

TERMS OF REFERENCE (SHORT TERM CONSULTANCY)

I. General information

Title of the assignment	Feasibility Study for implementing a Tri-Generation Facility at Biyagama Export Processing Zone, Malwana, Sri Lanka
Name of the project	Green Policy Dialogue Facility (GPDF)
Country	Sri Lanka
Deadline for submission	3 june 2025

II. Context and justification of the need

1) Expertise France

Expertise France (EF) is a public agency and the French inter-ministerial actor in international cooperation. It became a subsidiary of the French Agency for Development Group (AFD Group) in January 2022. As the second largest agency of its kind in Europe, it designs and implements projects that sustainably strengthen public policies in developing and emerging countries on a range of policy issues (e.g. sustainable development, governance, stability, health, education). It operates in key areas of development and contributes alongside its partners to the implementation of the Sustainable Development Goals (SDGs).

For more information, please visit the website: www.expertisefrance.fr

2) European Union Delegation to Sri Lanka and the Maldives

The European Union (EU) Delegation to Sri Lanka and the Maldives is the funding partner of the EU Green Recovery Facility¹. Cooperation between the EU and Sri Lanka is based on the partners' mutual respect for democratic principles and human rights and covers a number of key areas of cooperation, including; diversification of trade and investment; networking between EU and Sri Lankan business communities; strengthening technical, economic and cultural linkages and providing technical assistance to Sri Lanka to interact more effectively with the EU; supporting Sri Lanka's efforts to improve the living conditions of the poorer sections of the population; green recovery, environmental protection and sustainable management of natural resources.

The EU Green Recovery Facility is part of a series of EU funded initiatives to be rolled out between 2021 and 2027 under the Team Europe Initiative (TEI) "Green Recovery", which will mainly focus on green economic recovery and on valuing and protecting Sri Lanka's rich biodiversity.

For more information, please visit the website: https://www.eeas.europa.eu/delegations/sri-lanka_en?s=238

¹ "EU Green Recovery Facility" is the "brand name" of the Green Policy Dialogue Facility (GPDF) initiative.

3) EU Green Recovery Facility

The EU Green Recovery Facility (The Facility) is a four-year intervention funded by the European Union (EU). It uses the current economic crisis as an opportunity to support Sri Lanka towards a more sustainable growth trajectory. The ultimate goal entails achieving a green (and blue) economy that is circular, carbon neutral, and socially inclusive; which, not only, is more respectful of biodiversity resources and socio-economic/demographic context, but would also provide much needed macroeconomic stability.

In this context, the Facility harnesses policy experiences and knowledge from the EU, along with national and regional ones, to contribute to the green recovery (medium term) and transition (long term) of the Sri Lankan economy and society.

The Facility more specifically supports the mainstreaming of green economy (GE) challenges and objectives in the Sri Lankan policy landscape, as well as the facilitation of bringing GE policy to action by contributing to the following specific objectives:

- **SO1:** Support the development and implementation of inclusive national green, blue and sustainable public policies, with participation of women and men in all their diversity.
- **SO2:** Improve the business and investment climate in view of promoting an inclusive circular economy (both green and blue).
- **SO3:** Increase accessibility and availability to green and sustainable finance.

The primary direct beneficiaries of the Facility are public institutions, particularly the Ministry of Environment and the Ministry of Finance, as well as government institutions focused on SMEs. Other direct beneficiaries include the private sector, financial institutions, and civil society.

The Facility, which started in Q2 2023 is the first bilateral project implemented by Expertise France in Sri Lanka.

4) Background and justification

Sri Lanka's energy sector is a pivotal component of its socio-economic landscape, experiencing significant transformations to align with global and national sustainability goals. Over the years, the country has focused increasingly on renewable energy (RE) and energy efficiency (EE) as critical pillars for achieving its climate commitments and reducing reliance on imported fossil fuels. Guided by ambitious targets, including a 70% renewable energy share in electricity generation by 2030 and complete carbon neutrality by 2050, Sri Lanka's strategic approach is centred around comprehensive reforms, robust policies, and active involvement from both public and private sector stakeholders. The Facility Steering Committee's decision to explore feasibility studies for tri-generation systems reflects Sri Lanka's commitment to accelerating these clean energy initiatives.

