of Japan such as in Kiribati, Tonga, Tuvalu and the Cook Islands, among others. The TA will also draw lessons from the following projects and interventions of JICA in the PIC-11 RE and power sector. Japan being one the most advanced FPV countries, having the most FPV plants installed and in operation globally, the TA will encourage Japanese entities participation in capacity building events, including coordination with Japanese FPV technology providers. The TA must also draw significant lessons and recommendations from global FPV practice leaders and technology providers.

13. Current experience in FPV systems show minimal adverse environmental impacts, which are found to be lower than those of a land-based system. Nonetheless, initial environmental examinations will be done to assess potential impacts including on aquatic flora and fauna. The following project sites have been prioritized for assessments, with alternative areas to be identified by the consultant and assessed during the course of the TA: (i) Kiribati: the Bonriki reserve freshwater pond or the lagoon near Bonriki, (ii) Tonga: the lagoon fronting the Popua Diesel Power Station, in Tongatapu island (iii) Tuvalu: the Fongafale lagoon in Funafuti.

14. The scope of work for the TA consulting firm is divided into four main components to deliver the objectives and scope of the TA. The contract is initially for three years, with a possibility of extension and consideration for follow on assignments including preparation of other floating solar plus projects and implementation support for floating solar projects prepared under this TA.

Component 1: PIC-11 floating solar roadmap – assessment of theoretical and technical potential of floating solar projects in the PIC-11, including identification of priority project concepts and pipeline for 5, 10 and 20-year horizons. This task will include, but will not be limited to, the following key activities:

- (i) The consulting firm shall carry out an inception mission to the selected countries. Checklists, questionnaires, documents and information/data requirements and agencies to meet must be developed and provided prior to the missions.
- (ii) Using readily available satellite data and solar resources data and conduct desktop assessments of the theoretical and technical potential for FPV, that can be installed nearshore, on lagoons and on natural or man-made reservoirs of selected PIC-11 main atolls and islands.
- (iii) Identify and describe the lagoons, reservoirs, ponds, and lakes suitable for FPV and include in the feasibility study reports.
- (iv) Identify critical vulnerabilities of the PIC-11 and identify potential sustainable value-added end-uses beyond electricity including solar-powered water supply (desalination and rainwater collection, pumping and storage from solar plants), greenhouses, aquaculture, vertical farming/hydroponics, alternative fuels, solar charging stations, clean electricity mobility, and other value-added outputs.
- (v) Determine and assess the potential for replication within Kiribati, Tonga and Tuvalu and in other PIC-11 countries, particularly the second set of priority countries and include in the feasibility study reports and final report.
- (vi) Prepare a floating solar plus road map for 5-, 10-, 20-year horizons, including value-added outputs and applications, and required grid extensions and network

- strengthening, policy actions and reforms, investment costs required and timing private sector entry (including budgetary and financing arrangements) involved.
- (vii) Assess private sector appetite for investment in FPV, solar powered water supply, alternative fuels and electric mobility in PIC-11 countries.
 - (viii) Identify, prioritize and conceptualize at least three projects, per country for potential financing by ADB, other international development partners and donors, and private sector. Prepare pre-feasibility studies for the next three priority projects for three different countries.

Component 2a: Analyses of tariff structures and recommendations for business models

- (i) Considering existing and ongoing tariff reviews and tariff models, assess the current tariff structure of the power sector in the three selected countries; and the long-term investment demand in the power sector to meet the countries' renewable energy development target and climate commitments. Develop or update existing excel-based tariff models or templates and tariff setting methodology for the electricity utility. Conduct training workshops to relevant stakeholders to enable ongoing review and update of the model.
- (ii) Identify the gap of the tariff structure, run model simulations, and generate recommendations for adjusting tariff and thus enhancing renewable energy development, including but not limited to solar PV and floating solar PV.
- (iii) Propose financing plans and arrangements based upon analyses of market environment, regulatory environment, private sector investment appetite, and evaluate any prospective co-financing and private sector financing opportunities for future projects.
- (iv) Prepare analysis and recommendations for business models, ranging from pure public financing, public-private partnership (PPP), independent power producer (IPP) and other suitable modalities, with several different ownership and operational options while ensuring adequate balancing of risk and benefits. Each proposed business model will clearly state stakeholders' role and responsibilities as well as its risks.
- (v) Propose the optimum modality for procuring and contracting the projects, as well as the Tonga project with private sector participation.
- (vi) Incorporate findings into the relevant sections of ADB's Report and Recommendation of the President (RRP) or Facility Financing Proposals for the three projects, including all the supporting due diligence reports, linked and supplementary documents.
- (vii) For the three countries and project sites, prepare an Environmental Assessment and Resettlement Framework (EARF) as part of the business model to be attached to draft request for proposals
- (viii) Provide input for capacity development in terms of generating a feasible business model with relevant stakeholders of the selected countries.
- (ix) Develop model tender documents and requests for proposals and corresponding recommended procedures for each business model.
- (x) Draft, or enhance as appropriate, power purchase agreements for independent power producers

Component 2b: Design, conduct feasibility studies and all required due diligence and assist in the procurement of the three projects. This task will include, but will not be limited to, the following key activities:

- (i) The consulting firm shall carry out an inception mission to the selected countries. Checklists, questionnaires, documents and information/data requirements and agencies to meet must be developed and provided prior to the missions.
- (ii) Conduct site-specific feasibility studies (including necessary bathymetric, hydrographic, topographical, geotechnical, hydrological, climate hazard studies, wind, wave, meteorological and other surveys) and recommend the optimum technical solution (module, floatation, anchoring, mooring and other FPV system technologies, cabling, electrical, electromechanical, auxiliary and protection, control and monitoring systems) size and configuration, including grid integration and, proposals for battery energy storage systems. The technical, financial, environmental and social safeguards due diligence shall include, but will not be limited to, site, water, grid infrastructure and resource assessments, design criteria, conceptual design, cost estimation, financial and economic analyses, and environmental and social safeguards due diligence following ADB's Safeguard Policy Statement (2009). The site assessment and final project scope and selection must ensure that none of the projects will result in a Category A for environmental impacts. Prepare and submit corresponding Initial Environmental Examination (with Environmental Management Plan) and safeguards due diligence report (DDR) or resettlement plan, as appropriate. The technical due diligence/feasibility studies must provide recommendations on, but not limited to: (a) main sources of information/databases, (b) considerations on meteorological, solar and hydrodynamic data including sea level rise; (c) material, equipment and system gains/losses; (d) electrical and electromechanical design of system (d) system simulations and performances. Conduct a risk assessment of surveying and testing activities associated with the detailed investigations and identify management measures (including for safety, health and communicable diseases including COVID-19) to be implemented and to be included in services contracts for any sub-contracting.
- (iii) Develop the design criteria and conceptual design for the FPV systems, including grid connection, and any relevant support facilities including supervisory, control and data acquisition systems, monitoring stations, grid connection/transmission system, access roads and other required civil works, buildings, substation, foundations, and related facilities.
- (iv) Develop technical specifications and bidding documents, following ADB's Procurement Policy (2017, as amended from time to time), and standard bidding documents for procuring a design-build-operate (DBO) contractor, with a 1-year operation and maintenance (O&M) services and related (O&M) training to local operators. Develop related project administration manuals (PAMs).
- (v) Assist the government executing and implementing agencies, and their Project Management Units (PMUs), and ADB in the procurement including issuing invitation for bids, providing clarifications, evaluating the bids, and during contract discussions up to contract award.
- (vi) Provide input for capacity development in terms of generating a feasible system configuration in the selected countries and in other PIC-11 countries.
- (vii) Prepare the following outputs, reflecting all measures identified in the site assessments and environmental management plan, at a level suitable for feasibility study and bidding documents; and sufficient to enable construction firms to submit detailed bids. The outputs include but are not limited to:
 - a) Project conceptual design drawings, location plans, site plans and technical specifications and drawings

