

OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

1. The proposed transaction technical assistance (TA) facility will provide project preparatory assistance, technical support, policy advice, and capacity building to strengthen due diligence and improve project readiness to Southeast Asian developing member countries (DMCs) for a series of lending projects and programs identified in the country operations business plans, 2018-2020. Asian Development Bank, through the Southeast Energy Division will coordinate the overall TA activities working closely with the governments and resident missions.
2. The TA will help Southeast Asian DMCs assess sector problems and challenges, conduct optimal power system planning and tariff analysis, understand the recent technological advancements in renewable energy, battery storage, energy efficiency and smart grids, analyze the costs and benefits of available energy investment options. The TA will also plan, design and prioritize investments, assess technical suitability, economic, financial and social viability, capacity and institutional issues, address environmental and social safeguards and, identify measures to strengthen project implementation capacity of energy investment projects. At the same time, the countries need to develop institutional, policy and human resource capacity to effectively plan and manage energy investments. The proposed TA will serve as a facility to support Southeast Asian DMCs in making informed and strategic decisions on sustainable energy investments by supporting necessary activities such as capacity development, training, knowledge sharing and dissemination, technical advice, peer reviews etc.
3. The TA will initially support project preparation activities related to (i) Support for a Sustainable Power Sector (Cambodia); (ii) National Solar Park Project: Capacity Development for Increased Solar Generation (Cambodia); (iii) Grid Reinforcement Project for Expanded Renewable Energy Generation Project (Cambodia); and (iv) Carbon Capture and Storage (CCS) Activity in the Natural Gas Processing Sector (Indonesia).¹ These energy sector projects require similar preparation, due diligence, design and readiness activities and therefore, this TA will reduce transaction costs through minimizing the need for stand-alone transaction TAs. The TA facility will also provide technical knowledge services and capacity building support to ongoing projects, supporting (i) Viet Nam's Ha Noi and Ho Chi Minh City Power Transmission Development Sector project and Power Transmission Investment Program (Tranche 3); (ii) Market Transformation Through Introduction of Energy-Efficient Electric Vehicles Project (Philippines); and (iii) Power Transmission Improvement Project (Myanmar).
4. The TA requires 154 person-months of international consultants and 119 person-months of national consultants, consisting of energy sector specialists as primary experts, including financial, economic, regulatory, gender, social, environmental, climate and other experts as required. The consultants will be engaged by ADB in accordance with ADB's Procurement Policy (2017 as amended from time to time). 57.5 person-months of consultants in the areas of social and environmental safeguards, program coordination, knowledge management, and resource persons for specialized technical requirements will be engaged using the individual selection method and output-based partial lump sum contracts. 215.5 person-months of consultants in the technical and other areas of expertise will be engaged through consulting firm(s) using quality- and cost-based selection method (quality: cost weighting of 90:10), following ADB's Procurement Policy (2017 as amended from time to time) and the associated PAIs/TA Staff Instructions.

¹ Future facility support is also anticipated for the GMS Cross-Border Power Trade and Distribution Project (Lao PDR), Pilot Carbon Capture and Storage Activity in the Gas Processing Sector (Indonesia), the Sustainable Rural Power Supply Project (Philippines), and the Power Network Development Project (Myanmar).

5. Among the above-listed projects, the scope for the Cambodia project is presented in Section I, which will need to be implemented as a first order once the TA is approved. The scope for the other projects is presented in Sector II, which will need to be further elaborated with defined deliverables during project implementation, supported by contract [variation](#) as required. The TA scope is also expected to expand to cover additional activities, consistent with the TA's outputs and outcome, and be replenished from time to time as funds are required and identified, including those from cofinancing sources and ADB-administered trust funds. Accordingly, the consultant contracts will be extended with corresponding budget increase subject to consultants' satisfactory performance and their availability.

Section I. Cambodia: Support for a Sustainable Power Sector (Co-financed by the Clean Energy Financing Partnership Facility and the Clean Technology Fund Business Development Facility under the Climate Investment Funds)

A. Project background

6. In recent years, the Government of Cambodia has made significant progress developing the energy sector, including growing and diversifying national generation capacity from diesel to hydropower, coal, and solar, and increasing the national electrification rate from 15% in 2007 to over 68% in 2017. These efforts have contributed to recent high economic growth and substantial poverty reduction in Cambodia.

7. The Government recognizes that expanding access to modern, affordable and reliable forms of energy is essential for the country's continued social and economic growth. However, the organization and strategy within the power sector in Cambodia is fragmented and the development of policies and physical infrastructure (generation, transmission and distribution) is done in an ad hoc manner. For example, while the government has committed to a 16% reduction in greenhouse gas emissions by 2020, from a business as usual scenario by 2030 from the energy sector, there are no clear renewable energy or energy efficiency policies in place to meet this goal.² Nor is there a comprehensive least-cost electrification plan to meet the government's electrification targets of 100% of villages connected by 2020. In recent years, development partners have provided recommendations and drafted high-level strategic advice, which needs to be translated into detailed strategies, programs and operating guidelines.³

8. The country's current Power Development Plan (PDP), updated in 2015, forecasts meeting future growth in electricity demand through investments in thermal generation (coal-fired in the short-term and both coal and natural gas in the long-term) and large hydropower. However, the social and environmental impacts of these plants and the high cost of imported coal are making conventional energy sources less desirable. In addition, the current PDP does not consider the benefits of new sources of renewable energy like solar and the rise of decentralized renewables, such as rooftop solar. Moreover, the planning process did not employ a broad consultative approach or knowledge transfer to MME and EDC planning departments. At the same time, recent reductions in the cost of solar photovoltaic power generation, the country's abundant solar resources, and the ability of solar to complement the generation profile of Cambodia's existing hydropower, are making solar an attractive alternative to large hydro and coal-fired plants. The country's first 10 MW solar plant located at Bavet in Svay Rieng Province

² Government of Cambodia. 2015. *Cambodia's Intended Nationally Determined Contribution*. Phnom Penh.

³ For example, see European Union. 2013. *Draft National Policy, Strategy and Action Plan for Energy Efficiency*.

which was financed by ADB's private sector operations, was commissioned in October 2017.⁴ Building on the success of this project, the government, with ADB support, is currently developing a 100 MW capacity solar park, and aims to tender out construction of the first power plant to private developers by August 2018.⁵ The government is also developing guidelines for solar rooftop generation and exploring the potential for floating solar installations in existing hydro reservoirs.

9. The current PDP does not reflect recent technological advancements in renewable energy and associated cost reductions, enhanced energy efficiency, or coordination with regional power sector strategies for the Greater Mekong Subregion. Thus, there is a strong case for Cambodia to embark on a new power sector strategy and power development plan. The sector strategy should also include a comprehensive institutional, legal, and regulatory scheme. In addition, there needs to be an implementation plan that facilitates the cost-effective and well-sequenced development of generation, transmission, and distribution infrastructure.

B. Scope of Work

10. Under the Cambodia component for Support for a Sustainable Power Sector, an international consulting firm specializing in power system planning, including transmission and distribution planning and engineering, will be engaged to assist MME with the following outputs: (i) develop an improved, comprehensive energy sector strategy (including energy efficiency, renewable energy, and rural electrification), (ii) prepare a 10-year power development plan (that includes generation, transmission, and distribution), (iii) develop an investment plan and pipeline of priority projects; and (iv) prepare a medium-term capacity development plan for MME and EDC staff.

11. The consulting firm will be required to hold several interactive public stakeholder discussions with civil society organizations, development partners, and the government; prepare several reports; set up systems and procedures; implement a variety of capacity development activities; and monitor project implementation. Approved policies and strategies will be disclosed to the public through MME's website in both English and Khmer language, as well as through other means appropriate to reaching other interested stakeholders.

12. A team of international and national consultants from the engaged consulting firm will be responsible for preparing the energy sector strategy, 10-year power development plan, investment plan, and capacity development plan. It is estimated that a total of 77 person-months of consulting services, comprising 47 person-months of international consulting services and 30 person-months for national consulting services, are required to undertake this work. Of this, 35 person-months of international consulting services and 30 person-months of national consulting services are to be engaged through a firm. The technical assistance activities (TA activities) will be administered over a period of 24 months from August 2018–August 2020. ADB will engage consulting firms and individual consultants in accordance with ADB Procurement Policy (2017, as amended from time to time) and the associated Project Administration Instructions/TA Staff Instructions.

⁴ ADB. 2016. *Report and Recommendation of the President to the Board of Directors: Proposed Loans and Administration of Loan to Sunseap Asset (Cambodia) Co. Ltd. Cambodia Solar Power Project (Cambodia)*. Manila.

⁵ The project represents a collaborative approach between ADB's Southeast Asia Energy Division and the Office of Public-Private Partnerships, which signed a transaction advisory services agreement with EDC in June 2017 to support EDC in the tender process for the first solar power plant.

13. The following team of experts will be engaged from a consulting firm that has expertise in energy demand and market analysis, demand projections, assessing supply options to meet energy demand, investment requirements, and legal and institutional arrangements.