The Sri Lankan energy sector consists primarily of electricity, petroleum, and biomass resources, with electricity being the focal point of ongoing renewable energy advancements. In Sri Lanka's energy sector, biomass and petroleum each contribute around 40-45% to primary energy supply, while electricity accounts for 10-12% of final energy use, with biomass dominating residential energy needs and petroleum primarily serving the transport sector.

The power sector is structured under the [Ministry of Energy \(MoPE\)](#), while the [Ceylon Electricity Board \(CEB\)](#), the key player in electricity generation, transmission, and distribution, is the dominant entity. [Lanka Electricity Company \(LECO\)](#) an institution established in 1983 to

distribute electricity in areas previously served by Local Authorities. LECO receives electricity from CEB at 11 kV and distributes in LECO franchise areas along the Western coastal belt. The [Public Utilities Commission of Sri Lanka \(PUCSL\)](#) serves as the regulator, overseeing compliance, efficiency, tariff and consumer protection procedures and standards. Additionally, the [Sri Lanka Sustainable Energy Authority \(SLSEA\)](#) leads efforts in promoting renewable energy and energy efficiency initiatives across various sectors.

[Sri Lanka's Nationally Determined Contributions \(NDCs\)](#) under the Paris Agreement emphasize a robust commitment to reduce greenhouse gas (GHG) emissions by 14.5% from the business-as-usual (BAU) scenario for the decade 2021- 2030. For the industrial sector, a commitment to introduce tri-generation facilities in selected industrial parks is part of the climate action plan submitted by Sri Lanka. With the aim to reduce GHGs and promote sustainable development. The following are listed as key activities of the NDC implementation plan to achieve this goal:

- Carry out rapid assessments of tri-generation potential in 10 industrial parks
- Carry out detailed assessment in one of the BOI industrial parks for piloting
- Developing business models and funding options
- Implement a Tri-generation facility pilot project
- Depending on the success of the pilot project, expand it into BOI and other industrial parks and other prospective applications
- Make provisions through policy instruments to have Tri-generation for new industrial zones

Tri-generation, also known as Combined Cooling, Heating, and Power (CCHP), is an advanced energy solution that simultaneously generates electricity, heating, and cooling from a single fuel source. This process efficiently utilizes fuel to produce multiple forms of energy, maximizing output and reducing waste. Tri-generation systems are particularly valuable in industrial zones, where facilities often require substantial amounts of energy in different forms to support diverse production processes, such as electricity for machinery, heating for processes, and cooling for climate & weather sensitive operations.

Sri Lanka has limited deployment of tri generation systems. These systems are only used in a very few industries to maximize energy efficiency by simultaneously producing electricity, steam, and cooling from a single fuel source.

In Sri Lanka, industrial zones like the Biyagama Export Processing Zone are significant energy consumers and produce notable greenhouse gas emissions due to their high demand for fossil-fuel-based electricity, heating, and cooling. Implementing tri-generation in these zones could play a crucial role in advancing Sri Lanka's targets for reducing greenhouse gas emissions. Additionally, integrating renewable resources into tri-generation, such as biomass, can further enhance sustainability and create economic opportunities by utilizing locally sourced fuels.

The [Biyagama Export Processing Zone \(BEPZ\)](#)² is one of Sri Lanka's key industrial zones, located in the Gampaha District, about 20 km from Colombo. Established in 1985 and managed by the Board of Investment (BOI) of Sri Lanka, it spans approximately 450 acres and hosts 62 tenant industries, including apparel, electronics, rubber, food processing, and logistics. The zone is home to both local and multinational companies, benefiting from tax incentives, infrastructure facilities, and proximity to Colombo Port and Bandaranaike

² BEPZ location - <https://g.co/kgs/21gdj2K>

International Airport. BEPZ plays a crucial role in Sri Lanka's export sector, contributing significantly to employment and economic growth.