- b) Access roads and perimeter fencing design.
- c) Water supply design. Identify utility access points (water and electricity) during construction and operation.
- d) Construction and installation plan, approach, and methodology.
- (viii) **Cost Estimates.** Prepare Project cost estimates to be broken down in sufficient detail to allow financial and economic evaluation. A cost estimate summary report shall: (i) clearly state the basis/assumptions behind all unit rates; (ii) reference other local costs for similar items of work, unless this can be justified not to be possible; (iii) outline justification for the level of contingency applied; and (iv) detail all other assumptions made in the preparation of the cost estimates.
- (ix) **Financial Due Diligence.** Conduct Financial due diligence in accordance with ADB's requirements¹² including:
 - a) Following ADB's guidelines, conduct a (or update existing) financial management assessment of the executing and implementing agencies, including (a) assessing whether previous financial management assessments have been conducted by ADB or other agencies and, if so, reviewing the results and ascertaining whether these can be used as input, (b) assessing capacity for planning and budgeting, management and financial accounting, reporting, auditing, internal controls, and information systems (c) reviewing proposed disbursement and funds-flow arrangements, and (d) concluding on the financial management risk rating and identifying and confirming measures for addressing identified deficiencies;
 - b) supporting the preparation and agreement of cost estimates and a financing plan, which are based on verifiable data and are sufficient to support project implementation; include life-cycle costs of major equipment with consideration for asset replacement and O&M expenses (spares) within the life of the plants.
 - c) preparing financial projections and conducting financial analyses of the projects and of the executing and implementing agencies, and incremental recurrent costs, to determine financial sustainability, and reviewing proposed cost-recovery and tariff policies (also considering ongoing tariff reviews), including affordability;
 - d) conducting financial evaluations (financial cost-benefit analyses) including sensitivity analyses of each component of the projects that have a cost-recovery objective; and calculate the financial internal rate of return.
 - e) where significant risks are identified to project financial sustainability or viability, proposing relevant financial performance indicators to be incorporated in financial covenants; and
 - f) assessing and reaching agreement on financial reporting, auditing and public disclosure arrangements for each project, and, as appropriate, identifying and agreeing arrangements for receiving financial statements from executing and/or implementing agencies.
- (x) **Economic Due Diligence.** Conduct an economic analysis for the projects in accordance with ADB's requirements¹³, including:
 - a) Assess economic costs and benefits associated with the proposed projects and establish and compare the with-project and without-project scenarios. Calculate the Economic Internal Rate of Return (EIRR) for the project. Identify

¹² ADB. 2014. Financial Management, Cost Estimates, Financial Analysis, and Financial Performance Indicators. *Operations Manual*. OMG2/BP. Manila. Also refer <http://www.adb.org/projects/operations/financial-management-resources>

¹³ ADB *Guidelines of the Economic Analysis of Projects*. Available from <https://www.adb.org/documents/guidelines-economic-analysis-projects>.

- and analyse likely economic uncertainties that could affect each project's viability and undertake risk and sensitivity analysis in accordance with ADB's *Handbook for Integrating Risk Analysis in the Economic Analysis of Projects*.
- b) The economic analysis and economic due diligence of the project shall follow ADB's 2017 "Guidelines for the Economic Analysis of Projects"¹⁴
- (xi) **Environmental Due Diligence.** Undertake an environmental assessment for the project in accordance with ADB's Safeguard Policy Statement 2009 (SPS) including:
- a) Sites selection will ensure minimum adverse environmental impacts to ensure no project is Category A.
 - b) In coordination with the social safeguards, gender and climate specialists, undertake meaningful consultations with key stakeholders, beneficiaries and directly and indirectly affected people and communities as agreed with the IAs and ADB.
 - c) identification and description of physical, biological, climatic, and socio-economic baseline conditions of the sites and project areas.¹⁵
 - d) conduct an audit of the IAs/utilities existing facilities and operations and identification of corrective actions
 - e) undertake the impact assessment and identify the measures required to avoid and/or manage/mitigate adverse impacts and prepare a costed environmental management and monitoring plan (EMP) for the pre-construction (including identification of potential materials sourcing and haulage for the access road), construction and operations stages of the project
 - f) based on items (i) – (iv) prepare the initial environmental examination (IEE) for the projects and ensure that environmental safeguard measures to be implemented for the Projects will comply with both SPS and country safeguard system
 - g) assist the IAs prepare and submit the environmental license applications for the projects (including any reformatting of the IEE necessary to meet EIA reporting requirements under the country safeguard system)
- (xii) **Social Safeguards, Poverty, Social and Gender Due Diligence.** Update existing or conduct social safeguards, poverty, and gender assessments for the project in accordance with ADB's requirements and other co-financiers if applicable, including but not limited to the following:
- a) Review the scope and activities of the proposed projects and conduct due diligence on its potential impacts on land/water surface rights acquisition and/involuntary resettlement. Site selection will minimize physical and economic displacements where possible.
 - b) In coordination with relevant government agencies, conduct stakeholder and community consultation activities with all relevant stakeholders (e.g. affected persons, civil society/non-government organizations (CSO/NGOs), women) including focus group consultations, interviews and surveys to examine socioeconomic characteristics of the project area and expected social and economic benefits and involuntary resettlement impacts of the project. Prepare a report on consultations with local communities as part of the safeguards documents and draft a stakeholder and community consultation plan. Relevant

¹⁴ <https://www.adb.org/sites/default/files/institutional-document/32256/economic-analysis-projects.pdf>

¹⁵ The baseline will be sufficiently detailed and include noise measurements given the largely urban nature of the likely project sites and include information from the social/gender assessment as required. The baseline will be specific to the sites and project areas and not include generic information about Kiribati in general unless specific contextual information is required.

information such as draft safeguards documents will also be disclosed in accordance with the country's laws and ADP SPS and Communication Policy. Minutes of meetings and consultations duly signed or acknowledged by the attendees should be prepared.

- c) Establish the land/water/water surface ownership, use and access rights for all proposed infrastructure under the projects. Formal records of land tenure or written advice from the relevant land authority confirming Government ownership must be obtained where government land is to be used or existing land lease agreement if applicable. A due diligence report must be prepared for foreshore, government land or reclaimed land or existing government lease. In the absence of any written or formal records, alternative agreements or documentation acceptable to the government and ADB will be facilitated between the landowners and the government. The findings will be summarized in the environmental assessment;
- d) If any private land is required to be acquired, restriction on land use or access will take place, assets on government and/or private land will be affected, or an easement created for any land-based infrastructure, a land acquisition and resettlement action plan (LARP) is to be prepared in accordance with the pertinent government laws and ADB Safeguard Policy Statement 2009 (SPS) and co-financiers, if any. The content of the LARP should follow prescribed content and outline of the Resettlement Plan according to ADB SPS¹⁶. However, if safeguards impacts will also take place on government owned or lease land, then the LARP should include the outcome of the due diligence for government lands.
- e) Assess the capacity of the executing and implementing agencies in complying with ADB's safeguards requirements such as implementing gender and social development measures and LARP and recommend capacity building measures. Potential support which could be provided by the project for physically and economically displaced persons will also be explored.
- f) Assist the government to establish and implement the project's grievance redress mechanism during project preparation to avoid any delays associated with safeguards.
- g) Following ADB guidelines, conduct detailed gender analysis (guided by ADB's gender and energy toolkit) and identify gender entry points for the project
- h) Following ADB policy and requirements, assess the gender impact of the project design. Assess gender related issues in the project area and identify ways to make the project beneficial for women and men – including ensuring ongoing work and recommendations on the enabling framework (e.g. draft Energy Act, tariff setting) is gender sensitive. Recommend measures to address gender issues and incorporate them into project design. Carry out gender analysis (guided by ADB's gender and energy toolkit), consult with stakeholders, including women, women's organizations, professional women's networks, on key gender entry points and prepare Gender Action Plans (GAPs). Each project GAP should mirror the project's Design and Monitoring Framework (DMF) outputs and include gender-inclusive design features, gender targets, indicators and baselines, timelines, cost estimates and implementation arrangements.