14. **Power system/planning engineer (international, 8 person-months; national, 4 person-months).** The international expert shall preferably have an advanced degree, minimum master's degree, in electrical engineering, and at least 15 years of experience in power system planning, including 5 years as a project manager. As team leader, this expert will be responsible for all TA activity outputs and will serve as liaison with the Ministry of Mines and Energy (MME), EDC, and the ADB Project Officer. The expert will seek and coordinate the inputs of all team members and ensure the quality and timely submission of reports. The national expert will support the international expert in accomplishing the tasks. The power system/planning engineer will undertake the following activities:

- (i) Review existing fragmented power system planning studies and reports prepared by MME and development partners;
- (ii) Review existing network studies (load flow, steady state and transient stability, short circuit) and identify factors that limit the utilization of Cambodia's transmission network and identify suitable solutions to improve the utilization of Cambodia's transmission network;
- (iii) Review power development plans for the Greater Mekong region in general, with a view to assessing the implications for Cambodia's power sector plans;
- (iv) In consultation with MME and EDC, obtain an updated understanding of the implementation of the various plans;
- (v) If necessary, the power system/planning engineer may undertake additional network studies to determine the timing of 500kV/230kV transmission lines;
- (vi) Based on updated demand forecasts and outlooks for rooftop solar photovoltaic uptake, and existing and planned generation projections, determine a least-cost optimal generation plan to deliver a reliable power system. This will include scenarios with high levels of grid-connected solar photovoltaic generation. The plan should take into account any relevant policies that impact the power sector;
- (vii) To demonstrate the robustness of the developed plan, the Power System/Planning Engineer should carry out dispatch simulations for a variety of conditions expected in Cambodia's power system;
- (viii) Train MME and EDC staff in the use of existing power system planning software; if no such software exists, procure a suitable power system planning software package considering suitability and lifecycle costs. The software should be appropriate for planning Cambodia's power system including facilities for (1) development of least cost generation expansion plans with scenarios of high levels of renewable energy, (2) dispatch simulations, (3) demand forecasting, and (4) capability for representing and expanding the transmission network. If software tools are already in place, then determine their suitability and if necessary, procure an updated version to ensure that it is able to manage planning in an environment with high levels of renewable energy;
- (ix) Carry out training of MME and EDC planning staff in developing the updated 10-year power development plan that considers low cost solar photovoltaic generation in the power generation mix. The training should include coverage of transmission and distribution network planning issues and contain input from the Transmission/Distribution Engineer; and

- (x) Supervise and organize the necessary workshops and seminars and conduct the necessary training and capacity building for MME and EDC staff, including a capacity development implementation program.

15. Transmission/distribution engineer (international, 5 person-months; national, 5 person-months). The international expert shall preferably have an advanced degree, minimum master's degree, in electrical engineering. The expert shall have at least 10 years of experience working with transmission and distribution planning software tools, including certificates of completed software courses. The expert should have at least 5 years of experience in transmission planning. The national expert will support the international expert in accomplishing the tasks. The Transmission/distribution engineer will undertake the following activities:

- (i) Undertake technical review of projects in EDC's investment plan for critical transmission lines, distribution lines, and substations;
- (ii) Review the cost estimates, procurement plan, implementation schedule, and proposed location of the transmission and distribution lines and their associated substations;
- (iii) Conduct training on new technologies and support on how these could be used in Cambodia;
- (iv) Review existing technical specifications with MME and EDC's technical staff to determine their appropriateness and if necessary, work with MME and EDC's engineering team in updating the technical specifications;
- (v) In consultation with the Power System/Planning Engineer, develop a suitable transmission plan for the least-cost optimal generation plan;
- (vi) In consultation with the Least-Cost Electrification Specialist, develop suitable plans for distribution network development that are consistent with the least-cost optimal generation plan developed by the Power System/Planning Engineer;
- (vii) Carry out necessary technical studies on the transmission plans that are consistent with the 10-year least-cost optimal generation plan to ensure that they will adhere to the standards defined in Cambodia's grid code;
- (viii) Jointly with MME and EDC's planning and engineering teams, carry out pre-feasibility studies for a few critical transmission and distribution lines and their associated substations. Undertake the analysis between different voltage levels and technologies, proposed location of the future substations, footprint (land acquisition), preliminary design, costing, contract packaging, and implementation schedule;
- (ix) Conduct due diligence on proposed upgrades required in substations along with MME and EDC staff including substation automation and help the staff in defining scope, costs, etc.; and
- (x) Ensure that MME and EDC staff can carry such analysis on their own through on-the-job training for selected immediate transmission and distribution components.

16. Energy specialist/planner (international, 5 person-months; national 5 person-months). The international expert shall preferably have an advanced degree, minimum master's degree, in energy economics and at least 10 years of work experience in energy planning, with 5 years of experience with renewable energy (particularly solar photovoltaic). The national expert will support the international expert in accomplishing the tasks. The energy specialist/planner will undertake the following activities:

- (i) Develop a common methodology for power demand and supply analysis and develop power demand projections for the 10-year study period. These projections will consider projections for gross domestic product, population and other economic indicators in close consultation with the Ministry of Economy and Finance and Ministry of Planning, local research institutions, and development partners;
- (ii) Conduct the surveys on the use of energy in various sectors;
- (iii) Conduct a survey to collect data on significant new load facilities that may be connected to the network for their consideration in the demand forecast;
- (iv) Develop a set of power system demand forecasts for Cambodia's power system that reflect present and expected economic conditions, plans for electrification, the results of the survey on energy use by various sectors, and plans and options for energy efficiency improvements. The forecasts will need to be developed to support the planning studies being carried out by the Power System/Planning Engineer and the Transmission/Distribution Engineer in their studies. For example, forecasts of net demand for each 115 kV, 230 kV (and possibly 500 kV) substations will be required;
- (v) Develop scenarios of rooftop solar photovoltaic uptake suitable for Cambodia's conditions over the 10-year outlook period by location so that they can be included in the demand forecasts;
- (vi) Assess the power supply options in Cambodia from hydropower, coal-based, solar photovoltaic generation and imports from neighboring countries to determine their merits in terms of environmental impacts, social impacts and which source is of low-cost to the economy;
- (vii) Assess the technical feasibility of some power supply options in close consultations with the Energy Economist. Economist;
- (viii) Recommend options, including their costs, for delivering the power supply required to meet the power demand, in close consultation with the Power System/Planner Engineer and Energy Economist;
- (ix) Train EDC and MME staff on the developing common methodology and develop the capacity development plan; and
- (x) Design, organize, facilitate, and document public discussions with a range of stakeholders, including civil society on the supply options, and ensure that these discussions follow ADB models of good practice for consultation.

17. Power system/energy economists (international, 4 person-months; national, 4 person-months). The international expert shall preferably have an advanced degree, minimum master's degree, in economics, finance or engineering with at least 15 years of experience, including at least 10 years' experience in power system economic analysis. The national expert will support the international expert in accomplishing the tasks. The power system/energy economists will undertake the following activities:

- (i) Assess the economic feasibility of power supply options in close consultations with the Power System/Planner Engineer;
- (ii) In close consultation with the Energy Specialist/Planner, advise on economic costs of options for delivering the power supply required to meet power demand;
- (iii) Review the economic analysis of existing pre-feasibility/feasibility studies for at least two-each of generation, transmission and distribution projects and conduct sensitivity analysis to determine their overall economic rate of return. Identify the stakeholders who would benefit and carry out a distributional analysis of net

benefits. Undertake these tasks jointly with EDC and MME staff so as to improve their skills in these aspects;

- (iv) Identify the institutional and regulatory impediments to collecting energy information and preparing the long-term outlook; and
- (i) Determine the improvements necessary in the institutional and regulatory framework to support the function of energy planning in the MME, EDC and other agencies.

18. Financial/Public Private Partnership (PPP) specialist (international, 2 person-months; national, 2 person-months). The international expert shall preferably have a master's Degree in finance or business administration, CA/CPA or equivalent and a minimum of 10 years' experience, and extensive experience with PPP and IPP projects. The national expert will support the international expert in accomplishing the tasks. The Financial/PPP specialists will undertake the following activities:

- (i) Assess the availability of financial resources from domestic and international bilateral, multilateral, and private sector sources in meeting the investment needs, and develop a financing plan to implement the long-term planning;
- (ii) Develop business models and a database of innovative sources of investment for renewable energy and energy efficiency projects, including analyzing the possibility of developing the projects under a public-private partnership;
- (iii) Develop a funding vehicle that can attract global climate financing and leverage private sector resources for clean energy projects, in consultation with the Renewable Energy Specialist and Energy Efficiency Specialist;
- (iv) Develop a financial model of the 10-year outlook taking into account costs of generation, transmission and distribution, as well as the financing modalities as recommended by the Energy Economist to determine the implications for the total cost of electricity supply under the least-cost plan;
- (v) In undertaking the financial analysis, train MME and EDC in undertaking such analysis on their own; and
- (vi) Review MME and EDC financial management practices and prepare a financial management assessment report.

