TERMS OF REFERENCE FOR CONSULTANTS

1. The transaction technical assistance facility (F-TRTA) will require a total of 44 person-months of consulting services (20 international and 24 national) in the areas of technical analysis and network planning for liquefied natural gas (LNG) infrastructure development, renewable energy development, procurement, financial management, financial analysis, economic analysis, environment safeguards and social development (involuntary resettlement, indigenous peoples, gender and poverty assessment). The survey works required for the LNG infrastructure development, purchase of software for network planning and analysis, trainings and workshops will be carried out as and when required in consultation with executing and implementing agencies.

Consultants to be recruited as Individuals

2. **Gas Sector Expert and Team Leader (international, 2.0 person-months).** This international specialist shall be able to analyze the business case for construction of LNG infrastructure including small scale LNG (SS LNG) options, various LNG procurement options and provide optimal sourcing arrangement for supply of LNG to Maldives. The international expert should have a post-graduation in management/business administration with a degree in engineering or closely related field, minimum 15 years of relevant experience in oil and gas and power projects including experience in development of LNG terminals with minimum of 5 years of marine experience. The experience of working with the Asian Development Bank (ADB) on LNG markets and operations in South Asia Subregional Economic Cooperation (SASEC) countries will be an advantage. The consultants will work in delivering the outputs which include but are not limited to:

(i) Act as the team leader and responsible for overall guidance and coordination to the technical and commercial experts (power sector specialist, marine expert, LNG commercial and regulatory expert and LNG transmission design expert) supporting LNG project;
(ii) Project planning and scheduling - list all the required activities, estimate their expected timelines for completion, develop the dependencies, identify the critical path and monitor them during the course of assignment to restrict the delays;
(iii) Advise on basic specifications for floating storage unit (FSU) terminal considering the gas needs for the proposed power plant;
(iv) Conduct meetings with the potential vendors/organize workshop before publishing a request for proposal (RFP) to gather insights on their requirements;
(v) Review of work being done by other engaged experts and present the results and findings before the executing agency and ADB for their approval;
(vi) Assess operational, economic and environmental benefits on account of replacing petroleum fuels with natural gas in power sector; and
(vii) Consolidate, document, and disseminate the major findings and results for knowledge management in collaboration with other experts at the end of the assignment.

3. **Power Sector Specialist (transmission and generation) (international, 2 person-months).** The International Power Sector Specialist, together with national experts, shall work with Ministry of Environment (MOE) and State Electricity Company Limited (STELCO) supported states in reviewing their existing power sector plan and provide technical and management expertise to implementing agencies, provide necessary guidance, recommendation and undertake all the required technical support in selecting the development of priority projects across transmission, and generation sectors. International consultant should have a master's

degree in electrical/power engineering together with 12 years of experience in energy sector project development, including 5 years' experience in providing bid advisory services for power sector projects development. The experience of working with ADB in power sector in SASEC countries will be an advantage. The consultants will work in delivering the outputs, which include but are not limited to:

(i) Demand analysis to substantiate the requirement of 200 megawatts (MW) gas-based power plant in Thilafushi;
(ii) Analyze the various contractual options for constructing the proposed power plant including SS LNG options;
(iii) In collaboration with the finance expert, undertake budgetary estimations of major components of the project, determining possible capacity cost, operational cost for the power plant under different contractual scenarios and its resulting impact on the cost of electricity generation;
(iv) Support the LNG Commercial and Regulatory Expert in drafting the RFP for construction and operations and maintenance (O&M) of the proposed power plant;
(v) Identify vendors/parties who would be interested to construct the gas-based power plant in Thilafushi Island;
(vi) Support the Team Leader in conducting the workshop with the relevant parties to identify their requirements (data, assumptions, output guarantee, bank guarantee, letter of credit, etc.);
(vii) Support the LNG Commercial and Regulatory Expert in drafting the RFP documents and associated project agreements for constructing the power plant; and
(viii) Support the Team Leader in preparing and disseminating the major findings for knowledge management, whenever required.