¹⁶ ADB. 2009. *Safeguard Policy Statement*, Manila. <http://www.adb.org/Documents/Policies/Safeguard-Policy-Statement-June2009.pdf>

- i) Assess potential poverty and social impacts of each project and prepare a Summary Poverty Reduction and Social Strategy (SPRSS) for each project.
- (xiii) Prepare and submit feasibility studies for optimized project scopes to ensure reliable, efficient and climate resilient operation of the grid-connected floating PV and battery storage system, including bill of quantities, cost estimate (including cost of associated infrastructure), financing plan, economic/financial analyses, environmental/social safeguards, financial management assessment, procurement and risk assessment, procurement plan, climate risk and vulnerability assessment including greenhouse gas emission reduction calculations, gender assessment, and feasibility study-level drawings
- (xiv) **Procurement Approach**
 - a) Conduct Strategic Procurement Planning (SPP) for the FPV projects following referencing existing SPPs conducted for PV and BESS or similar projects.
 - b) The public-sector funded projects will be procured using post qualification and single-stage-one-envelope procurement methodology utilizing the ADB Standard Bidding Documents for the Procurement of Plant¹⁷ and will include a one-year operation and maintenance services period. Potential for tendering the public sector funded projects at the same time will be explored such that bidders may bid for one, or both projects, to achieve economies of scale.
 - c) The private sector funded project will also undergo competitive tender
 - d) Update existing or conduct Project Procurement Risk Assessments in accordance with the ADB Guide on Assessing Procurement Risks and Determining Project Procurement Classification (2015).¹⁸ The risk assessments shall take into account all existing available similar exercises conducted under prior ADB and other donor projects. The risk assessment shall include a market analysis to ascertain the level of interest of the supply market to provide the goods and services required under the project. The ADB Guidance Notes (GN) on Strategic Procurement Planning and The Procurement Risk Framework may also be referenced.¹⁹ Procurement of goods and works under the projects will be undertaken in accordance with the ADB Procurement Policy (2017, as amended from time to time).
- (xv) For each project, submit all due diligence reports and draft all linked documents including inputs to the Project Administration Manuals and the Report and Recommendation to the President/Facility Financing Proposal and other documents for financing approval.
- (xvi) Perform other tasks as may be reasonably requested by ADB.

Component 3: Institutional Capacity Building for Stakeholders

- (i) Conduct relevant capacity needs assessment at the national and sub-national level.
- (ii) Design, organize and conduct a capacity building program in the selected countries and within PIC-11 to develop institutional capacity on FPV. Capacity building program could include training, workshops or virtual FPV site visits conducted by leading FPV firms and countries, including from Japan; (b) training on project planning, site and resource assessments, conceptual design, engineering, procurement, construction, and operation and maintenance, including cost estimation, financial and economic analyses, developing technical

¹⁷ <https://www.adb.org/documents/procurement-plant-guide-2016>

¹⁸ <https://www.adb.org/documents/procurement-risks>

¹⁹ All reference documents are available at <https://www.adb.org/business/main>

- specifications, bidding documents and request for proposals, and formulating business models
- (iii) Design and conduct virtual workshops/training and knowledge-sharing events
 - (iv) Design and conduct hands-on technical trainings;
 - (v) Develop training materials and reports including user guides or manuals for floating solar PV system of various configurations.
 - (vi) Convene training and workshops in the international venues and disseminate knowledge products online, including but not limited to the ADB website.
 - (vii) Organize and conduct national training workshops, engaging with key stakeholders including relevant CSOs/NGOs, international NGOs and peak civil society groups in the relevant countries, two international conferences linked with the Pacific Power Association (PPA) and other regional platforms for wider exposure;
 - (viii) Create three country-specific knowledge products and one regional knowledge product on the TA findings and lessons learned and disseminate through international conferences, publications and ADB-supported platforms with government partnerships

15. **Bidding Documents**

- a) The Consultant will conduct investigations²⁰ and prepare bidding documents as follows:
 - (i) **Surveys: geotechnical, topographical, hydrographic, bathymetric, meteorological/climatic.** The consultant (and its subconsultant) will execute all necessary surveys of the FPV sites, including underwater and land surveys, and for any transmission or grid connection alignments. The surveys will include all proposed project infrastructure, temporary land acquired for preparation or staging of the floating structure, and any other areas which may be required for DBO contractors to complete their designs. Proposed scope of works will be presented and cleared by ADB and the IAs prior to advertising. Data will be presented on AutoCAD drawings and presented in an electronic format (.dwg and .pdf) to allow DBO contractors to use in design. Based on findings and recommendations from the feasibility studies, the Consultant will undertake needed investigations/surveys of the proposed sites sufficient to allow DBO contractors to complete bids. The Consultant may subcontract physical site investigation, bathymetry, water quality and seabed/lakebed and earthworks laboratory analysis and other surveys, reflecting the ADB core procurement principles and in accordance ADB Procurement Policy (2017, as amended from time to time). Proposed subcontracted scope of works will be presented and cleared by ADB and the IAs prior to advertising. The Consultant will be responsible for (a) collection of available background geotechnical/hydrographic data, (b) review and interpretation of site investigation and earthworks laboratory report, (c) site inspection and assessment (including slope stability if required) of access roads and FPV/solar plant site, (d) foundation assessment for FPV/solar plant site, (e) identification and assessment of borrow pits, if required, and (f) preparation of geotechnical report to attach to bidding documents, and other inputs into the DBO bidding documents, as required.

²⁰ The cost for bathymetric/hydrographic, topographical, geotechnical and other required surveys will be included in the firm's financial proposal as provisional sums. As needed, the firm will engage suitably qualified contractors using shopping selection procedures following ADB's *Procurement Policy 2017*.

- (ii) Conduct a risk assessment of surveying/testing activities associated with the detailed investigations set out in (i) and (ii) above as well as for the geotechnical and hydrographic investigations and identify management measures (including health and safety) to be implemented and/or to be included in services contracts for any sub-contracting. Confirm if need for an environmental license is triggered by any activity in the investigations. If required, assist IAs in applying for the environmental license.
- (iii) **Conceptual Engineering Design.** The Consultant will complete conceptual engineering design suitable for Section 6 of the ADB Standard Bidding Document, suitable for DBO procurement for the construction. Engineering design will be determined in close coordination with IAS and will include, but not be limited to:
 - (1) quantity calculations (bill of quantities [BOQ]), unit price analysis and cost estimates with supporting data and calculations.
 - (2) proposed site layout and technical design drawings suitable for DBO contracting.
 - (3) solar resource and climate risk and vulnerability assessments.
 - (4) project design (and specifications) including modules, inverters, battery energy storage systems, meteorological stations, grid integration and support infrastructure, SCADA system, etc.
 - (5) grid details including system analysis.
 - (6) interconnection requirements.
 - (7) bathymetric, topographical, geotechnical, hydrological, meteorological, and other surveys/assessments.
 - (8) testing and commissioning requirements.
 - (9) training requirements for IAs staff.
 - (10) site access designs.
 - (11) site preparation requirements, including earthworks, and water and electricity connection/supply during construction.
 - (12) other issues such as power and water supply, aviation glare, fencing (security), and flooding, storm surges, cyclones, tsunamis, and rising sea level etc.