19. Renewable energy specialists (international, 4 person-months; national, 4 person-months). The international expert shall preferably have a master's degree, minimum 4-year bachelor's degree, and at least 15 years of experience in renewable energy technologies and applications. The expert should have at least 8 years' work experience in solar photovoltaic regulation, including developing appropriate feed-in tariffs and renewable energy policies. The national expert will support the international expert in accomplishing the tasks. The renewable energy specialists will undertake the following tasks:

- (i) Review Cambodia's existing renewable energy (other than hydropower) policy, regulations, strategy, and institutional arrangements and determine their appropriateness in the current context. Suggest appropriate changes, if necessary;
- (ii) Consolidate information on promoting renewable energy development from MME including those proposed by the private sector;
- (iii) Review existing studies and reports on the development of renewable resources undertaken by development partners and prepare a priority list of projects for implementation;
- (iv) Prepare renewable energy development strategy for Cambodia, including targets, implementation strategy, necessary investment, and institutional arrangements;
- (v) Specify the VRE development options for use in the 10-year plan;

- (vi) Design, organize, facilitate, and document public stakeholder discussions on renewable energy development (solar photovoltaic ground mounted and roof-top mounted projects) with a range of stakeholders, including civil society, ensuring that they follow ADB models of good practice for consultation;
- (vii) Conduct institutional development activities such as (but not limited to) strategic planning, organizational performance assessment, sector development planning and action plan preparation;
- (viii) Advise on development of various business models for renewable energy development, including public–private partnerships, and funding vehicles that can attract global climate financing; and
- (ix) Based on assessments, suggest appropriate long-term capacity development plan in renewable energy and emerging technologies, such as use of battery energy storage systems on transmission and distribution networks.

20. **Energy efficiency specialists (international, 3 person-months; national, 3 person-months).** The international expert should preferably have an advanced degree, minimum master's degree, in engineering with at least 15 years of work experience, including 7 years in energy efficiency work. The national expert will support the international expert in accomplishing the tasks. The energy efficiency specialists will undertake the following tasks:

- (i) Review the existing energy efficiency policy, law, regulations, and institutional arrangements. Also review work of EU consultants and their recommendations. In consultation with MME, assist in drafting suitable policy recommendations;
- (ii) Review existing studies and reports for energy efficiency including the building codes under preparation;
- (iii) Examine the potential of introducing minimum energy performance standards for lights, electric motors, electric fans as a low hanging fruit in targeting energy efficiency improvements;
- (iv) Assist MME in preparing an energy efficiency policy for Cambodia, including targets, implementation strategy, necessary investment, and institutional arrangements;
- (v) Determine options for improvement in energy efficiency and assist the Energy Specialist in reflecting energy efficiency improvements into the demand outlook for Cambodia's power sector;
- (vi) Conduct workshops, seminars, and conferences;
- (vii) Design, organize, facilitate, and document public stakeholder discussions with a range of stakeholders, including civil society, ensuring that they follow ADB models of good practice for consultation;
- (viii) Conduct institutional development activities such as (but not limited to) strategic planning, organizational performance assessment, sector development planning and action plan preparation;
- (ix) Advise on development of various business models to promote energy efficiency, including public–private partnerships, and funding vehicles that can attract global climate financing; and
- (x) Based on review of documents and assessment of existing institutional structure in MME, recommend appropriate capacity development plans for energy efficiency.

21. **Least-cost electrification specialist (international, 4 person-months)/GIS Specialist (national 3 person-months).** The international expert should preferably have a master's degree, minimum 4-year bachelor's degree, in electrical engineering, with a minimum 10 years' professional experience and a minimum 5 years in power distribution and sub-transmission

system planning. Experience in grid transmission planning also desirable. Working knowledge of a credible commercial power flow software package is required with experience in use of tools such as GIS and Network Planner preferable. The national expert will support the international expert in accomplishing the tasks. The least-cost electrification/GIS specialists will undertake the following tasks:

- (i) Identify household and villages by GIS techniques and validate MME/EDC data.
- (ii) Carry out a review of the rural electrification plans and implementation to date;
- (iii) Prepare distribution load forecasts by province, where necessary coordinating this work with the load forecasting work of the Energy Specialist;
- (iv) Assess existing rural electrification plans and determine geospatial least cost distribution network expansion plans for Cambodia, that are consistent with the wider plans developed by the Power System/Planner Engineer;
- (v) Update Cambodia's rural electrification plans taking into account distributed resources, and off-grid solutions;
- (vi) Determine an off-grid development plan consistent with rural electrification plans which complements the overall plan developed on this project;
- (vii) Where necessary, carry out power flows and power system analysis for distribution systems;
- (viii) With the other specialists, conduct optimization modelling for on-grid and off-grid electrification options; and
- (ix) Conduct power system studies reviewing options for network reinforcement as necessary, including costs of various options.

22. **Program coordinator (international, 12 person-months).** This position will be filled through the direct hiring of an individual consultant by ADB. The international expert should preferably have a master's degree in an appropriate field (engineering, energy policy, urban planning, etc.) with at least 6 years of work experience. The Program Coordinator should have prior experience working in Southeast Asia with an understanding of Cambodia's energy sector. The analyst will report to the ADB project officer and be based in ADB's offices in Bangkok. The program coordinator will undertake the following tasks:

- (i) Support the ADB project officer and other experts by conducting background research, undertaking analysis, developing and finalizing sections of reports, and maintaining a database of reference material; and
- (ii) Support ADB missions, workshops and consultations, and participate in technical discussions with government.

23. The consultants will prepare an inception report within 1 month, an interim report within 12 months, and a draft final report within 23 months from the commencement of consulting services. For each report, the consultants will organize a workshop to enhance staff skills in energy planning from the concerned ministries.

Section II. Country Project Planning and Implementation Support

24. The below TORs are indicative and subject to minor modification once the scope for each consultant is identified. It is estimated that a total of 196 person-months of consulting services, comprising 107 person-months of international consulting services and 89 person-months for national consulting services, are required to undertake preparation, due diligence, design and readiness activities for (i) National Solar Park Project: Capacity Development for Increased Solar Generation (Cambodia); (ii) Grid Reinforcement Project for Expanded Renewable Energy

Generation Project (Cambodia); and (iii) Carbon Capture and Storage (CCS) Activity in the Natural Gas Processing Sector (Indonesia).⁶ These energy sector projects require similar preparation, due diligence, design and readiness activities and therefore, this TA will reduce transaction costs through minimizing the need for stand-alone transaction TAs. The TA facility will also provide technical knowledge services and capacity building support to ongoing projects, supporting (i) Viet Nam's Ha Noi and Ho Chi Minh City Power Transmission Development Sector project and Power Transmission Investment Program (Tranche 3); (ii) Market Transformation Through Introduction of Energy-Efficient Electric Vehicles Project (Philippines); and (iii) Power Transmission Improvement Project (Myanmar)

25. The TORs will be further elaborated with defined deliverables during project implementation and contract variations will be made accordingly. The TA scope is also expected to expand to cover additional activities, consistent with the TA's outputs and outcome, and be replenished from time to time as funds are required and identified, including those from cofinancing sources and ADB-administered trust funds. Accordingly, the consultant contracts will be extended with corresponding budget increase subject to consultants' satisfactory performance and their availability.

C. International Consultants

26. **Solar energy specialist/team leader (international, 4 person-months).** The specialist will have a degree in electrical engineering or related field and preferably 15 years of professional experience in energy development projects and experience in ADB-funded projects (or by any other similar international funding agencies). The consultant will undertake the following tasks:

- (i) Review existing renewable energy (other than hydropower) policy, regulations, strategy, and institutional arrangements and determine their appropriateness in the current context; suggest appropriate changes, if necessary;
- (ii) Consolidate information on promoting renewable energy development from the government and from private sector;
- (iii) Review existing studies and reports on the development of renewable resources undertaken by development partners and prepare a priority list of projects for implementation;
- (iv) Specify the renewable development options for use in the 10-year plan;
- (v) Advise on development of various business models for renewable energy development, including public-private partnerships, and funding vehicles that can attract global climate financing;
- (vi) Based on assessments, suggest an appropriate long-term capacity development plan in renewable energy and emerging technologies, such as use of battery energy storage systems on transmission and distribution networks;
- (vii) Conduct technical due diligence of the components and packages of identified projects, including reviewing selected feasibility studies and detailed design reports, ensure quality control, analyze technical and institutional risks associated with the proposed approach and identify mitigation measures;
- (viii) Support the selected projects' executing agency and ADB team in meeting project readiness criteria for project Board approval;
- (ix) Help solve (as required) technical challenges in ongoing projects;

⁶ Future facility support is also anticipated for the GMS Cross-Border Power Trade and Distribution Project (Lao PDR), Pilot Carbon Capture and Storage Activity in the Gas Processing Sector (Indonesia), the Sustainable Rural Power Supply Project (Philippines), and the Power Network Development Project (Myanmar).

