**BARBADOS INVESTMENT AND DEVELOPMENT CORPORATION**

**TERMS OF REFERENCE FOR**

**DESIGN AND INSTALLATION SERVICES**

**TITLE**

**Provision of services** **to design and install a 250 kWh anaerobic digestion plant at Greenland Landfill or Newton Industrial Estate in Barbados.**

**INTRODUCTION**

The Barbados Investment and Development Corporation (BIDC) is an agency of the Government of Barbados with specific responsibility for promoting and facilitating industrial and export development. The Corporation is currently undergoing a strategic pivot to restructure Barbados’ manufacturing industrial landscape, centered around three (3) key pillars. These pillars are the ocean economy, bio economy and design economy. The Corporation aims to contribute to the diversification and growth of the Barbados economy through new investment, increased exports and employment creation. This will be achieved by fostering the development of competitive manufacturing and related services companies under the three (3) pillars. To this end, we wish to engage the services of a firm to design, build and install a 250 kWh biogas plant at Greenland Landfill or Newton Industrial Estate in Barbados.

**BACKGROUND**

The Government of Barbados propositions development of a vibrant bioenergy sector with 100% renewable energy transformation by 2030, owing to rising population size, high transportation costs, and extreme vulnerability to exogenous shocks. Bioenergy can contribute to a more secure, sustainable, and economically-sound future by providing domestic clean energy sources, reducing Barbados’ dependence on foreign oil, create green jobs and revitalize key service sectors such as agriculture and manufacturing. Through deployment of bioenergy technologies, Barbados will emerge as a regional leader in the clean energy economy.

Anaerobic digestion is mature technology exploited globally for waste management and resource recovery. In this biological process, micro-organisms breakdown of organic matter in an oxygen-free environment into biogas and a bio-fertilizer. Biogas is composed of methane (50-70 %) and carbon dioxide (30-40 %) with trace amounts of water vapor, hydrogen sulfide and other gases. Raw biogas can be converted directly to electricity and heat in a generator or upgraded to biomethane through removal of carbon dioxide and other contaminants. Compressed biomethane is carbon neutral and interchangeable with conventional natural gas. Applications of biomethane include cooking, industry processes and vehicle transport. The residue from anaerobic digestion of organic material is a low odor, pathogen free and nutrient-rich slurry that can be stored and used as biofertiliser or other value-added materials.

**PROJECT OVERVIEW**

The project seeks to design and install a 250 kWh anaerobic digestion plant at Greenland Landfill or Newton Industrial Park, requiring approximately 6000 tonnes of biomass input per year and generating approximately 2 MWh of electricity annually. Feedstock for anaerobic digestion will be various organic waste streams (food waste, roadside grasses, industrial wastewater, etc.) from BIDC’s industrial estates. The digester design should include the following components: feeding system, fermenter, gas treatment system, gasbag storage with analyser, gas flare, 250 kWh generator and digestate phase separator. The biogas generated will be injected into the national energy grid. The project objectives and deliverables are given below.

**PROJECT OBJECTIVES**

The objectives of this project are to:

1. Design 250 kWh anaerobic digestion plant in partnership with BIDC’s technical staff.
2. Build and install a biogas system at Greenland Landfill or Newton Industrial Park with national grid connection for electrification and digestate storage.
3. Perform preliminary testing of the biogas facility.
4. Provide training on operation and maintenance of the plant.

**SCOPE OF WORK**

The scope of work will include, but is not limited to the following:

1. Site verification of project before plant construction.
2. Assessment of the proposed substrate input feed/blends.
3. Plant construction drawings with a detailed feasibility study and recommendations for the size of the project based on proposed feedstock availability.
4. The civil works construction (construction of digester, inlet, outlet and feedstock pre-treatment facilities) should be done in line with the best engineering practices and quality assurance standards.
5. Test run and commissioning of biogas system (e.g. digester structural test, leakage test in digester and pipelines, measuring instruments check test, etc.)
6. In the case of electrification, the supply and installation of electrical and electronic equipment (e.g., generator, control panel, switch board, load controller, all earthing and lightning protection equipment) and other related accessories should be the responsibility of the firm.
7. Provide appropriate training to BIDC’s technical staff on the operation and maintenance of the plant.
8. Supply of standard operation and maintenance manuals.

**COMPANY EXPERIENCE**

Interested firms must demonstrate their level of experience in design and construction of large biogas plants systems. A summary of relevant projects undertaken to date should be provided. Additional information (e.g. project completion certificate) may be supplied to support the claims.