16. **Procurement Support.** The Consultant will facilitate procurement in accordance with ADB Procurement Policy (2017, as amended from time to time). The Consultant will provide support and assistance to the PUB on all aspects of the procurement process including but not limited to the following:

a) Capacity Assessment and Planning

- (i) Update or conduct the procurement capacity assessments of the IAs, and other engaged government entities, and advise on any additional support required to deliver this project. Conduct or update the procurement risk assessments and prepare the procurement risk assessment and management plans for each project
- (ii) Conduct market assessments to determine the interest of the global supply market in serving the project requirements in order to package the project accordingly.
- (iii) Conduct or update existing Strategic Procurement Planning documents and prepare the procurement plans in accordance with respective government regulations and ADB's procurement policies and guidelines.

- (iv) Draft and update bidding documents incorporating ADB's comments prior to issuance

b) Tender stage

- (i) Support the advertisement for the procurement of the DBO and IPP contract(s), as determined during the planning stage;
 - (ii) Interpret and assist in drafting responses to technical comments received from potential bidders and support the preparation of addendums and clarifications.
 - (iii) Co-ordinate and attend site inspections and pre-bid meetings;
 - (iv) If requested, be present at bid opening to assist with the process; and,
 - (v) Support the IAs and assigned evaluation committees, as requested, throughout the evaluation process, including but not limited to:
 - Reviewing and providing comments on the content of technical and financial proposals;
 - Assisting in the preparation of detailed clarification requests, where required;
 - Interpreting responses received for compliance with requested issues and compliance with ADB procedural requirements; and.
 - Providing inputs to draft and final bid evaluation reports.
- d) **Contract Award.** Provide detailed support to IAs in the process of contract discussions, negotiation, finalization, and award of the relevant contract in accordance with EAs/IAs and ADB requirements.

E. Institutional arrangement

17. ADB will be the executing agency working closely with the country executing agencies (EAs) and implementing agencies (IAs). The counterparts are: Kiribati: Ministry of Finance and Economic Development, Ministry of Infrastructure and Sustainable Energy and the Public Utilities Board (PUB); Tonga: Ministry of Finance and National Planning and Tonga Power Limited (TPL); Tuvalu: Ministry of Finance and Tuvalu Electricity Corporation (TEC). Other PIC-11 utilities, particularly the next three priority countries, will also be consulted on the pre-feasibility studies and roadmap development directly and through existing regional platforms such as the Pacific Power Association (PPA), ADB's annual Asia Clean Energy Forum, PARD's Pacific CEOs Talks, the multi-donor Pacific Regional Infrastructure Facility, and the Pacific Islands Leaders Meeting. The TA consultants will support TA administration and coordination, working closely with, assisting, and training the existing solar project management units (PMUs) in PUB, TPL and TEC. The TA consultants will also work closely and coordinate with the country IAs and focal points, and other consulting teams under PREIF TAs, such as F-TRTA 9242,²¹ F-TRTA 9425²² and F-TRTA 9772.²³ Other relevant ministries and government agencies of beneficiary countries will also be consulted. The TA consultants will familiarize themselves with the project design and the approved RRP/FFP and linked documents for the Tonga Renewable Energy Project, the Tuvalu Increasing Access to Renewable Energy Project, and the proposed Kiribati South Tarawa Renewable Energy Project for reference and for updating.

²¹ ADB. 2016. [Regional: Pacific Renewable Energy Investment Facility](#) (formerly Pacific Renewable Energy Investment Program). Manila. (TA 9242-REG)

²² ADB. 2017. [Regional: Capacity Building and Sector Reform for Renewable Energy Investments in the Pacific](#). Manila.

²³ ADB. 2019. [Regional: Preparing the Pacific Renewable Energy Investment Facility \(Phase 2\)](#). Manila. (TA 9772-REG).

18. The country counterparts and their PMUs will provide data, counterpart technical staff, and assist in additional data collection, logistics, meeting arrangements and other arrangements needed to accomplish the tasks. The consultants will work with the existing PMUs of the ADB-funded renewable energy projects in the three countries: Kiribati South Tarawa Renewable Energy Project, Tonga Renewable Energy Project, and the Tuvalu Increasing Access to Renewable Energy Project. The consultants will also work with other PIC-11 utilities and established solar PMUs in the next set of priority projects (indicatively Nauru, Republic of the Marshall Islands (RMI), and Samoa, the Federated States of Micronesia (FSM), or Solomon Islands subject to further assessments).

F. Reporting Requirements

19. The TA consultants will submit the following reports and project documents in English, to ADB and respective EAs/IAs. The country-specific outputs/reports may have differing schedules of delivery (completion), in which case the corresponding payment milestone will be split equally and paid on delivery should there be significant delays in submission for the relevant country report/documents (for Kiribati, Tonga and Tuvalu).

Table 1: Reporting Requirements and Payment Schedule

Report	Deadline [months from Notice to Proceed (NTP)]	Payment Milestone % of Lump sum
1. Inception report	Within 2 month from NTP	10%
2. Inception workshops and Interim report	Within 5 months from NTP	10% (+ prov'l sum)
3. Interim report 2	Within 8 months from NTP	10% (+ prov'l sum)
4. Regional conference proceedings	Within 10 months from NTP	Provisional Sum
5. Interim report 3	Within 12 months from NTP	5%
6. Midterm workshops and Interim report 4	Within 15 months from NTP	5% (+ prov'l sum)
7. Midterm report	Within 18 months from NTP	15%
8. Interim report 5	Within 22 months from NTP	10%
9. Procurement reports	Within 26 months from NTP	15%
10. Final workshops and draft final report	Within 30 months from NTP	10% (+ prov'l sum)
11. International conference proceedings	Within 34 months from NTP	Provisional Sum
12. Final report (completion report)	End of assignment	10%

Note: Provisional sums are for surveys and training events (with prior approval from ADB and paid at cost)

- a) Inception Report: includes implementation schedule, personnel schedule and procurement plan
- b) Interim report 1: includes capacity needs assessment report, site, water, and resource assessment reports for the 3 projects, strategic procurement planning, procurement risk assessments, financial management assessments, procurement capacity assessments, capacity development plan
- c) Interim report 2: with 3 Initial Environmental Examinations and related Environmental Management Plans, Safeguards Due Diligence reports or resettlement plans, tariff structure recommendations, draft roadmap (with draft pre-feasibility reports of next set of three projects)
- d) Interim report 3: Includes project feasibility studies, social, poverty and gender assessments
- e) Interim report 4: training workshops and virtual study tour/s reports; pre-feasibility studies
- f) Midterm report: technical specifications and bidding documents; Project Administration Manuals and all linked documents
- g) Interim report 5: Includes business models and draft requests for proposals; final draft roadmap and pipeline
- h) Procurement reports include bid evaluation reports
- i) Draft final report with final roadmap.
- j) Final report (completion report).

20. At least 1 international conference, at least 6 in-country training and capacity building seminars (at least 2 per country), and technical visits/virtual study tours to an existing FPV

installation will be conducted, plus one regional/international conference/workshop after submission of the draft final report. Other workshops and on-the-job training will be conducted, as necessary. A training report with participant evaluation must be submitted after each event. The consultants will also prepare regular status reports that highlight issues affecting timely completion of the assignment. The Summary of Major Outputs and Activities are in Table 2.