4. **Marine Expert (international, 1.5 person-months).** Review the sites and survey documents and analyze the location to suggest probable sites for FSU considering all technical, geographical, and commercial considerations. The international marine expert should have a degree in engineering or closely related field, Master's degree is preferable. The expert should have at least 8 years of working experience. The consultant will work in delivering the outputs which include but are not limited to:

(i) Analyze sea and weather conditions to assess its impact and the operational risks due to environmental and/or sea conditions of direct influence and recommend an appropriate set of limiting sea states;
(ii) Assess the need for breakwater and an offshore/onshore jetty;
(iii) Determine the mooring configuration and specifications of mooring equipment and jetty facilities for safe operations of the proposed infrastructure;
(iv) Prepare a location map showing general location, specific location, project boundary and project site layout with coordinates;
(v) Provide general commentary on berthing, unberthing, emergency departure and general ship traffic considerations based on operational requirements of the project; and
(vi) Support the team leader in preparing and disseminating the major findings for knowledge management, whenever required.

5. **LNG Commercial Expert (international, 2.5 person-months).** The consultants will: (i) undertake preliminary due diligence of project components and analyze the business case for development of LNG infrastructure including SS LNG options and gas-based power plant in Maldives and (ii) assess options for the implementation of public-private partnership (PPP)-type

structures in the sector and recommend an optimal commercial structure for the project. The international expert should have a post-graduation in business administration with degree in engineering or closely related field. The expert should have at least 8 years of relevant professional experience including experience in: (i) the commercial development of LNG-to-power integrated projects; (ii) the commercial structuring of energy- and LNG-related PPPs (or equivalent structures involving private sector developers) including build, own & operate (BOO), build, own, operate & transfer (BOOT), design, build and finance (DBF) etc. structures; (iii) accessing private LNG market players (developers etc.); and (iv) bid advisory services. Experience in policy and regulatory advisory assignments and experience of working with development of LNG projects in SASEC countries would be preferred. The consultants will work in delivering the outputs which include but are not limited to:

(i) Carry out a detailed project definition analysis which will involve the following:
   a) identify exhaustively the various LNG-to-power procurement options; and
   b) review in particular the feasibility and advantages of various PPP options including DBF, design, build, finance & operate (DBFO and DBFOM), BOOT etc.

(ii) Carry out an assessment of the potential counterparties under the considered commercial structures: financial and operational strengths of potential off takers, assessment of need for credit enhancements etc.;

(iii) Carry out market sounding among potential LNG project developers and investors to assess appetite of various envisaged structures;

(iv) Recommend optimal structures from a bankability and other considerations' point of view;

(v) Analyze the various contractual options for setting up the FSU, regasification units, pipelines and associated infrastructure for transporting regasified liquefied natural gas (R-LNG)/LNG to the power plant;

(vi) Draft the required RFP documents to source LNG & selection of project developer(s), mentioning the scope, terms of reference, qualification criteria and evaluation criteria, wherever applicable. The RFPs shall maintain full compliance with national laws, follow industry standards and align with expectations of international bidders:
   a) RFP for LNG procurement on competitive basis;
   b) RFP for deployment of FSU, regasification units and seaside mooring facilities;
   c) RFP for infrastructure and other allied facilities for LNG/R-LNG pipeline from FSU to the power station; and
   d) RFP for construction and operations of the proposed power plant.

(vii) Prepare the terms of business pertaining to following terms for different project agreements to be signed with project developers:
   c) Capacity, capacity utilization and specification;
   d) Performance guarantee and damages;
   e) Payment procedure, terms and guarantee;
   f) Data and information sharing, compliance obligations; and
   g) Any other term considered necessary.

(viii) Present the salient features of the RFPs to the interested parties during the pre-RFP workshop;

(ix) Consult with relevant agencies/stakeholders to understand their compliance requirements for installing the LNG infrastructure and estimate the anticipated timelines for approval; and

(x) Support the team leader in preparing and disseminating the major findings for knowledge management, whenever required.