An initial [feasibility study](#) (Annex 1) was carried out to explore the possibilities of introducing tri-generation at BEPZ initiated by SLSEA and conducted by Industrial Services Bureau (ISB) in 2018 with the support of University of Moratuwa (UOM). In the initial feasibility study, electrical demand analysis was done based on bulk supply information from CEB and onsite measurements were taken only in selected 36 industries. Thermal energy demand was calculated based on installed capacities, fuel consumption and operating efficiencies of thermal utilities. The 2018 feasibility study served as an initial assessment, concentrating on technical feasibility without considering sustainable business models for implementation and operation or concrete investment pathways. The need to evaluate various ownership, financing, and operational models was emphasized as a crucial component to ensure the project's economic and operational viability.

The energy demand and consumption profiles at the BEPZ have changed substantially since 2018. These changes could be attributed to an increase in production capacities, new types of industries operating within the zone, or variations in energy use patterns. Economic conditions, including electricity tariffs and fuel prices, have shifted significantly since the initial feasibility study. Moreover, supply chain dynamics for fuel and system components have evolved, which impacts the financial viability of the tri-generation system. A revised assessment is necessary to incorporate these economic and logistical factors. Hence there is a need for conducting a new feasibility study considering all above aspects.

III. Objectives and desired results

1) General Objective of the Consultancy

To accelerate the sustainable energy transition in Sri Lanka

2) Specific objectives of the Consultancy

To conduct a comprehensive feasibility study on implementing a tri-generation facility at BEPZ, assessing its technical, financial, environmental, and regulatory feasibility, and providing a roadmap for investment, relevant human resources mobilization and implementation.

3) Anticipated results

All key stakeholders of BEPZ have a clear understanding of the technical and financial viability of a Tri generation facility

IV. Description of the assignment

1) Planned activities

This feasibility study will assess the viability of establishing a centralized tri-generation plant utilizing biomass as the primary energy source at the Biyagama Export Processing Zone. The study is expected to provide critical insights into the technical, financial, and environmental feasibility of such a system.

The Consultancy Team will achieve the objective of this assignment through the following activities grouped in 3 phases:

Steps of the consultancy

Phase 1 – Inception phase

- Conduct stakeholder consultations with BOI, Ministry of Industries (MOI), Ministry of Environment (MOE), CEB, SLSEA, Central Environment Authority (CEA), tenant industries at BEPZ, potential funding organizations and other relevant entities.
- Conduct stakeholder consultations in order to have a stakeholder mapping indicating the roles of each stakeholder in the development / governance of the project
- Conduct site visits and review past feasibility study to analyse conclusions and gaps, policies, and regulations.
- Identification of parameters which should be taken into account for the assessment of the suitability of available land to be carried out in phase 2.
- Develop a detailed work plan and updated methodology to be approved before starting phase 2.

Phase 2 – Data Collection and Analysis Phase

- Conduct baseline energy demand (electricity, steam/hot water, cooling) assessments using industry data, surveys, and real-time monitoring (when adequate industry data is not available).
- Identify relevant environmental regulations and standards that the project must comply with.
- Identify suitable tri-generation technologies, in particular solutions from the European Union.
- Evaluate biomass supply chain feasibility including the sustainability of biomass sourcing, focusing on the long-term impacts on local agriculture, forestry, and land use.
- Develop contingency plans to address potential technical failures or biomass supply chain disruptions.
- Analyse and assess the suitability of available land within the BEPZ (or in the immediate neighbourhood) for the installation of the tri-generation plant.
- Assess the infrastructure requirements, including biomass treatment, storage facilities, connections to the power grid, water supply, and distribution networks.
- Conduct a site-specific environmental and social impact assessment (ESIA)³ to evaluate the potential effects on air quality, water resources, soil, and local ecosystems of the site available for the tri generation plant.
- Analyse potential revenue streams, including energy sales, waste heat recovery, and carbon credits.
- Assess the legality of selling electricity and thermal energy to tenant industries.
- Identify relevant governance framework needed for the project's success
- Develop financial models to project return on investment (ROI), payback period, and overall financial viability.
- Identify potential sources of funding through conventional and non-conventional financing including sustainable financing.
- Evaluate the feasibility of different financing structures, such as public-private partnerships (PPP).
- Evaluate risks related to cost overruns, market fluctuations in biomass prices, revenue projections, potential environmental hazards and propose risk mitigation strategies.