G. Major Outputs and Activities

21. The major outputs and activities are summarized in Table 2. All outputs will be submitted in English to both ADB and the national implementing agencies. All documents and reports will be made available in an electronic format to ADB.

Table 2: Summary of Major Outputs and Activities

Major Activities	Major Outputs	Expected Completion
Component 1: Floating solar roadmap and project pipeline		
- Assessment of floating solar potential	- Inception report	Month 1
- Assessment of economic, infrastructure and climate vulnerabilities and needs	- Needs assessment report	Month 5
- Identify, prioritize and conceptualize priority projects	- List of priority projects;	Month 8
- Draft floating solar roadmap for 5-, 10-, and 20-year horizon	- Draft roadmap	Month 16
- Pre-feasibility studies	- Pre-feasibility studies	Month 18
- Submission and presentation	- Presentation of draft	Month 20
- International conference	- Presentation	Month 24
- Final roadmap	- Final report	3 months before contract completion
Component 2a: Analyze policies and tariff structures and recommend suitable for business models for the three selected countries		
- Assess/analyze current tariff structure and the renewable energy sector environment;	- Tariff and policy assessment report	Month 4
- Prepare an Environmental Assessment and Resettlement Framework (EARF) as part of the business model to be attached to draft request for proposals	- EARF	Month 8
- Recommend appropriate tariff structure and potential solar PV business models in the selected countries	- Business models and draft requests for proposals and power purchase agreements	Month 12
Component 2b: Project Design and assistance to procurement		
- Inception workshop	- Inception report	Month 1
- Site, water, solar resource, load profiles and grid connection assessments	- Site selection and assessment report	Month 3
- Confirm scope, conduct technical, financial, economic, financial management, environment and social safeguards, gender, governance	- Technical due diligence reports; FMAs, PCAs, SPPs/PRA	Month 5
- Safeguards: 3 Initial Environmental Examinations (IEE); and 3 social and social safeguards due diligence reports (DDRs) or resettlement plans (RPs), including	- 3 IEEs and 3 DDRs/RPs, gender assessments, poverty and social assessment,	Month 6

Major Activities	Major Outputs	Expected Completion
land acquisition requirements, as part of the feasibility studies to be attached to the bidding documents	- Design and technical specifications and bidding documents	Month 7
- Prepare feasibility studies and project administration manuals (PAM)	- 3 project feasibility studies PAM and all linked documents	Months 9-12
- Prepare bidding documents for the three projects	- Bidding documents;	Month 11
- Assist in procuring DBO contractor and private sector	- Invitation for bids	Month 12
- Assist in bid/proposal evaluation and assist in contract discussions	- Bid evaluation reports	Month 15
- Component 3: Institutional Capacity Building for Stakeholders	- Recommendation to award	Month 18
- Capacity development needs assessment	-	
- Strategy and action plan for capacity development	- Capacity needs assessment report	Month 2
- Targeted trainings, national workshops, international conferences including technical (virtual) study tours	- Capacity Building Plan	Month 4
	- Training materials and reports and evaluation	Month 4-up to contract completion

Source: Asian Development Bank

H. Qualifications of Experts and Detailed Tasks

22. The assignment is expected to be executed over 36 months requiring 65 person-months of international and 72 person-months of national consultants. A consulting firm will be recruited using the quality- and cost-based selection method (quality: cost weighting of 90:10), using full technical proposals, following ADB's Procurement Policy (2017, as amended from time to time). The consulting team shall work closely with the national executing and implementing agencies and ADB, including relevant Pacific regional and country offices, to perform the tasks efficiently and effectively. Significant field days in the three countries will be required from the team during TA implementation. The consulting firm shall deliver all the required due diligence, tasks outputs and activities and related reporting and documentation. The team shall include, but not be limited to, the following expertise from key and non-key experts. Minimum qualifications and some specific tasks for these experts are outlined below.

Table 3: Summary of Consulting Services Requirement

International Experts Name of Positions	Person months	National Experts Name of Positions	Person Months
Firm		Firm	
Key Experts		Non-key Experts	Indicative
Solar/RE expert/Team leader	11	3 Electrical engineers/National Team Leaders	24
Power systems/instrumentation expert	6	3 Civil engineers	15
Floating PV specialist	5	3 Environmental engineers/ Safeguards experts	15
Civil/Water engineer	5	3 Social safeguards/Gender experts	18
Transaction advisor	3		
Legal and regulatory expert	3		
Procurement/Contracts specialist	5		
Non-key Experts	Indicative		
Battery and grid integration specialist	4		
Climate change specialist	4		
Environment specialist	5		

Gender specialist	3		
Social safeguards specialist	5		
Financial specialist	3		
Economist	3		
Total	65	Total	72

Source: Asian Development Bank

1. International Consultants (65 person-months - indicative)

A. Key Experts

23. **Solar/RE expert/team leader (11 person-months).** The expert shall have a bachelor's degree or higher degree in engineering, with specialization in renewable energy engineering focusing on solar energy, with at least 10 years of team leadership and experience in design, development and implementation of solar PV power plants totaling at least 50MW aggregated capacity and preferably with experience in grid-connected FPV projects. The expert should have previous experience in procurement, engineering, grid integration design of intermittent generation such as solar and hybrid operations with PV and batteries. Previous work experience of ADB financed project, in ADB developing member countries (DMCs), is desirable. The expert will manage the TA consultant team as team leader. The Team Leader will be responsible for the overall administration of the TA assignment. To enable advanced actions on equipment procurement, the expert shall develop the design, prepare technical specifications and drawings, and draft bidding documents and contract in collaboration with the procurement experts and other technical experts. The expert shall closely cooperate with ADB and the national IAs and PMUs during the TA implementation and especially the procurement process. The expert's task will include following:

- (i) Work closely with and coordinate with all IAs and PMUs to ensure effective and efficient TA implementation
- (ii) Lead or lead the supervision of the site, water/underwater, solar resource, meteorological and grid infrastructure assessments
- (iii) Lead the assessment of critical vulnerabilities of PIC-11 and the formulation of the floating solar roadmap and the priority pipeline of projects
- (iv) Develop and produce the technical specifications and required drawings of the FPV system, and necessary implementation arrangement for power evacuation, including battery storage systems, as appropriate, and support facilities.
- (v) Conduct capacity building needs assessment for solar technologies, which may include technology, site selection criteria, due diligence process, operation and maintenance, design, implementation, and management.
- (vi) Develop training programs, training materials, reports, and evaluation including relevant manuals. Work with contractors to enhance their operation and maintenance manuals.
- (vii) Work closely with the procurement expert, technical experts as well as the transaction advisor and the legal and regulatory expert in preparing tender documents. Ensure bidding documents technical specifications are adequate and attractive to bidders, and to project sponsors in the case of the Tonga project.
- (viii) Prepare the inputs for bid documents particularly for the technical specifications such as, desired output and related parameters, performance warranties etc.
- (ix) Prepare terms of reference and checklists for technical and financial bid evaluation in accordance with ADB's Guide to Bid Evaluation.
- (x) Lead preparation of relevant reports and outputs under the TA, particularly the feasibility studies and project administration manuals and linked documents.

- (xi) Provide expert inputs to the capacity development plan and act as resource person/trainer/facilitator in the capacity development activities.
- (xii) Any other related activity as may be reasonably requested by ADB.

24. **Power systems/instrumentation expert (6 person-months).** The expert shall have a bachelor's degree or higher degree in electrical engineering or similar fields and at least 8 years of relevant experience in power systems planning, engineering and design, operation, and management of power plants, especially grid-connected solar photovoltaic projects and related transmission and support systems. The expert shall have at least one large-scale grid-connected PV experience and experience in FPV is highly desirable. Previous experience in ADB DMCs, particularly in the Pacific, is desirable.