6. **LNG Transmission Design Expert (international, 1.0 person-months).** The consultant will undertake preliminary due diligence of project components and design optimal pipeline required for development of LNG infrastructure and gas-based power plant in Maldives. The international expert should have a bachelor's degree in engineering or closely related field, master's degree is preferable. The expert should have at least 5 years of relevant professional experience including experience in design of transmission pipeline infrastructure for LNG projects. The consultants will work in delivering the outputs which include but are not limited to:

(i) Determine the routes and feasibility for transporting LNG/R-LNG from proposed FSU terminal to the power plant using subsea and onshore natural gas/LNG pipelines in consultation with the Ministry;
(ii) Undertake topographic route survey by available technology to finalize the tentative onshore route for laying and building the pipeline to transport LNG/R-LNG from the proposed FSU terminal to the power plant;
(iii) Identify details of gas pipeline configuration required, its capacity diameter, thickness, pressure and temperature ratings, major equipment viz. meters, pressure regulators, costs, feasibility etc.;
(iv) Support Commercial Expert in preparing the RFP for infrastructure and other allied facilities for LNG/R-LNG pipeline from FSU to the power station and related project agreements;
(v) Support Finance Expert in preparing budgetary estimations for the pipeline asset;
(vi) Support the Team Leader in conducting the pre-RFP workshop with the interested parties; and
(vii) Support the team leader in preparing and disseminating the major findings for knowledge management, whenever required.

7. **Renewable Energy Expert (international, 3.5 person-months).** The consultants will prepare the plan and technical analysis, and detailed specifications for renewable energy development considering the existing renewable penetration and other associated infrastructure. The international expert should have a degree in engineering and a post-graduation in renewable energy engineering. The expert should have at least 12 years of relevant professional experience with at least 7 years of experience in Small Islands Nations including design of renewable energy minigrids. The consultants will work in delivering the outputs which include but are not limited to:

(i) Review the existing system and propose plan for future renewable energy development for Maldives in line with Strategic Action Plan (2019–2023);
(ii) Support the Team Leader in providing necessary information and technical support, and support in discussions with the interested project developers;
(iii) Prepare a renewable energy-based cost benefit analysis which is practical and achievable based on Maldives scenario;
(iv) Support the Commercial Expert in preparing the comparative assessment; and
(v) Support the team leader in preparing and disseminating the major findings for knowledge management, whenever required.

8. **Environmental Specialist (international, 2 person-months).** The consultants will undertake preliminary due diligence of the project for ADB financing. This will include identifying any potential environmental issues and defining the scope of environment studies to be undertaken to meet the ADB's Safeguards Policy Statement (2009) requirements. Preferably the consultants have at least a master's degree in environmental science or similar and has at least 10 years of experience in technical assistance of development agencies like ADB, particularly in the power sector. The consultants will assess environmental impact on candidate project sites,

list impacts on soil, air and water and recommend relevant mitigation measures. The consultants will work in delivering the outputs which include but are not limited to:

(i) Conduct environmental impact assessment (EIA) for proposed project sites and prepare environmental assessment reports and required environmental management plans to determine mitigation measures in the respective design, construction, and maintenance phases of, and national regulatory requirements in accordance with the ADB's Safeguard Policy Statement (2009);
(ii) Prepare rapid environmental assessment checklist and determine environmental category for each proposed site;
(iii) Map the environmentally sensitive areas through checking the integrated biodiversity assessment tool and prepare a summary of environmental issues identified, e.g., any critical habitats might be triggered for each project to support the determination of its environmental categorization;
(iv) Conduct species surveys, if critical habitats triggered, in collaboration with ADB consultants, to determine the candidate project impacts and how to mitigate them based on the requirements of International Finance Corporation performance standard 6;
(v) Conduct avian species study if needed to provide suggestion on site selection in order to avoid the any fly way or critical habitats;
(vi) Conduct air quality assessment for biomass to provide mitigations for subprojects in degraded airsheds;
(vii) Prepare environmental assessment reports depending on the individual project categorization (environmental category A or B or C) assigned by ADB in accordance with the ADB's Safeguard Policy Statement (2009);
(viii) Organize and coordinate required environmental surveys and special baseline condition surveys in collaboration with ADB consultants. Responsible for preparation, implementation, documentation, and reporting of the baseline, e.g. water quality (pH, BOD, COD, DO, N, P, heavy metals etc.) and monitoring field surveys for vegetation, terrestrial fauna and aquatic life;
(ix) Document and organize public consultations, including local stakeholders, in project sites;
(x) Carry-out safeguards training, workshops, seminars, and other capacity building activities to facilitate improvement of executing agencies/implementing agencies' safeguards capacity as required;
(xi) Conduct additional environmental surveys as required; and
(xii) Perform other functions as may be assigned or delegated by ADB team leader from time to time during the assignment.