- (x) Design, organize, facilitate, and document public stakeholder discussions with a range of stakeholders, including civil society, ensuring that they follow ADB models of good practice for consultation;
- (xi) Conduct institutional development activities such as (but not limited to) strategic planning, organizational performance assessment, sector assessment and development planning and action plan preparation; and
- (xii) Conduct workshops, seminars, and conferences. The consultant is required to coordinate and cooperate with other specialists closely.

27. **Electric vehicle (EV) specialists (international, 9 person-months).** The specialists will have a degree in electronic engineering or related field and preferably 10 years of professional experience in EV development projects and experience in ADB-funded projects (or by any other similar international funding agencies). The specialists will undertake the following tasks:

- (i) Coordinate with local government units, utilities, tricycle associations and fleet managers, on key considerations for successful deployment of e-trikes;
- (ii) Support identification of key routes to be used by e-trike fleets;
- (iii) Support design of safe and adequate charging infrastructure and suggest technical specifications for charging stations for electric vehicles within local government units (LGUs) in the Philippines, consult with distribution companies and technology providers, and advise the Department of Energy on effective deployment of vehicle charging infrastructure for increased electric vehicle use including the use of solar panels;
- (iv) Review business models and use proposals for electric vehicles within LGUs. The consultant shall identify risks and propose approaches for minimizing risks and maximizing project benefits;
- (v) Develop responsibility and financial flow approaches in consultation with LGUs to ensure sustainable deployment of e-trike fleets;
- (vi) Develop safety protocols for first responders;
- (vii) Develop monitoring requirements for LGUs to ensure compliance with deeds of donation;
- (viii) Review proposals submitted for ADB consideration and provide succinct, technical feedback; and
- (ix) Identify weaknesses and risks in e-trike deployment plans and identify opportunities to strengthen the proposals.

28. **Carbon capture and storage (CCS) specialist (international, 3 person-month).** The specialist should have a degree in engineering, management, science, economics or other related areas from a recognized university. Post graduate/doctorate qualification is desired. The expert should have more than 15 years' experience preferably in the oil and gas industry. The candidate should demonstrate experience in implementation /research of CCS or Carbon Capture, Utilization, and Storage. The specialist will undertake the following tasks:

- (i) Review existing plant configuration and performance;
- (ii) Review, assess, and comment on the potential pilot CCS projects including updated survey data and pre-feasibility studies/feasibility studies; identify associated risks; and analyze the net CO₂ benefit from proposed pilots;
- (iii) Review and comment on the proposed monitoring and verification plan and propose improvements, if needed;
- (iv) Identify the key data to be compiled and shared during project operation in order to maximize knowledge transfer during the course of the pilot;
- (v) Recommend options for incorporating high-level technology into project expansion;

- (vi) Identify key technical risks and mitigation measures;
- (vii) Coordinate with team members from the proposed Center of Excellence in Indonesia and identify ways in which they can contribute to the pilot project and wider knowledge sharing; and
- (viii) Provide critical technical inputs to other team members to aid in development of social and environmental safeguard activities. The consultant is required to coordinate and cooperate with other specialists closely.

29. **Transmission line specialist/team leader (international, 7 person-months).** The specialist will have a degree in electrical engineering or related field and preferably 15 years of professional experience in transmission network development projects and experience in ADB-funded projects (or by any other similar international funding agencies). The specialist will undertake the following tasks:

- (i) Conduct technical due diligence of the components and packages of identified projects, including reviewing selected feasibility studies and detailed design reports, ensure quality control, analyze technical and institutional risks associated with the proposed approach and identify mitigation measures;
- (ii) Support the selected projects' executing agency and ADB team in meeting project readiness criteria for project Board approval;
- (iii) Help solve (as required) technical challenges in ongoing projects;
- (iv) Design, organize, facilitate, and document public stakeholder discussions with a range of stakeholders, including civil society, ensuring that they follow ADB models of good practice for consultation;
- (v) Conduct institutional development activities such as (but not limited to) strategic planning, organizational performance assessment, sector assessment and development planning and action plan preparation; and
- (vi) Conduct workshops, seminars, and conferences. The consultant is required to coordinate and cooperate with other specialists closely.

30. **Substation specialist (international, 6 person-months).** The specialist will have a degree in electrical engineering or related field and preferably 15 years of professional experience in transmission substation development projects and experience in ADB-funded projects (or by any other similar international funding agencies). The specialist will undertake the following tasks:

- (i) Carry out a survey of the substations;
- (ii) Review the preliminary study and technical standards in use by the executing agency;
- (iii) Prepare engineering design for substations including substation equipment layout, drawings, bill of quantities, control system, protective coordination, SCADA telecommunication system, and cost estimation;
- (iv) Prepare technical specifications, implementation schedule, and evaluation and qualification criteria to be applied to the potential bidders;
- (v) work with transmission line specialist and procurement specialist to provide harmonized quality bidding documents; and
- (vi) Provide all technical information and necessary documents for bidding document to the Procurement Specialist in a timely manner. The consultant is required to coordinate and cooperate with other specialists closely.

31. **Distribution specialist/team leader (international, 6 person-months).** The specialist will have a degree in electrical engineering or related field and preferably 15 years of professional

experience in distribution network development projects and experience in ADB-funded projects (or by any other similar international funding agencies). The specialist will undertake the following tasks:

- (i) Conduct technical due diligence of the components and packages of identified projects, including reviewing selected feasibility studies and detailed design reports, ensure quality control, analyze technical and institutional risks associated with the proposed approach and identify mitigation measures;
- (ii) Support the selected projects' executing agency and ADB team in meeting project readiness criteria for project Board approval
- (iii) Help solve (as required) technical challenges in ongoing projects;
- (iv) Design, organize, facilitate, and document public stakeholder discussions with a range of stakeholders, including civil society, ensuring that they follow ADB models of good practice for consultation;
- (v) Conduct institutional development activities such as (but not limited to) strategic planning, organizational performance assessment, sector assessment and development planning and action plan preparation; and
- (vi) Conduct workshops, seminars, and conferences. The consultant is required to coordinate and cooperate with other specialists closely.

32. Energy efficiency specialist (international, 5 person-months). The specialist will have a degree in electrical engineering or related field and preferably 15 years of professional experience, including 7 years in energy efficiency work and experience in ADB-funded projects (or by any other similar international funding agencies). The specialist will undertake the following tasks:

- (i) Review the existing energy efficiency policy, law, regulations, and institutional arrangements as well as existing studies and reports for energy efficiency;
- (ii) Examine the potential of introducing minimum energy performance standards for lights, electric motors, electric fans as a low hanging fruit in targeting energy efficiency improvements;
- (iii) Review an energy services companies (ESCOs) market that can serve the energy efficiency needs of all levels of the government and conduct demonstration projects in several government or private sector facilities including on-the-job training.
- (iv) Assist the government in preparing the energy efficiency policy (if not existent or outdated) including targets, implementation strategy, investment, and institutional arrangements;
- (v) Design, organize, facilitate, and document public stakeholder discussions with a range of stakeholders, including civil society, ensuring that they follow ADB models of good practice for consultation;
- (vi) Conduct institutional development activities such as (but not limited to) strategic planning, organizational performance assessment, sector development planning and action plan preparation;
- (vii) Develop various business models to promote energy efficiency, including public-private partnerships, and funding vehicles that can attract global climate financing and identify immediate investment opportunities such as public lighting; and
- (viii) Conduct workshops, seminars, and conferences. The consultant is required to coordinate and cooperate with other specialists closely.

33. **GIS specialist (international, 1 person-months).** The specialist will have a degree/certified training in engineering, geography, environmental sciences, and mapping technologies preferably with prior experience in collecting data from developing country government agencies for geospatial mapping. The specialist will be responsible for conducting the geo-referenced data collection, preparation, digitization, and analysis needed to arrive at least-cost off-grid energy access deployment plans for select states and regions. The specialist will liaise with the entire consulting team to obtain the necessary household energy demand, supply, renewable energy resource availability and other data; and with government ministries and agencies to obtain data such as the location and expansion plans of the national grid, location of communities, and geographical terrain. The specialist will undertake the following tasks:

- (i) Identify household and villages by GIS techniques;
- (ii) Prepare structured GIS-layered database to support the spatial analysis;
- (iii) Conduct geospatial identification and characterization of power (cluster) loads from communities and social infrastructure, and
- (iv) Creating geospatial maps for least-cost off-grid energy access planning. The specialist will also be required to organize user training seminars on geospatial planning and least-cost rural electrification planning. The consultant is required to coordinate and cooperate with other specialists closely.