- (i) Act as Deputy Team leader and assist the Team leader in the performance of tasks and supervision of the TA team. Coordinate closely with the national team leaders.
- (ii) Coordinate with other team members and help team leader to develop a detailed work plan and implementation schedule.
- (iii) Work closely with the team leader in conducting grid integration studies
- (iv) Work closely with other experts in identifying value-added applications, benefits and uses apart from electricity to support and enhance the floating solar PV projects as well as future priority projects in the pipeline and the roadmap.
- (v) For the selected grids, conduct network planning as well as modeling and simulation of existing and planned renewable energy projects, particularly floating solar PV, and required grid strengthening and network investments as inputs to the roadmap and priority project pipeline
- (vi) Work closely with the team leader, international procurement expert and technical experts as well as the transaction advisor and legal and regulatory expert in preparing the bidding documents especially the technical specifications.
- (vii) Work closely with the Battery and Integration expert to supervise and monitor the project implementation with electrical/control and instrumentation related equipment.
- (viii) Ensure adherence to project safety plan and quality assurance plan.
- (ix) According to area of expertise, provide inputs to the capacity development plan and act as resource person/trainer/facilitator in the capacity development activities
- (x) Any other related activity as may be reasonably requested by ADB.

25. **Floating PV specialist (5 person-months).** The expert will have a bachelor's degree or higher degree in electrical engineering or similar fields and at least 8 years of experience in designing, implementing, commissioning, operating and maintaining solar PV and battery storage systems for power utilities and related transmission and support systems. The expert must have familiarity with floating PV technologies, configurations and designs and must have relevant experience in the assessments, conducting feasibility studies and designing and implementing grid-connected floating PV projects of at least 100kW. The expert must work closely with the team leader and other technical experts in the design, technical due diligence and specifications for the FPV projects and to identify suitable project concepts and configurations for the roadmap, and in preparing the conceptual design of the next three FPV projects. Previous experience in ADB DMCs, particularly in the Pacific, is desirable.

26. **Civil/water Engineer (5 person-months).** The expert will have a bachelor's degree or higher degree in civil, structural, water, environmental engineering and at least 5 years of experience in design, construction, supervision, operation and maintenance of renewable energy projects for power utilities, especially grid-connected solar photovoltaic projects and related transmission and support systems. The expert shall have at least one grid-connected PV experience and experience in FPV is highly desirable. The Expert shall conduct due diligence on

required civil works and provide inputs to the feasibility studies, technical specifications and bidding documents. The expert shall work with the team leader, FPV specialist, and climate change and environmental experts as well as national experts in the physical site assessments and surveys (topographical, geotechnical, bathymetric/hydrographic and others). Previous experience in ADB DMCs, particularly in the Pacific, is desirable.

27. **Transaction advisor (3 person-months)**. The expert shall have at least Master's degree or higher in finance, law or related fields and will have a recognized professional qualification. The expert should have at least 10 years' experience which will include drafting of model transaction and legal documents for public-private partnerships and independent power producers, including but not limited to request for proposals, power purchase agreements, risk allocation. The expert should preferably have relevant professional experience in transaction advisory services in tendering renewable energy projects, preferably solar projects, to the private sector, particularly with a demonstrable track record of successfully structuring and executing project tenders through private sector participation. The expert will work closely with the Legal, Procurement and the Financial specialist and Economist for defining an optimized way of structuring the floating PV projects in the selected countries. The expert is expected to have advanced degree in finance or law. Experience in developing countries, particularly in the Pacific region, is desirable.

- (i) The expert will develop various business models to improve bankability of floating solar PV project and enhance private sector participation.
- (ii) The expert will advise with the objective of optimal allocation of responsibilities and risks between the private sector and the public utility. The expert should have experience in identifying and allocating project risk and role and responsibilities of the stakeholders.
- (iii) The expert will work closely with the team leader and legal, finance, economics and procurement expert on structuring potential business models considering policy, tariff and market environment of selected countries. Provide advice, recommendations and guidance to the EAs.
- (iv) Working closely with the legal/regulatory expert, structure and provide inputs to the tender documents, power purchase agreements and other transaction documents.
- (v) Provide other risk and financial advice as may be required.
- (vi) Provide inputs to the concepts, approach, and timeline of investments in the roadmap and priority project pipeline for financing by ADB, development partners, public-private partnership and private sector
- (vii) According to the area of expertise, provide inputs to the capacity development plan and act as resource person/trainer/facilitator in the capacity development program
- (viii) Working with relevant experts, prepare a financial model (with outputs that include profit and loss, cash-flow and balance sheet statements) and detailed financial analysis establishing the financial viability of the Project;
- (ix) Propose a reasonable minimum level of user tariffs to be levied that will attract private sector and at the same time be acceptable socially (i.e., taking into consideration 'willingness to pay' issue) and be palatable politically (i.e., appropriate level of government contribution, if required);
- (x) Assist in preparation of bidding documentation including Request for Qualification (RFQ), market teaser for potential bidders, pre-qualification documents, and bid documents.
- (xi) Carry out financial and technical evaluation of bids to rank bidders in terms of most value for money or lowest tariff;
- (xii) assist in negotiating power purchase agreement terms with the selected preferred bidder to reach successful award of bid.

- (xiii) Provide additional assistance between the award of bid and financial close with the private sector, if required

28. **Legal and regulatory expert (3 person-months).** The expert will have a degree in law and will have a recognized professional qualification. The expert should have at least 10 years' experience which will include drafting and review of national energy legislation and design of energy regulatory frameworks. Among others, the expert shall work with the team especially the Transaction advisor in structuring contracts and agreements and shall support the formulation of the roadmap on the required frameworks for private sector participation in the energy sector of beneficiary countries. Experience in developing countries, particularly in the Pacific region, is desirable. The expert will, among others,

- (i) assess whether relevant legal frameworks, policies, regulatory, taxation and market conditions are conducive to private sector projects in the renewable energy sector and will identify relevant gaps and how it can be addressed
- (ii) undertake due diligence of relevant legal and contractual issues associated with private sector participation in the project and advise from a legal perspective on the risk allocation in the proposed contractual arrangements. The legal expert will:
- (iii) Identify legal issues, including statutory, institutional, regulatory and other issues, associated with introducing private sector participation in the Project(s), and confirm the legal basis for the transaction, including rights to operate and maintain the system, develop and collect revenues/tariffs/user charge;
- (iv) Drafting of the power purchase agreement or other contractual arrangement between the private sector investor and the utility;
- (v) Review legal, regulatory, taxation and accounting issues in the context of foreign investment in the PIC;
- (vi) Carry out all legal work required for the implementation of the tender process for the proposed project;
- (vii) Extend support to the utility and government during the review of legal analysis, pre-qualification stage and bidding process

29. **Procurement/Contracts specialist (5 person-months).** The expert shall have a bachelor's degree or higher degree in engineering or related fields, with minimum 8 years of relevant experience in procurement in accordance with ADB procurement guidelines or similar, preparation of bidding documents and contract documentation or supervision of the execution of works. Previous experience in ADB DMCs and ADB funded projects is desirable. Demonstrated experience working with FIDIC contracts, particularly the Gold, Silver, and Yellow books is highly desirable. Experience in managing stringent material/equipment standard for FPV is desirable. The international expert will guide the national expert.