³ This needs to conform with IFC standards as well as applicable national requirements.

Phase 3 – Delivery phase

- Develop a detailed feasibility report consolidating findings from technical, financial, governance, regulatory and environmental assessments.
- Provide recommendations for the location, design/ specifications, implementation and operation,
- Provide recommendations on enabling environment for tri-generation projects in Sri Lanka (policies, regulations, etc.)
- Present findings to key stakeholders including the identified risks and the risk mitigation measures
- Develop a bankable report for implementing a Tri- generation facility at Biyagama Export Processing Zone
- For potential sources of funding identified in phase 2, identify funding modalities for the project and facilitate the initial discussions between the relevant BEPZ stakeholders and the identified funding partners.
- Validate recommendation with key relevant stakeholders
- Conduct a dissemination workshop for wider stakeholder group including policy makers and potential investors to present the validated findings and recommendations.

2) Anticipated deliverables

Phase	Deliverable	Objectives and expected results of the deliverable	Expected Submission
Phase 1	Deliverable 1 - Inception Report	Detailed and updated methodology and work plan, after conducting an initial stakeholder feedback / mapping, literature survey and initial site visit	T0 + 04 weeks
Phase 2	Deliverable 2 - Baseline Energy Assessment Report	Detailed analysis of energy demand and usage patterns at BEPZ.	T0 + 13 weeks
Phase 2	Deliverable 3 - Technical Feasibility Report	Evaluation of suitable tri-generation technology, infrastructure compatibility, biomass availability and sustainability.	T0 + 23 weeks
Phase 2	Deliverable 4 - Environmental Impact Assessment (EIA) report	Identification of potential environmental risks and mitigation strategies.	T0+ 37 weeks
Phase 2	Deliverable 5 - Financial Analysis Report	Investment models and cost-benefit analysis	T0 + 38 weeks
Phase 2	Deliverable 6 - Funding Modality Options Report	Different financial mechanisms or approaches available to fund the initiative	T0 + 39 Weeks
Phase 2	Deliverable 7 - Policy and Governance Assessment report	Review of regulatory requirements and necessary approvals for the proposed governance system.	T0 + 41 weeks

Phase 3	Deliverable 8 – Draft Feasibility and Financial pathway Report	Comprehensive document integrating all assessments and concrete financing modalities	T0 + 43 weeks
Phase 3	Deliverable 9 – Policy recommendations report	A report outlining the identified changes needed and associated recommendations to enable the emergence of tri-generation projects in Sri Lanka. The report should also highlight the positive aspects and impacts of such projects to increase the interest of policy makers and other key stakeholders.	T0 + 45 weeks
Phase 3	Deliverable 10 - Validation workshop Report	A workshop with relevant stakeholders to validate the findings and recommendations	T0 + 50 weeks
Phase 3	Deliverable 11 - Dissemination workshop report	A workshop with wider stakeholder participation including policy makers and potential investors to present the validated findings and recommendations.	T0 + 54 weeks
Phase 3	Deliverable 12 - Final Report	A finalized document based on deliverable 8 incorporating feedback from the validation workshop and presenting the conclusive feasibility study.	T0 + 56 weeks

T0 = Date of the notification of the contract

4) Monitoring and Evaluation (M&E) of the Consultancy Assignment

The Consultancy Team should report the assignment progress in a timely manner by aligning the planned activities with the M&E standards outlined in the M&E plan of the Facility, which will be shared with the Consultancy Team at the beginning of the consultancy. As part of the analysis phase, adjustments to the methodology or subsequent activities will have to be made as needed, with documentation of changes for M&E purposes. The methodology should therefore specify data sources, data collection and analysis along with methods and tools used, reporting, quality control and assurance procedures, etc.