34. **Smart grid specialist (international, 8 person-months).** The specialist will have a degree in electrical engineering or related field and preferably 15 years of professional experience in smart grid development projects and experience in ADB-funded projects (or by any other similar international funding agencies). The specialist will undertake the following tasks:

- (i) Review the existing smart grid development policy, law, regulations, and institutional arrangements as well as existing studies and reports for smart grid development;
- (ii) Examine the potential of introducing most appropriate smart grid technologies as a low hanging fruit in targeting efficiency improvements;
- (iii) Assist the government in preparing the smart grid development policy (if not existent or outdated) including targets, implementation strategy, investment, and institutional arrangements;
- (iv) Examine the potential of introducing most appropriate smart grid technologies as a low hanging fruit in targeting efficiency improvements including higher transmission technology such as high temperature low sag conductor, decentralized voltage control for distribution, micro-grids, automation and remote monitoring systems, etc.
- (v) Design, organize, facilitate, and document public stakeholder discussions with a range of stakeholders, including civil society, ensuring that they follow ADB models of good practice for consultation;
- (vi) Conduct institutional development activities such as (but not limited to) strategic planning, organizational performance assessment, sector development planning and action plan preparation;
- (vii) Develop various business models to promote smart grid development, including public–private partnerships, and funding vehicles that can attract global climate financing; and
- (viii) Conduct workshops, seminars, and conferences. The consultant is required to coordinate and cooperate with other specialists closely.

35. **Energy policy and regulatory specialist (international, 6 person-months).** The specialist will have a master's degree in energy economics, public policy, or related field with a minimum 15 years' professional experience in policy analysis and strategic planning and organization management in energy sector. The specialist will undertake the following tasks:

- (i) Review energy sector laws, policies, and strategies;
- (ii) Conduct the sector assessment, identify the areas for improvement and develop a roadmap for sector policy development and reforms,
- (iii) Design, organize, facilitate, and document public stakeholder discussions with a range of stakeholders, including civil society, ensuring that they follow ADB models of good practice for consultation;
- (iv) Conduct institutional development activities such as (but not limited to) strategic planning, organizational performance assessment, sector development planning and action plan preparation; and
- (v) Conduct workshops, seminars, and conferences. The consultant is required to coordinate and cooperate with other specialists closely.

36. **Power system planner (international, 2 person-months).** The specialist will have a degree in electric engineering or related field with a minimum 15 years' professional experience in power system planning. The specialist will undertake the following tasks:

- (i) Review existing power system planning studies and reports and existing network studies (load flow, steady state and transient stability, short circuit);
- (ii) Review power development plans for the Greater Mekong region in general, with a view to assessing the implications the country's power sector plans;
- (iii) In consultation with the government, obtain an updated understanding of the implementation of the various plans;
- (iv) Conduct additional network studies to determine the timing of 500kV/230kV transmission lines if necessary;
- (v) Based on updated demand forecasts and outlooks for rooftop solar photovoltaics uptake, and existing and planned generation projections, determine a least-cost optimal generation plan to deliver a reliable power system;
- (vi) Carry out dispatch simulations for a variety of conditions to demonstrate the robustness of the developed plan;
- (vii) Train the government and utility staff in the use of existing power system planning software; if no such software exists, procure a suitable power system planning software package considering suitability and lifecycle costs;
- (viii) Develop the updated 10-year power development plan that considers low cost solar photovoltaics generation in the power generation mix; and
- (ix) Conduct workshops, seminars, and conferences. The consultant is required to coordinate and cooperate with other specialists closely.

37. **Financial innovation and engineering specialist (international, 3 person-months).** The specialist will have a master's degree in finance or business administration, CA/CPA or equivalent and a minimum of 10 years' experience, and extensive experience with corporate and project financing in energy sector. The specialist will undertake the following tasks:

- (i) Assess the financial performance of implementing agencies (IAs) and their subsidiaries based on their balance sheets in the past years;
- (ii) Review IAs and their subsidiaries' capex/investment/financing plans (generation, transmission and distribution) for the period 2018-2030 based on national power

- (iii) development plans and in consultation with other major lenders and financiers; Make reasonable financial projections of IAs and their subsidiaries under several scenarios considering different energy mixes, modest vs radical tariff reforms/increases cost-recovery and subsidy schemes and electricity demand projections;
- (iv) Recommend financial restructuring and refinancing strategies to improve the financial performance of IAs and their subsidiaries and propose sector reform strategies that affect IA's financial performance, especially focused on IA's restructuring, equitization, and divestiture plans, and tariff increase roadmap; and
- (v) Develop innovative financial engineering products to lower the cost of capital considering IAs' financial status and projections, and other constraints, based on international best practices and benchmark cases similar to the concerned countries.

38. Project financial specialist (international, 8 person-months). The specialist will have a master's degree in finance or business administration, CA/CPA or equivalent and a minimum of 10 years' experience in project financial analysis in the power sector and related projects including in financial due diligence (FDD), and experience with ADB (or other multilateral development bank) funded projects. The specialist will undertake the following tasks:

- (i) Prepare detailed project cost estimate and financing plan;
- (ii) Conduct project financial viability analysis (if it is a project with full cost recovery objective), or incremental recurrent cost analysis and financing capacity in cases where there is insufficient cost recovery;
- (iii) Assess financial management capacity;
- (iv) Conduct financial analysis and sustainability assessment of executing and implementing agencies;
- (v) Design funds flow, accounting, auditing, and financial reporting arrangements, including any necessity or capacity for using the Advance procedure or the Statement of Expenditure procedure;
- (vi) Prepare any prospective co-financing to meet the requirement of government's investment scheme for the project;
- (vii) Assess executing and implementing agency's financial management capabilities and provide recommendations for institutional strengthening of financial management; and
- (viii) Support the selected projects' executing agency and ADB team in meeting project readiness criteria for project Board approval. The consultants' activities will be guided by, and outputs prepared in accordance with Guidelines on the ADB's Financial Management and Analysis of Projects (2005) as described in the ADB's Financial Due Diligence: A Methodology Note (2009); and ADB's technical guidance notes for Financial Management Assessment (2015) and for Project Financial Reporting (2015), and for Preparation of Cost Estimates (2014), eLearn module for Cost Estimates preparation and presentation, and other resources available at the website of ADB's Procurement, Portfolio, and Financial Management Department. The consultant is required to coordinate and cooperate with other specialists closely.

39. Project economist (international, 6 person-months). The specialist will have a degree in economics or related field with a minimum of 10 years' experience in economic analysis of power sector projects or similar projects, and experience with economic analysis of ADB (or other multilateral development bank) funded projects. The specialist will undertake the following tasks:

- (i) Assess the economic benefits of the project and develop a methodology to define the benefits of the project and then quantify them;
- (ii) Specify indicators to monitor the project benefits and establish procedures and provide cost estimates for benefit monitoring and evaluation;
- (iii) Undertake the 10 Keys Areas of Economic Analysis including demand and least cost analysis; and
- (iv) Support the selected projects' executing agency and ADB team in meeting project readiness criteria for project Board approval. The consultants' activities will be guided by, and outputs prepared in accordance with ADB's Guidelines for the Economic Analysis of Projects (2017). The consultant is required to coordinate and cooperate with other specialists closely.

40. **Procurement specialist (international, 8 person-months).** The specialist will have a degree in engineering and a minimum of 10 years' experience years in procurement in the power sector and related projects, and experience with procurement in line with ADB requirements. The specialist will undertake the following tasks:

- (i) Undertake and prepare the Project Procurement Risk Assessment including procurement capacity assessment;
- (ii) Develop suitable contract packaging and assist the EA to prepare a procurement plan covering the whole implementation period of procurement activities for multiple subprojects in provinces;
- (iii) Prepare Master Bidding Documents for each type of contract to be used;
- (iv) Provide reports on the assessment findings, gaps and capacity building programs for enhancing the country procurement capacity;
- (v) Carry out job training and workshops to develop staff capability on procurement management for executing and implementing agencies, and relevant government agencies, particularly in the preparation of bidding documents and bidding procedures; and
- (vi) Support the selected projects' executing agency and ADB team in meeting project readiness criteria for project Board approval. The consultants' activities will be guided by, and outputs prepared in accordance with the ADB Procurement Guidelines (2015, as amended from time to time). The consultant is required to coordinate and cooperate with other specialists closely.

41. **Environmental specialist (international, 6 person-months).** The specialist will have a degree in environmental science or related field and a minimum of 10 years' experience working in areas of environmental safeguards for ADB (or other multilateral development bank) funded projects. The specialist will undertake the following tasks:

- (i) Conduct and prepare the Rapid Environmental Assessment Checklist, and the initial environmental examination (IEE) including environmental management plan for the project;
- (ii) Conduct an environmental audit of the project;
- (iii) Review safeguards documents produced by the executing agency and fill the gaps, if any, to ensure compliance with ADB Safeguard Policy Statement 2009;
- (iv) Revise the project administration manual safeguard sections as required;
- (v) Support the executing agency in implementing safeguard plans by developing a detailed terms of reference and assisting the executing agency in implementing

the plan and provide training and capacity building in dealing with environmental issues; and

- (vi) Support the projects' executing agency and ADB team in meeting project readiness criteria for project Board approval. The consultant is required to coordinate and cooperate with other specialists closely.