- (i) The expert will work closely with the team leader and technical experts and collect information on unit costs of materials, machinery and equipment, cost of civil works and metal works, transportation, labor cost. etc., based on recent similar projects in the Pacific.
- (ii) Based on the inputs from other technical team members, recommend the most appropriate procurement approaches. Propose the most appropriate contract packages, as agreed with the EAs and ADB, following ADB's Procurement Policy (2017, as amended from time to time).
- (iii) Prepare bidding documents working closely with the team leader and with assistance from relevant experts following ADB's Procurement Policy (2017, as amended from time to time) and latest standard bidding documents and user's guide.

- (iv) Assist the IAs, PMUs and ADB in tendering including during the technical and financial evaluation of bids and assist in preparation of bid evaluation reports.
- (v) Working with the transaction advisor, financial and economic experts, develop tender documents and requests for proposals for private sector investments in floating solar PV. Assess various arrangements and develop model tender documents for future FPV projects, including through public-private partnership and similar arrangements.
- (vi) Conduct or update existing procurement capacity assessment of the national EAs and IAs.
- (vii) Provide input to the capacity development plan and assist in the conduct of training workshops as required.

B. Non-Key Experts (indicative person-months inputs)

30. **Battery and grid integration specialist (4 person-months).** The expert will have a degree in electrical engineering and at least 5 years of experience in designing, implementing, commissioning, operating and maintaining battery storage systems for power utilities. The expert shall have a bachelor's degree or higher degree in electrical engineering or similar fields and at least 8 years of relevant experience in engineering and design, operation, and management of power plants, especially grid-connected solar photovoltaic and battery system projects and related transmission and support systems. The expert shall have at least one large-scale grid-connected PV experience and experience in FPV is highly desirable. Previous experience in ADB DMCs, particularly in the Pacific, is desirable.

31. **Climate change specialist (4 person-months).** The expert is expected to have a graduate degree in related fields, and at least 7 years of relevant working experience in climate change modelling, hydrological modelling, and in climate change risk assessment in energy projects, or a combination of undergraduate degree and directly relevant professional experience. The consultant with previous experience in developing countries in the Pacific region is desirable. The consultant will prepare the climate change impact, risk, vulnerability and adaptation assessment reports for the project following ADB guidelines for climate proofing investment in the energy sector; provide inputs to due diligence documents and bidding documents to incorporate recommended climate proofing and climate resilience elements; provide inputs to climate change mitigation and emissions reductions calculations and projections and other relevant inputs to meet the overall project objectives. Previous experience in ADB DMCs, particularly in the Pacific, is desirable.

32. **Environment specialist (5 person-months).** The expert shall have a bachelor's degree or higher degree in environmental sciences or similar. The expert should preferably have relevant professional experience of 8 years or more with significant experience for preparing environmental impact assessment for energy projects. Familiarity with the implementation of selected countries' environmental protection law is desirable. Previous experience in environmental impact assessment is required and experience with water environments is preferred. The expert will be responsible for conducting environmental safeguard due diligence in accordance with ADB's Safeguard Policy Statement (2009). The international expert will guide the national experts and the PMU.

- (i) For each project, prepare an Initial Environment Examination (IEE) report presenting the environmental impacts, taking into account aquatic or ecological aspects, and mitigation measures of the proposed projects. Recommend environmental

- management and monitoring plans (EMPs) to address identified/potential environmental impacts.
- (ii) In collaboration with the social safeguard experts, prepare an Environmental Assessment and Resettlement Framework and conduct required community and stakeholder consultations and disclosure of the IEE following ADB's Safeguard Policy Statement (2009).. Ensure that the cost of implementing mitigation measures for identified environmental management and monitoring plans, and any strengthening measures, are included in the proposed cost.
 - (iii) Prepare for each project the IEE which meets both the Government's requirements and ADB's Environmental Assessment Guidelines (2003).
 - (iv) Assist the team leader for capacity building on environmental safeguards. According to the area of expertise, provide inputs to the capacity development plan and act as resource person/trainer/facilitator in the capacity development program.

33. Social safeguards specialist (5 person-months). The expert shall have a bachelor's degree or higher in sociology, anthropology, social sciences or related fields with minimum 8 years of professional experience. The expert will be responsible for conducting social safeguard due diligence including land acquisition requirements in accordance with ADB's Safeguard Policy Statement (2009) (SPS). Experience in developing countries, particularly in Pacific, is preferred as is experience in the implementation of ADB's Safeguard Policy Statement and preparation of Land Acquisition and Resettlement Plan (LARP) including entitlement matrix and stakeholder consultations. Experience with similar assignments with ADB and ADB DMCs is highly preferred. The international expert shall guide the local experts and the PMU.

- (i) Working with the gender expert, conduct social analysis, including gender analysis, of the projects and conduct required community and stakeholder consultations and disclosure of the LARP following ADB's Safeguard Policy Statement (2009), ADB's Policy on Gender and Development (2003) and government requirements. Propose detailed implementation arrangements in compliance with the Safeguard Policy Statement.
- (ii) Assess land acquisition requirements of the projects and, if required, design of mitigation measures in accordance with ADB's Safeguard Policy Statement (2009).
- (iii) Review government policy on social safeguards, corporate social responsibility, and local community development and ascertain how these can be streamlined into the overall implementation of the TA and the three projects.
- (iv) Establish network with the relevant women's organizations.
- (v) Develop monitoring tool and regular reporting system.
- (vi) Conduct regular monitoring and reporting.
- (vii) According to the area of expertise, provide inputs to the capacity development plan and act as resource person/trainer/facilitator in the capacity development program

34. Gender specialist (3 person-months): The expert should have a postgraduate degree in sociology, social sciences or public administration. The expert will have at least 10 years' experience carrying out gender assessments and analysis, gender planning, gender mainstreaming (preferably in infrastructure and energy sector) and primary gender research. Experience in developing countries, particularly in Pacific, is preferred as in experience in implementation of ADB Safeguard Policy Statement (2009), ADB's Policy on Gender and Development (2003) and government requirements, and preparation and implementation of Gender Action Plans and stakeholder consultations. Experience with similar assignments with ADB and ADB DMCs is highly preferred. The international expert shall work closely with the environmental and social safeguards specialists and guide the local experts and the PMU. The

expert will lead the gender analyses/assessments or update thereof and in preparation of the gender action plans.

35. Financial specialist (3 person-months). The expert shall have at least bachelor's degree or higher in accounting, economics, finance or similar fields. The expert should preferably possess a professional accountancy/finance qualification such as a Chartered Accountant, CPA, or equivalent. The expert should have a minimum of 8 years' experience in financial analysis and due diligence of energy projects, at least 5 years of which were dedicated to power generation facilities. Experience in Solar PV and in ADB DMCs, particularly within the Pacific region NS with ADB is highly desirable. The expert's tasks will include the following:

- (i) Conduct the financial due diligence of the projects following the Technical Guidance Note (TGN) for Financial Management Assessment (2014 and 2015) and the ADB's 2017 Guidelines for the Economic Analysis of Projects, Handbook on Economic Evaluation of Environmental Impacts; and Financial Management and Analysis of Projects (2005).
- (ii) Prepare the overall project costs using a spread sheet, separating foreign exchange and local currency, including physical price and contingencies. Identify applicable local taxes and duties and all risks to project revenues and costs and conduct relevant sensitivity analyses.
- (iii) Work closely with the technical and procurement experts in the development of the financial model and corresponding financial analysis and evaluation.
- (iv) Undertake financial analysis of the proposed investment project, including estimation of the financial internal rate of return (FIRR) with identification of risk factors, preparation of sensitivity tests, and recommendation for mitigation measures
- (v) Assist and work closely with the Team leader, procurement expert, transaction advisor and economist in structuring and developing business models and request for proposals.
- (vi) Assess current tariffs and willingness to pay, and develop a methodology to propose fares/tariffs and/or subsidy mechanisms to improve the overall profitability of the project where applicable to attract private sector interest;
- (vii) Identify potential financing resources for future solar and floating solar PV projects and recommend potential financing structures, particularly with participation of private entities.
- (viii) For projects identified for the private sector that are not entirely financially viable, propose modalities to make these projects bankable and attractive for private sector undertaking, including but not limited to extending guarantees (sovereign and sub-sovereign), where applicable;
- (ix) Perform a value-for-money analysis, comparing the overall costs of the project involving private sector participation with those of an alternative public sector project, and taking into account the allocation of risks between parties;
- (x) Highlight other sources of revenue including provision of establishing other commercial activities that may be added to the project to ensure its financial viability to the private sector
- (xi) Assess the national IAs capacity for financial management and provide input for the capacity development program.
- (xii) Assist ADB mission team as required and in preparing reports.