5) Coordination

The Consultancy Team (service provider) shall designate a single contact person for project administrative purposes. Mr Etienne Baudon of the Sustainable Development Department (e-mail: etienne.baudon@expertisefrance.fr) will be the service provider's sole contact person for Expertise France.

The Consultancy Team will work under the supervision of the Project Manager of the Facility, based in Colombo, and in close collaboration with Expertise France headquarters from preparation for the consultancy and missions right up to its completion. Furthermore, regular exchanges must take place with the Project Manager on assignment progress and any difficulties that may be encountered.

A launch meeting shall be held 2 days after the contract award has been notified.

V. PLACE, DURATION AND INDICATIVE SCHEDULE

1. **Estimated start date:** 1 July 2025
2. **End date:** 30 July 2026
3. **Effective duration:** Approx. 56 weeks
4. **Location:** The consultancy will take place remotely as well as through missions in Sri Lanka.

VI. REQUIRED EXPERTISE AND PROFILES

These terms of reference define the **minimum required profiles**. If deemed necessary, a list of additional experts, comparable to the profiles presented below with justification for their expected contributions can be proposed. The Service Provider must also provide a declaration of the availability of such specialists and/or suitable subject matter expert/s for the required roles.

(International Profile) Team Leader cum Tri-Generation Expert

The Team Leader will be the main contact person for Expertise France for the execution of this task. In particular, the Team Leader will have to plan and direct the activities and work of the team according to the identified needs. The Team Leader will be held responsible for the quality of all deliverables and on time submissions.

The Team Leader should have the following set of qualifications, competencies, skills and experience:

Educational Qualifications:

- Master's degree or equivalent in the field of energy or related fields.

Professional Experience:

- A minimum of 10 years of experience in handling energy sector projects
- Proven experience in tri-generation project development and operation preferably in industrial zones within the last 5 years
- Experience in the European Union will be a strong asset.
- Experience in managing a team of consultants
- Experience in project management, risk assessment and project financing
- Professional experience in Sri Lanka or in South Asia in a similar assignment will be considered as an asset

Professional Skills:

- Excellent listening, synthesis and communication skills
- Rigour and ability to write in a clear, precise and concise manner
- Perfect oral and written command of English

(National or International Profile) - Energy Auditing Expert

This expert should have a very sound knowledge and experience on energy auditing and will work under the supervision of the Team Leader. She/he will ensure technical assessment is carried out in a comprehensive manner.

Educational Qualification:

- Master's degree or equivalent in the field of energy management or related fields

Any other profile in line with the consultancy to be performed can also be considered.

Professional Experience:

- A minimum of 8 years of experience in energy auditing including energy measurement, monitoring and verification
- A minimum of 5 years of experience on industrial operations and energy optimization
- A minimum of 5 year of experience in preparing investment grade bankable audit reports
- Knowledge on tri-generation would be a strong asset.

Professional Skills:

- Knowledge of Sri Lanka based industrial operations would be an asset
- Excellent analytical skills to verify energy data.
- Very good oral and written command of English.

(National or International Profile) – Industrial Operations Expert

The expert should have a very sound knowledge and experience on industrial operations, and will work under the supervision of the Team Leader. He/she will examine existing infrastructure and identify the upgrades needed towards transition to absorbing electricity, heating and cooling from the tri generation plant.

Educational Qualification:

- Undergraduate degree in electrical/mechanical engineering or related field
- A Master's degree in electrical/mechanical/industrial engineering or related field would be a strong asset

Any other profile in line with the task to be performed under this consultancy can also be considered.

Professional Experience:

- A minimum of 10 years of experience in working with steam systems, cold chains and or Heating Ventilation and Air Conditioning (HVAC) systems
- A minimum of 5 years of experience in energy transition/change management projects.
- Professional experience in Sri Lanka or in South Asia in a similar assignment will be considered as an asset
- Proven experience with Tri generation systems and governance will be an asset

Professional Skills:

- Good knowledge on vapour absorption chiller operation will be considered a strong asset
- Excellent listening, synthesis and communication skills
- Very good analytical, oral and written command of English

(International Profile) – Finance Expert

The expert should have a very sound knowledge on project finance and experience in securing green / sustainable project financing, and will work under the supervision of the Team Leader. He/she will be responsible for carrying out financial and economic analysis as well as mapping out the potential funding pathways and modalities.