42. **Social resettlement specialist (international, 6 person-months).** The specialist will have a degree in social science or a related field and a minimum of 10 years' experience in working in areas of social safeguard for ADB (or other multilateral development bank) funded projects. The specialist will undertake the following tasks:

- (i) Review national and local laws and regulations, administrative arrangements and requirements, and budgetary processes relevant to land acquisition and resettlement (LAR) and indigenous peoples; analyze relevant laws and regulations vis-à-vis ADB's social safeguard requirements, as described in the ADB Safeguard Policy Statement and recommend gap-filling measures as needed;
- (ii) Review available reports and secondary data on relevant resettlement and indigenous people issues;
- (iii) Identify potential LAR impacts of proposed project components and conduct the necessary preparatory surveys (inventory of loss, socioeconomic survey of project-affected households);
- (iv) Work closely with other consultants in exploring design options to avoid LAR impacts for proposed project components;
- (v) Determine the replacement costs of all categories of losses;
- (vi) If any land acquisition or resettlement is needed for the project, help the executing and implementing agencies in preparing a resettlement plan consistent with ADB standards;
- (vii) Conduct meaningful consultations with affected households and other relevant stakeholders; work closely with the government agency responsible for resettlement and assist the government in initiating a participatory process for preparing and approving a resettlement plan;
- (viii) Confirm if there are potential social impacts associated with any associated facilities and prepare a due diligence report (DDR) with a corrective action plan;
- (ix) Determine the presence of indigenous peoples /ethnic minorities (as per definition of indigenous peoples in the ADB Safeguard Policy Statement) in the proposed project areas. If indigenous peoples are present, carry out surveys and field-based studies as required to assess potential project impacts on them;
- (x) Determine whether indigenous peoples will be physically displaced and whether impacts, if any, are principally resettlement in nature. Based on the assessment, determine the need for a stand-alone Ethnic Minorities Development Plan (EMDP), or combined resettlement and ethnic minorities development plan (REMDP) in line with ADB Safeguard Policy Statement requirements, including appropriate budget and implementation arrangements, and measures to ensure meaningful participation of the indigenous peoples and involvement of NGOs, where appropriate;
- (xi) Ensure overall project compliance with ADB's indigenous people safeguard; work closely with other specialists to ensure indigenous people concerns, impacts, mitigation measures and required resources are reflected in the overall project design, cost estimates, and other relevant project documents;
- (xii) Develop a project-specific grievance redress mechanism to handle complaints in an effective and culturally appropriate manner;

- (xiii) Advise the executing agency, participating local government(s), and implementing agencies on ADB Safeguard Policy Statement requirements and procedures;
- (xiv) Assess the capacity and commitment of responsible institutions to update and implement the resettlement plan/EMDP/REMDP. Recommend an institutional strengthening strategy, and/or formation and training of a social safeguards unit within the executing and implementing agencies, if required;
- (xv) Assist in preparing relevant appendices and sections of the RRP and other related draft documents, including the design and monitoring framework, the summary poverty reduction; and social strategy and any social action, mitigation, and/or participation/communication plans; and
- (xvi) Support the selected projects' executing agency and ADB team in meeting project readiness criteria for project Board approval. The consultant is required to coordinate and cooperate with other specialists closely.

43. **Gender specialist (international, 5 person-months).** The specialist should have a masters' degree in social sciences, gender studies or public administration (an additional degree in engineering will be an advantage). She/he should have formal training in gender analysis and gender planning and demonstrated experience, skills, and expertise in mainstreaming gender in infrastructure projects, especially in the energy sector, including in renewable energy systems and projects. She/he should be familiar with the energy sector in the Asia and Pacific region, particularly in South East Asian countries, especially on issues of "vulnerability," "accessibility," and "affordability" related to energy resources and services. Experience in conducting primary gender research is needed. She/he should also be familiar with gender analysis tools and methodologies in the energy sector. She/he should have consulted for international or nongovernment organizations (NGOs) supporting gender and development work in the energy sector. She/he will be responsible for the following key tasks:

- (i) Review ADB documents on the requirements for gender mainstreaming such as Policy on Gender and Development (1998), OM C2 on Gender and Development in ADB Operations (2010), and Guidelines for Gender Mainstreaming Categories of ADB Projects (2012);
- (ii) At the outset, agree with ADB and the executing agency on the intended gender category of the concerned project;
- (iii) As part of the poverty and social analysis, conduct a detailed gender analysis as guided by ADB's Gender and Energy Tool Kit (<https://www.adb.org/sites/default/files/institutional-document/33650/files/gender-toolkit-energy.pdf>), particularly emphasizing access to energy services and use of energy services and gender division of labor, control of energy sources and technologies, women's and men's energy needs and preferences, and opportunities for and constraints on women's participation;
- (iv) Identify the socioeconomic profile of key stakeholder groups in the target population and disaggregate data by sex and analyze the link between poverty and gender;
- (v) Assess and identify potential gender-differentiated impacts of the project;
- (vi) Collect sex-disaggregated baseline data that could be used to monitor potential project gender benefits and impacts;
- (vii) Assess and recommend key gender elements in mitigation measures (e.g., resettlement, HIV, trafficking in women);
- (viii) Identify government agencies, nongovernment and community-based organizations, and women's groups that can be utilized during project preparatory

- phase and project implementation and assess their capacity;
- (ix) Review the related policy and legal framework, as necessary;
- (x) Based on gender analysis, develop a gender action plan (GAP) for the concerned project that mirrors the design and monitoring framework outputs and includes gender-inclusive design features, gender targets and indicators, time lines, assigned responsibilities, and implementation arrangements;
- (xi) Provide cost estimates for GAP implementation;
- (xii) Integrate GAP or gender design features in the project design and relevant project documents;
- (xiii) Prepare terms of reference for gender specialist services to implement GAP or project gender features, including for any NGOs to be recruited for implementation;
- (xiv) Prepare other documentations related to gender required in the report and recommendation of the President (RRP) (e.g., design and monitoring framework gender targets, implementation arrangements of the project administration memorandum, summary poverty reduction, and social strategy); and
- (xv) Provide any other required gender inputs as may be necessary under the TRTA facility, more particularly under its output 2 such as gender elements as part of policy advice, sector analysis and capacity-development e.g. related to energy efficiency, tariff analysis, etc.

44. **Climate change specialist (international, 2.5 person-months).** The specialist will have a master's degree or higher in environmental management, climate change, or a related area with preferably 5 years of relevant experience in the areas directly related to climate change adaptation and experience in conducting climate change vulnerability and impact assessments. The specialist will undertake the following tasks:

- (i) Identify climate change risks and assess the impact on selected projects;
- (ii) Develop measures to improve climate change resilience and promote adaptation and mitigation; and
- (iii) Provide training to stakeholders as required. The specialist will prepare a report supplementing the IEE report and describe the methodological framework adopted for, and results emerging from: (a) project site visits, stakeholder consultation and the review of documentation that may be relevant to the project, especially in relation to the identification of project components or assumptions (e.g. associated with design, infrastructure or operation) that could be vulnerable to existing or future hydroclimatic impacts; (b) an investigation into the availability and quality of data, tools, and/or models for assessing existing or future hydroclimatic conditions and risks for the project; and (c) A Climate Risk and Vulnerability Assessment. Screen the project for climate change risks (using ADBs AWARE tool) and eventually propose adaptation measures including engineering and non-engineering adaptation measures for the project design to better understand any climate-related vulnerabilities to the project components. The consultant is required to coordinate and cooperate with other specialists closely.

45. **Knowledge specialist (international, 2.5 person-month).** The specialist will have a master's degree or higher in development, communication, knowledge management, or other related fields with preferably 5 years of relevant experience in knowledge capturing and disseminations in energy sector. The specialist will undertake the following tasks:

- (i) Identify knowledge sharing needs in the participating countries;

- (ii) Develop stakeholder coordination and a communication plan;
- (iii) Develop knowledge deliverables to effectively capture and share knowledge arising from the project; and
- (iv) Prepare and organize knowledge sharing events.

46. **Resource persons (international, 3 person-months).** Resource persons (technical specialists, project management experts, and/or ADB staff) will be engaged to review documents and be speakers, facilitators, or discussants in related workshops, seminars, or conferences. Recruitment of these experts will be on need basis. The terms of reference for these experts will be developed on demand.

D. National Consultants

47. **Power sector specialist (national, 13 person-months).** The specialist will have a degree in electrical engineering or related field and preferably 15 years of professional experience in energy development projects and experience in ADB-funded projects (or by any other similar international funding agencies). The consultant will assist international technical specialists as appropriate and provide inputs as necessary. The consultant will undertake the following tasks:

- (i) Review selected feasibility studies and detailed design reports, ensure quality control, analyze technical and institutional risks associated with the proposed approach and identify mitigation measures; and
- (ii) Support the selected projects' and ADB team in meeting project readiness criteria for project Board approval.