36. Economist (3 person-months). The expert shall have a master's degree or higher in economics or a related field. The expert should have at least 10 years of experience in energy sector including tariff analysis. Experience in Solar PV and in ADB DMCs, particularly within the Pacific region and with ADB is highly desirable. The expert's tasks will include the following:

- (i) Conduct economic analysis of the FPV projects, including least cost analysis and comparison of alternative solar technologies and configurations, considering economic costs and benefits following ADB's 2017 Guidelines for the Economic Analysis of Project, Handbook on Economic Evaluation of Environmental Impacts and Financial management and Analysis of Projects (2005).
- (ii) Calculate greenhouse gas benefits in the economic analysis following the 2019 "Greenhouse Gas Emissions Accounting for ADB Energy Project Economic Analysis."
- (iii) Review economic justification for the proposed investment and carry out a cost-benefit analysis (CBA), including assessment of potential revenue, cost-efficiency and cost savings opportunities by highlighting "least cost" options;
- (iv) Carry out economic analysis for the proposed investment project, including estimation of the economic internal rate of return (EIRR) and net present value (NPV), with sensitivity analysis and quantitative risk analysis
- (v) Working with the team, especially the team leader, legal and regulatory expert and the transaction advisors, assess the current tariff structure of the selected countries and long-term investment demand to meet the country's renewable energy targets and climate commitments.
- (vi) Identify any gap in the tariff structure and planned/recommended restructuring that hinder development of renewable energy including solar and recommend mechanisms to adjust tariff.
- (vii) Assist and work closely with the Team leader, procurement expert, transaction advisor and financial expert in structuring and developing business models.
- (viii) Identify potential financing resources for future solar PV projects, particularly with participation of private entities
- (ix) Assess the national IAs capacity for long-term planning for energy sector including resource allocation and provide input for the capacity development program
- (x) Assist ADB mission team as required and in preparing reports

2. National consultants (non-key experts) in Kiribati, Tonga, Tuvalu - (indicatively 24 person-months (person-months) per country, or 72 person-months total)

37. **Three electrical engineers/national team leaders (8 person-months each).** The experts should preferably have a bachelor's degree or higher and professional certification in electrical engineering, mechanical engineering, or related fields, with at least 8 years of relevant professional experience in engineering and design, operation, and management of power plants and transmission systems. The expert, as the nationals team leader, will assist the team leader to execute his/her responsibilities, providing due diligence and recommendations for compliance with respective country standards, codes, laws, and regulations.

38. **Three civil engineers (5 person-months each).** The experts should preferably have a bachelor or higher degree in civil engineering or related fields with at least 8 years of relevant experience in geotechnical, topographic, or hydrographic surveys in accordance with international best practices. Experience or qualifications in structural, and/or water engineering are preferred. The Expert shall conduct due diligence on required civil works and provide inputs to the feasibility studies, technical specifications, and bidding documents. Previous experience in ADB funded or similar projects is desirable. The Expert will provide inputs and assistance to the international experts to deliver required outputs, providing due diligence and recommendations for compliance with respective country standards, codes, laws and regulations.

39. **Three environmental engineers/safeguards experts (5 person-months each).** The experts should preferably have a bachelor’s degree or higher degree in environmental sciences or related fields with minimum 8 years of relevant professional experience. The experts will assist the international Environment Specialist to deliver required outputs, providing due diligence and recommendations for compliance with respective country standards, codes, laws and regulations.

40. **Three social safeguards/gender experts (6 person-months each).** The experts should preferably have a bachelor’s degree or higher degree in sociology, anthropology or related fields with minimum 8 years of relevant professional experience. The experts will assist the international Social Safeguards and Gender specialist with focus on social safeguards and gender to deliver required outputs, providing due diligence and recommendations for compliance with respective country standards, codes, laws and regulations as well as cultural context.

41. **Preparation of Proposals**

- (i) Proposing entities are requested to prepare a concise, detailed and logical description of how they propose to deliver on the outputs of the contract in the section of their proposal called “Approach and Methodology”. The provision of generic information shall be avoided. In this narrative, entities should be explicit in explaining how they will achieve the outputs and include any relevant information on their past experience of delivering similar projects and in similar contexts and jurisdictions. Proposals must consider the implications of COVID-19-related travel restrictions on the approach and methodology and in scheduling activities, site investigations and home and field inputs to deliver the tasks and outputs described. The TOR should include a paragraph acknowledging COVID-19-related restrictions and discussing possible flexibilities to timelines, field/home inputs, activities, outputs, etc. if travel restrictions prevent missions and site investigations.
- (ii) Only one curriculum vitae (CV) must be submitted for each key and non-key expert included in the proposal. Only the CVs of key experts will be scored as part of the technical evaluation of proposals. The CVs of non-key experts will not be individually scored, however, ADB will review and individually approve or reject each CV of non-key expert positions in the proposal and consider the suitability of the bidders proposed team.
- (iii) All positions under the contract, both key and non-key experts, must be included and budgeted for in the financial proposal, using the forms provided in the RFP. Within the approach and methodology, the Consultant shall link the number of person months proposed to the delivery of the outputs, justifying the allocation accordingly.
- (iv) The Consultants Personnel schedule shall clearly show the percentage of home and field presence of each team member and both full time and intermittent time application to the project. Noting the system restrictions in CMS on the contents of the online personnel schedule, the Consultant is also encouraged to overlay the contents of its work schedule with its personnel schedule on a separately included Work Plan in order to further elaborate on how the inputs of its staff are aligned with the completion of outputs under the project. This may be included separately as part of the submission. The Consultant shall include all costs necessary to undertake this assignment within its proposal.

Table 4: Payment Schedule

Report	Deadline [months from Notice to Proceed (NTP)]	Payment Milestone % of Lump sum
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1.	Inception report	Within 2 month from NTP	10%
2.	Inception workshops and Interim report	Within 5 months from NTP	10% (+ prov'l sum)
3.	Interim report 2	Within 8 months from NTP	10% (+ prov'l sum)
4.	Regional conference proceedings	Within 10 months from NTP	Provisional Sum
5.	Interim report 3	Within 12 months from NTP	5%
6.	Midterm workshops and Interim report 4	Within 15 months from NTP	5% (+ prov'l sum)
7.	Midterm report	Within 18 months from NTP	15%
8.	Interim report 5	Within 22 months from NTP	10%
9.	Procurement reports	Within 26 months from NTP	15%
10.	Final workshops and draft final report	Within 30 months from NTP	10% (+ prov'l sum)
11.	International conference proceedings	Within 34 months from NTP	Provisional Sum
12.	Final report (completion report).	End of assignment	10%

Note: Provisional sums are for surveys and training events (with prior approval from ADB and paid at cost)