Educational Qualifications:

- Undergraduate degree in Finance, Economics or related field
- A Master's degree in Finance, Economics or related field would be an asset

Any other profile in line with the task to be performed under this consultancy can also be considered.

Professional Experiences:

- A minimum of 8 years of experience in financial analysis and project finance
- A minimum of 3 years of experience in commissioned energy projects
- A minimum of 5 years of experience working with European funding partners and mechanisms, including European development banks.
- Proven experience in financial modelling and structuring actual projects
- Professional experience in Sri Lanka or in South Asia in a similar assignment will be considered as an asset

Professional Skills:

- Very good knowledge of green financing pathways
- Very good knowledge in clean energy initiatives
- Good knowledge on energy markets will be considered a strong asset

(International Profile) – Energy Governance Expert

The expert should have a very sound knowledge and experience on legal frameworks in electricity/ power sector particularly in renewable energy integration and will work under the supervision of the Team Leader. He/she will ensure overall legal and governance expertise for the assignment, he/she shall coordinate with stakeholders and understand legal/regulatory frameworks of Sri Lanka electricity/power sector and legal frameworks of Europe and other countries which have implemented successful tri-generation integration and govern

Educational Qualification:

- A Bachelor's degree in Law / LLB / Energy Policy
- A Master's degree in Law / LLM / Energy Policy or related field would be an asset

Any other profile in line with the task to be performed under this consultancy can also be considered.

Professional Experience:

- A minimum of 05 years of experience within the last 8 years in energy and utilities regulatory field.
- A minimum of 03 years of experience in tri-generation facility governance framework advisory.

- Professional experience in Sri Lanka or in South Asian in a similar assignment will be considered as an asset

Professional Skills:

- Good knowledge on Energy sector agreements such as Energy purchase agreements and power purchase agreements PPAs will be considered a strong asset
- Excellent listening, synthesis and communication skills
- Very good analytical, oral and written command of English

(National Profile) – Environmental Expert cum Stakeholder Engagement Expert

The expert should have a very sound knowledge and experience in conducting environmental impact assessments and stakeholder engagement, and will work under the supervision of the Team Leader. He/she will be responsible for carrying out an environmental impact assessment for the proposed plant.

Education Qualifications:

- Undergraduate degree in Environmental Sciences or related field
- A Master's degree in Environmental Sciences or related field would be an asset

Any other profile in line with the task to be performed under this consultancy can also be considered.

Professional Experiences:

- A minimum of 8 years of experience in conducting environmental impact assessments for energy projects
- A minimum of 5 years of experience in working with industrial zones or multi stakeholder projects
- Familiarity with local and international environmental regulations
- Familiarity with sustainable biomass supply chain
- Experience in stakeholder identification & engagement

Professional Skills:

- Very good knowledge of Environment and Social Impact Assessment [E(S)IA]
- Very good knowledge in clean energy initiatives
- Communication strategy Development
- Good knowledge on sustainable biomass will be considered a strong asset

Additional experts⁴

The consultancy team may also propose any additional experts required for the successful completion of the assignment with justification. The justification for deploying other experts and their expected level of efforts backed by their resumes should be submitted along with the resume of the team leader and the other expert/s profiles.

⁴ The service provider may decide to deploy experts as relevant and needed for the assignment

Three reference contacts must be communicated for each profile submitted and Expertise France reserves the right to organise an interview with the Team Leader and/or the designated team member, prior to the award of the contract as part of the evaluation process.

VII. Visibility

During the implementation of all activities, the Consultancy Team will have to ensure that the visibility of the European Union, Expertise France, and the EU Green Recovery Facility is maximised. All deliverables, as well as events organised, must be in line with the Facility's visibility guidelines and based on the Facility's templates.