48. **Renewable energy specialist (national, 5 person-months).** The specialist will have a degree in electrical engineering or related field and preferably 15 years of professional experience in renewable energy development projects and experience in ADB-funded projects (or by any other similar international funding agencies). The consultant will assist international technical specialists as appropriate and provide inputs as necessary. The consultant will undertake the following tasks:

- (i) Review selected feasibility studies and detailed design reports, ensure quality control, analyze technical and institutional risks associated with the proposed approach and identify mitigation measures; and
- (ii) Support the selected projects' and ADB team in meeting project readiness criteria for project Board approval.

49. **Transmission engineer (national, 9 person-months).** The specialist will have a degree in electrical engineering or related field and preferably 15 years of professional experience in transmission network development projects and experience in ADB-funded projects (or by any other similar international funding agencies). The consultant will assist international transmission specialist as appropriate and provide inputs as necessary. The consultant will undertake the following tasks:

- (i) Review selected feasibility studies and detailed design reports, ensure quality control, analyze technical and institutional risks associated with the proposed approach and identify mitigation measures; and
- (ii) Support the selected projects' and ADB team in meeting project readiness criteria for project Board approval.

50. **Distribution engineer (national, 5 person-months).** The specialist will have a degree in electrical engineering or related field and preferably 15 years of professional experience in distribution network development projects and experience in ADB-funded projects (or by any other similar international funding agencies). The consultant will assist international distribution specialist as appropriate and provide inputs as necessary. The consultant will undertake the following tasks:

- (i) Review selected feasibility studies and detailed design reports, ensure quality control, analyze technical and institutional risks associated with the proposed approach and identify mitigation measures; and
- (ii) Support the selected projects' and ADB team in meeting project readiness criteria for project Board approval.

51. **Energy efficiency specialist (national, 3 person-months).** The specialist will have a degree in electrical engineering or related field and preferably 15 years of professional experience in energy efficiency projects and experience in ADB-funded projects (or by any other similar international funding agencies). The consultant will assist international energy efficiency specialist as appropriate and provide inputs as necessary. The consultant will undertake the following tasks:

- (i) Review selected feasibility studies and detailed design reports, ensure quality control, analyze technical and institutional risks associated with the proposed approach and identify mitigation measures; and
- (ii) Support the selected projects' and ADB team in meeting project readiness criteria for project Board approval.

52. **Energy policy and regulatory specialist (national, 5 person-months).** The specialist will have a master's degree in energy economics, public policy, or related field with a minimum 15 years' professional experience in policy analysis and strategic planning and organization management in energy sector. The consultant will assist international energy policy and regulatory specialist as appropriate and provide inputs as necessary. The specialist will undertake the following tasks:

- (i) Review energy sector laws, policies, and strategies;
- (ii) Conduct the sector assessment, identify the areas for improvement and develop a roadmap for sector policy development and reforms; and
- (iii) Conduct workshops, seminars, and conferences.

53. **Power system planner (national, 2 person-months).** The specialist will have a master's degree in electric engineering or related field with a minimum 10 years' professional experience in power system planning. The consultant will assist international power system planner as appropriate and provide inputs as necessary. The consultant will undertake the following tasks:

- (i) Review existing power system planning studies and reports and existing network studies (load flow, steady state and transient stability, short circuit);
- (ii) Review power development plans for the Greater Mekong region in general, with a view to assessing the implications the country's power sector plans;
- (iii) Obtain an updated understanding of the implementation of the various plans in consultation with the government;
- (iv) Conduct additional network studies to determine the timing of 500kV/230kV transmission lines if necessary;

- (v) Determine a least-cost optimal generation plan to deliver a reliable power system based on updated demand forecasts and outlooks for rooftop solar photovoltaic uptake and existing and planned generation projections;
- (vi) Carry out dispatch simulations for a variety of conditions to demonstrate the robustness of the developed plan;
- (vii) Train government and utility staff in the use of existing power system planning software; if no such software exists, procure a suitable power system planning software package considering suitability and lifecycle costs;
- (viii) Develop the updated 10-year power development plan that considers low cost solar photovoltaics generation in the power generation mix; and
- (ix) Conduct workshops, seminars, and conferences.

54. Financial/PPP specialist (national, 1 person-months). The specialist will have a master's degree in finance or business administration, CA/CPA or equivalent and a minimum of 10 years' experience, and extensive experience with PPP and IPP projects. The consultant will assist international financial/PPP specialist as appropriate and provide inputs as necessary. The consultant will undertake the following tasks:

- (i) Assess the availability of financial resources from domestic and international bilateral, multilateral, and private sector sources in meeting the investment needs, and develop a financing plan to implement the long-term sector planning;
- (ii) Develop business models and a database of innovative sources of investment for renewable energy and energy efficiency projects, including analyzing the possibility of developing the projects under a public-private partnership;
- (iii) Develop a funding vehicle that can attract global climate financing and leverage private sector resources for clean energy projects;
- (iv) Design, organize, facilitate, and document public stakeholder discussions with a range of stakeholders, including civil society, ensuring that they follow ADB models of good practice for consultation; and
- (v) Conduct workshops, seminars, and conferences.

55. Project financial specialist (national, 7 person-months). The specialist will have a master's degree in finance or business administration, CA/CPA or equivalent and a minimum of 10 years' experience in project financial analysis in the power sector and related projects including in FDD, and experience with ADB (or other multilateral development bank) funded projects. The consultant will assist international project financial specialist as appropriate and provide inputs as necessary. The consultant will undertake the following tasks:

- (i) Conduct an FDD of the project and financial analysis of executing and implementing agencies;
- (ii) Prepare detailed project cost estimates and financing plans;
- (iii) Prepare any prospective co-financing to meet the requirement of government's investment scheme for the project;
- (iv) Assess executing agency and implementing agency's financial management capabilities and provide recommendations for institutional strengthening of financial management; and
- (v) Support the selected projects' executing agency and ADB team in meeting project readiness criteria for project Board approval.

56. Project economist (national, 5 person-months). The specialist will have a degree in economics or related field with a minimum of 10 years' experience in economic analysis of power

sector projects or similar projects, and experience with economic analysis of ADB (or other multilateral development bank) funded projects. The consultant will assist international project financial specialist as appropriate and provide inputs as necessary. The consultant will undertake the following tasks:

- (i) Assess the economic benefits of the project and develop a methodology to define the benefits of the project and then quantify them;
- (ii) Design specific indicators to monitor the project benefits and establish procedures and provide cost estimates for benefit monitoring and evaluation;
- (iii) Undertake the 10 Keys Areas of Economic Analysis including demand and least cost analysis; and
- (iv) Support the selected projects' executing agency and ADB team in meeting project readiness criteria for project Board approval.

57. Procurement specialist (national, 6 person-months). The specialist will have a degree in engineering and a minimum of 10 years' experience in procurement in the power sector and related projects, and experience with procurement in line with ADB requirements. The consultant will assist international procurement specialist as appropriate and provide inputs as necessary. The consultant will undertake the following tasks:

- (i) Undertake and prepare the Project Procurement Risk Assessment including procurement capacity assessment;
- (ii) Develop suitable contract packaging and assist the executing agency to prepare a procurement plan covering the whole implementation period of procurement activities for multiple subprojects in provinces;
- (iii) Prepare Master Bidding Documents for each type of contract to be used;
- (iv) Provide reports on the assessment findings, gaps and capacity building programs for enhancing the country procurement capacity;
- (v) Carry out job training and workshops to develop staff capability on procurement management for executing and implementing agencies, and relevant government agencies, particularly in the preparation of bidding documents and bidding procedures; and
- (vi) Support the selected projects' executing agency and ADB team in meeting project readiness criteria for project Board approval.

58. Environmental specialist (national, 6 person-months). The specialist will have a degree in environmental science or related field and a minimum of 10 years' experience in working in areas of environmental safeguards for ADB (or other multilateral development bank) funded projects. The consultant will assist international environmental specialist as appropriate and provide inputs as necessary. The consultant will undertake the following tasks:

- (i) Conduct and prepare the Rapid Environmental Assessment Checklist and the IEE including an environmental management plan for the project;
- (ii) Conduct an environmental audit of the project;
- (iii) Review safeguards documents produced by the executing agency and fill in the gaps, if any, to ensure compliance with ADB Safeguard Policy Statement;
- (iv) Revise the project administration manual safeguard sections as required;
- (v) Support the executing agency in implementing safeguard plans by developing a detailed term of reference and assisting the executing agency in implementing the plan, and provide training and capacity building in dealing with environmental issues; and

- (vi) Support the projects' executing agency and ADB team in meeting project readiness criteria for project Board approval.