9. **Social Development and Gender Specialist (international, 1.5 person-months).** The consultant will undertake due diligence of the proposed projects for ADB financing in terms of social safeguards and gender. This will include identifying any potential resettlement and indigenous peoples issues, defining the scope of social studies to be undertaken, and prepare categorization forms and social safeguard plans to meet ADB's Safeguards Policy Statement (2009) requirements. The consultant will also contribute to the project's gender analysis, and will collaborate with the National Social and Gender Specialist in developing gender features to achieve some gender elements (SGE) and gender action plan (GAP) for effective gender mainstreaming (EGM) categorized projects. The consultant will be responsible to integrate social safeguards and gender considerations in the project documents and carry-out safeguards training, workshops, seminars, and other capacity building activities to facilitate improvement of implementing agencies' safeguards capacity as required. Preferably the expert has at least a

master's degree in social science or similar and has at least 10 years of experience in technical assistance of development agencies like ADB, particularly in the power sector.

10. **Social and Gender Specialist (national, 5 person-months).** The consultant will undertake due diligence of the proposed projects for ADB financing in terms of social safeguards and gender supporting the International Social Development and Gender Specialist. The consultant will be in charge of the groundwork including but not limited to the following: (i) designing the baseline survey to ensure sex-disaggregated data and information on issues of social inclusion; (ii) leading field data collection; (iii) conducting and documenting consultations with project stakeholders including affected persons in a gender-sensitive and inclusive manner; (iv) conducting awareness-raising among project teams on the importance of gender equality and social inclusion mainstreaming. The consultant will have at least a bachelor's degree in social science or similar or at least 5 years of experience in technical assistance of development agencies like ADB, particularly in the power sector.

11. **Energy Economist (International, 2.0 person-months)** The economist will prepare detailed economic analysis in accordance with ADB Guidelines for the Economic Analysis of Projects (2017). Specific tasks include:

(i) Review the macroeconomic context of the project to provide an understanding of the economy's overall performance and outlook, and of how specific macroeconomic factors may affect project performance;
(ii) Undertake demand analysis for the project services and or analysis of the expected constraint that the project should address. Demand analysis provides the basis for identifying the goods or services needed by users and for estimating the scale of, and economic benefits from, the investment project;
(iii) Identify the project rationale for public intervention which can be based on the failure of: (a) markets to adequately provide what society wants; or (b) public institutions to deliver public goods or services;
(iv) Help develop the "theory of change" for the project, which links demands/problems to be solved by the project, the project intervention, outputs, expected outcomes and impacts. The theory of change should be consistent with economic theory and evidence;
(v) Identify project alternatives. Least-cost analysis to be undertaken to identify the preferred alternative. The basis for selecting the preferred alternative should be clearly explained, particularly if it is not the least-cost alternative in economic terms;
(vi) Undertake and compare project benefits and costs in economic terms using with-project and without-project scenarios for each major project component. The basic criteria for assessing the project economic viability will be economic net present value and economic internal rate of return for subprojects (if included in project design) and total project. Border parity pricing should be applied for major tradable cost and revenue items, along with other appropriate conversion factors;
(vii) The economist is expected to conduct or coordinate collection of baseline economic and financial data. These data should have clear sources and should represent the situation with and without the project;
(viii) Assess if the project is sustainable (if its net benefits endure throughout its life at a level sufficient to meet the economic viability criteria) in accordance to ADB's Guidelines for the Economic Analysis of Projects (2017) and Greenhouse Gas Emissions Accounting for ADB Energy Project Economic Analysis: Guidance Note (2019) when preparing the economic analysis of projects. For revenue generating projects, financial analysis for project participants will be an important element of

sustainability analysis. For public sector projects assess the availability of funds to finance project expenditures, especially funds drawn from the government budget;