59. **Social resettlement specialist (national, 6 person-months).** The specialist will have a degree in social science or a related field and a minimum of 10 years' experience in working in areas of social safeguard for ADB (or other multilateral development bank) funded projects. The consultant will assist the international social resettlement specialist as appropriate and provide inputs as necessary. The consultant will undertake the following tasks:

- (i) Review national and local laws and regulations, administrative arrangements and requirements, and budgetary processes relevant to LAR and indigenous peoples; analyze relevant laws and regulations vis-à-vis ADB's social safeguard requirements, as described in the ADB Safeguard Policy Statement, and recommend gap-filling measures as needed;
- (ii) Review available reports and secondary data on relevant resettlement and indigenous people issues;
- (iii) Identify potential LAR impacts of proposed project components and conduct the necessary preparatory surveys (inventory of loss, socioeconomic survey of project-affected households);
- (iv) Work closely with other consultants in exploring design options to avoid LAR impacts for proposed project components;
- (v) Determine the replacement costs of all categories of losses;
- (vi) If any land acquisition or resettlement is needed for the project, help the executing agency and implementing agencies in preparing a resettlement plan consistent with ADB standards;
- (vii) Conduct meaningful consultations with affected households and other relevant stakeholders; work closely with the government agency responsible for resettlement and assist the government in initiating a participatory process for resettlement plan preparation and approval;
- (viii) Confirm if there are potential social impacts associated with any associated facilities and prepare a due diligence report (DDR) with a corrective action plan;
- (ix) Determine the presence of indigenous peoples /ethnic minorities (as per definition of indigenous peoples in the ADB Safeguard Policy Statement) in the proposed project areas. If indigenous peoples are present, carry out surveys and field-based studies required to assess potential project impacts on them;
- (x) Determine whether indigenous peoples will be physically displaced and whether impacts, if any, are principally resettlement in nature. Based on the assessment, determine the need for a stand-alone Ethnic Minorities Development Plan (EMDP), or combined REMDP in line with ADB Safeguard Policy Statement requirements, including appropriate budget and implementation arrangements, and measures to ensure meaningful participation of the indigenous peoples and involvement of NGOs, where appropriate;
- (xi) Ensure overall project compliance with ADB's Indigenous Peoples safeguard; work closely with other specialists to ensure Indigenous Peoples concerns, impacts, mitigation measures and required resources are reflected in the overall project design, cost estimates, and other relevant project documents;
- (xii) Develop a project-specific grievance redress mechanism to handle complaints in an effective and culturally appropriate manner;
- (xiii) Advise the executing agency, participating local government(s), and implementing agencies on ADB's Safeguard Policy requirements and procedures;

- (xiv) Assess the capacity and commitment of responsible institutions to update and implement the resettlement plan/EMDP/REMDP; recommend an institutional strengthening strategy, and/or formation and training of a social safeguards unit within the executing and implementing agencies, if required;
- (xv) Assist in preparing relevant appendices and sections of the RRP and other related draft documents, including the design and monitoring framework, the summary poverty reduction and social strategy and any social action, mitigation, and/or participation/communication plans; and
- (xvi) Support the selected projects' executing agency and ADB team in meeting project readiness criteria for project Board approval.

60. **Gender specialist (national, 5 person-months).** The specialist should have a postgraduate university degree in social sciences, gender studies or public administration (an additional degree in engineering will be an advantage). She/he should have formal training in gender analysis and gender planning and demonstrated experience, skills, and expertise in mainstreaming gender in infrastructure projects, especially in the energy sector, including in renewable energy systems and projects. She/he should be familiar with the energy sector in the Asia and Pacific region, particularly in South East Asian countries, especially on issues of "vulnerability," "accessibility," and "affordability" related to energy resources and services. Experience in conducting primary gender research is needed. She/he should also be familiar with gender analysis tools and methodologies in the energy sector. She/he should have consulted for international or nongovernment organizations (NGOs) supporting gender and development work in the energy sector. The specialist will be responsible for the following key tasks:

- (i) Review ADB documents on the requirements for gender mainstreaming such as Policy on Gender and Development (1998), OM C2 on Gender and Development in ADB Operations (2010), and Guidelines for Gender Mainstreaming Categories of ADB Projects (2012);
- (ii) At the outset, agree with ADB and the executing agency on the intended gender category of the concerned project;
- (iii) As part of the poverty and social analysis, conduct a detailed gender analysis as guided by ADB's Gender and Energy Tool Kit (<https://www.adb.org/sites/default/files/institutional-document/33650/files/gender-toolkit-energy.pdf>), particularly emphasizing access to energy services and use of energy services and gender division of labor, control of energy sources and technologies, women's and men's energy needs and preferences, and opportunities for and constraints on women's participation;
- (iv) Identify the socioeconomic profile of key stakeholder groups in the target population and disaggregate data by sex and analyze the link between poverty and gender;
- (v) Assess and identify potential gender-differentiated impacts of the project;
- (vi) Collect sex-disaggregated baseline data that could be used to monitor potential project gender benefits and impacts;
- (vii) Assess and recommend key gender elements in mitigation measures (e.g., resettlement, HIV, trafficking in women);
- (viii) Identify government agencies, nongovernment and community-based organizations, and women's groups that can be utilized during the project preparatory phase and project implementation, and assess their capacity;

- (ix) Review the related policy and legal framework, as necessary;
- (x) Based on gender analysis, develop a gender action plan (GAP) for the concerned project that mirrors the design and monitoring framework outputs and includes gender-inclusive design features, gender targets and indicators, time lines, assigned responsibilities, and implementation arrangements;
- (xi) Provide cost estimates for GAP implementation;
- (xii) Integrate GAP or gender design features in the project design and relevant project documents;
- (xiii) Prepare terms of reference for gender specialists to implement GAP or project gender features, including for any NGOs to be recruited for implementation;
- (xiv) Prepare other documentation related to gender required in the report and recommendation of the President (RRP) (e.g., design and monitoring framework gender targets, implementation arrangements of the project administration memorandum, summary poverty reduction, and social strategy); and
- (xv) Provide any other required gender inputs as may be necessary under the TRTA facility, more particularly under its output 2 such as gender elements as part of policy advice, sector analysis and capacity-development e.g. related to energy efficiency, tariff analysis, etc.

61. **Climate change specialist (national, 5 person-months).** The specialist will have a master's degree or higher in environmental management, climate change, or a related area with preferably 5 years of relevant experience in the areas directly related to climate change adaptation, and experience in conducting climate change vulnerability and impact assessments. The consultant will assist international climate change specialist as appropriate and provide inputs as necessary. The consultant will undertake the following tasks:

- (i) Identify climate change risks and assess the impacts on selected projects;
- (ii) Develop measures to improve climate change resilience and promote adaptation and mitigation; and
- (iii) Provide training to stakeholders as required. The specialist will prepare a report supplementing the IEE report and describe the methodological framework adopted for, and results emerging from: (a) project site visits, stakeholder consultation and the review of documentation that may be relevant to the project, especially in relation to the identification of project components or assumptions (e.g. associated with design, infrastructure or operation) that could be vulnerable to existing or future hydroclimatic impacts; (b) an investigation into the availability and quality of data, tools, and/or models for assessing existing or future hydroclimatic conditions and risks for the project; and (c) A Climate Risk and Vulnerability Assessment. Screen the project for climate change risks (using ADBs AWARE tool) and eventually propose adaptation measures including engineering and non-engineering adaptation measures for the project design to better understand any climate-related vulnerabilities to the project components. The consultant is required to coordinate and cooperate with other specialists closely.

62. **Resource persons (national, 6 person-months).** Resource persons (technical specialists, project management experts, and/or ADB staff) will be engaged to review documents and be speakers, facilitators, or discussants in related workshops, seminars, or conferences. Recruitment of these experts will be on need basis. The terms of reference for these experts will be developed on demand.

C. Reporting Requirements

63. The consultants will submit (i) an inception report within 2 months after mobilization, (ii) a revised inception report within 2 weeks after receiving comments from the executing and implementing agencies and ADB, (iii) an interim report within 9 months after mobilization, (iv) a revised interim report within 2 weeks after the interim workshop, (v) a draft final report within 20 months after mobilization, and (vi) a final report 1 month after the final workshop and receiving comments from ADB.

64. All TA deliverables and progress reports will be written in English. National consultants will be responsible for translating documents into national languages as necessary. Three copies of the deliverables will be submitted to ADB in English, and 10 copies will be submitted to the executing agency. The deliverables and progress reports should address the terms of reference, with details appropriate to that stage of the TA. The consultants invited to participate in the workshops and seminars will present key findings to relevant government agencies.

65. ADB will conduct inception, interim, and final review missions in addition to regular monitoring of TA implementation. During the missions, meetings with executing and implementing agencies and consultants will be held. ADB, together with the executing and implementing agencies and the consultants, will review consultant performance, implementation progress, and completion of deliverables based on the design and monitoring framework and the consultants' work plan. The reports submitted by the consultants will be reviewed by the executing and implementing agencies, ADB's cross-divisional team, other relevant government agencies, and external peer reviewers. The final outputs will be disseminated to key policy makers and stakeholders through the executing agency. The proceeds of the TA will be disbursed in accordance with ADB's *Technical Assistance Disbursement Handbook* (2010, as amended from time to time).