(ix) Undertake distributional analysis of project benefits to project beneficiary and stakeholder groups, and the extent to which they gain from benefits or bear costs associated with the project. Undertake poverty impact assessment where necessary;

(x) Undertake sensitivity and risk analysis. Where possible undertake a quantitative risk analysis (such as Monte Carlo simulation) and explicitly include probability distributions of key uncertain variables; and

(xi) Assist the project team leader to carry out project appraisal and prepare necessary documents for ADB project approval (supplementary appendix, summary appendix for report and recommendation to the President).

12. **Financial Management Specialist (international, 2 person-months).** The expert will support executing agencies in carrying out the financial management assessment as per ADB guidelines. The expert will conduct financial due diligence (FDD) in accordance with ADB's requirements.[1] Relevant guidance is available at http://www.adb.org/projects/operations/financial-management-resources. The FDD will include:

(i) Conduct a financial management assessment of the executing and implementing agencies, including: (a) assessing whether previous financial management assessments have been conducted by ADB or other agencies and, if so, reviewing the results and ascertaining whether these can be used as input; (b) assessing capacity for planning and budgeting, management and financial accounting, reporting, auditing, internal controls, and information systems; (c) reviewing proposed disbursement and funds-flow arrangements; and (d) concluding on the financial management risk rating and identifying and confirming measures for addressing identified deficiencies;

(ii) Support the preparation and agreement of cost estimates and a financing plan, which are based on verifiable data and are sufficient to support project implementation;

(iii) Prepare financial projections and conducting financial analyses of the executing and implementing agencies, and incremental recurrent costs, to determine financial sustainability, and reviewing proposed cost-recovery and tariff policies, including affordability;

(iv) Conducting financial evaluations (financial cost-benefit analyses) including sensitivity analyses of project components that have a cost-recovery objective;

(v) Where significant risks are identified to project financial sustainability or viability, proposing relevant financial performance indicators to be incorporated in financial covenants; and

(vi) Assess and reach agreement on financial reporting, auditing and public disclosure arrangements for the project, and, as appropriate, identifying and agreeing arrangements for receiving financial statements from executing and/or implementing agencies.

13. **Power System Specialist (national, 5 person-months).** The Power System Specialist (thereafter the Consultant) will be qualified with a degree in engineering or equivalent, with graduate qualifications and at least 7 years of work experience in the power sector. Working experience in South Asia would be preferable. He/she will support the International Power Sector

[1] ADB. 2014. Financial Management, Cost Estimates, Financial Analysis, and Financial Performance Indicators. *Operations Manual*. OMG2/BP. Manila

Specialist in power system due diligence activities for the project and other tasks mentioned in paragraph 3 as required.

14. **Project Manager (national, 9 person-months).** with engineering and/or procurement background and at least with 10 years of experience of project management. The coordinator will be involved in day to day coordination work at the Ministry of Environment and with other relevant stakeholders or agencies. He will coordinate with all the international and national consultants and will ensure that due diligence is being conducted as planned. He will lead the preparation of LNG infrastructure development. As a coordinator, he will also prepare periodic reports in coordination with the project team, MOE and ADB on the project preparation and troubleshooting.

15. **Environmental Specialist (national, 5 person-months).** The consultant will undertake due diligence of the proposed projects for ADB financing in terms of potential environmental issues and defining the scope of environment studies to be undertaken to meet the ADB's Safeguards Policy Statement (2009) requirements. The consultant will be in charge of the groundwork including but not limited to undertaking survey, collecting field data, and conducting consultation with project stakeholders and reporting to International Environmental Specialist. Preferably the expert has at least a bachelor's degree in environmental science or similar and has at least 5 years of experience in technical assistance of development agencies like ADB, particularly in the power sector.