**PROJECT SCHEDULE AND DELIVERABLES**

|  |  |
| --- | --- |
| **Deliverables** | **Due Date** |
| Site visit + design of biogas plant | August 31, 2022 |
| Construction and installation of biogas plant | April 30, 2023 |
| Preliminary testing of facility | July 31, 2023 |
| Training on operation and maintenance of biogas plant | August 31, 2023 |

**TIMEFRAME**

The timeframe for the execution of the project is **August 1, 2022** to **August 31, 2023**.

If you believe that this project timeframe is not suitable given the required work, your bid should advise on dates you consider most suitable.

**BID SUBMISSION INSTRUCTIONS**

**Bid Response**

1. Main Proposal
   1. Executive Summary

* The Tenderer is requested to detail an overview of their proposed solution,

outlining the key benefits and how it relates to the requirements in the outlined

project objectives.

2. Method Statement & Project Schedule

* + - An outline of the procedures you will employ to undertake this work. See template in Appendix A.
    - A list of all tools and equipment you will be using.
    - Your plans for biogas plant design and implementation.
    - Method for staff training including the provision of Plant Operation and Maintenance Manuals and Health & Safety procedures.
    - A complete project schedule with broken down by task should also be included.

3. Health & Safety Procedures

* An outline of the steps and procedures you will take to maximise accident prevention.
* The protocols you will employ in the event of an accident, the first aid measures

you will have in place and any first aid training your staff have undergone.

* Full specifications and safety data sheets (SDS) of all materials used.

4. Site Management

* + - The name, contact information and a brief CV of the daily site manager.
    - The names and contact information for all other key personnel.
    - A list of contact phone numbers to be used in an emergency.
    - The protocols you will employ in the event of there being complaints about personnel behaviour.

Note: BIDC reserves the right to ask for the removal, from the site, of any personnel who are, in any way, causing a disturbance or offence.

5. Pricing

* Bidders are requested to complete the pricing table below, providing a detailed

breakdown of costs. Please include your invoicing schedule to meet your financial

obligations for this project.

|  |  |
| --- | --- |
| **Description** | **Price - USD**  **(VAT inclusive)** |
| 1. Project feasibility study including feedstock assessment |  |
| 2. Site verification and biogas plant design |  |
| 3. Supply, installation and commissioning of proposed system –  EQUIPMENT |  |
| 4. Supply, installation and commissioning of proposed system -  MATERIALS |  |
| 5. Supply, installation and commissioning of proposed system –  LABOUR |  |
| 6. Preliminary testing of facility |  |
| 7. Staff training and provision of relevant procedures/manuals: (i)  operation and maintenance, and (ii) health and safety. |  |

6. References

* Please provide at least two (2) references (property name and contact) for

properties, which you have, provided services of a similar scope.

* In no more than 1000 words, briefly describe your process for handling customer

complaints including the chain of command.

**BIDDERS DEADLINE**

The tender is open for submissions from **June 1, 2022,** to **Thursday July 14, 2022.**

All proposals must be submitted via email to [tenders@bidc.org](mailto:tenders@bidc.org) **no later than 4:00 p.m. on** **Thursday, July 14, 2022.**

Proposals should clearly address the stated objectives, deliverables and project scope.

Submissions received after the specified date and/or not compliant with the instructions stated in this notice will NOT be considered.

Firms are asked to contact the CEO’s Office at 427-5350 for further information or clarification with respect to submissions.

BIDC does not bind itself to accept the lowest or any tender.

**NOTES**

Please note that this project is the subject of a competitive tender.

Your submission should demonstrate appropriate capacity and experience. It must also show that you have the appropriate resources in place to meet the requirements outlined.

Total costs for the project should be quoted in USD. The payment schedule/payment terms for this project are provided below. We prefer to make payments solely to the firm selected.

**PAYMENT SCHEDULE/PAYMENT TERMS**

|  |  |
| --- | --- |
| **Activity** | **Payment Percentage** |
| Feasibility study + Site verification + Biogas plant design | 25% |
| Construction and installation of biogas plant | 25% |
| Preliminary testing of facility | 25% |
| Training staff on the operation and maintenance of the plant | 25% |

**APPENDIX A**

**METHOD STATEMENT TEMPLATE**

Method Statement written by:

Date:

Company:

Location of work to be carried out:

1. Brief Outline of the Work to be Undertaken

2. Tools, Equipment and materials to be utilized

3. Setting up Site

4. Reporting Details

Person in charge of the onsite work activity:

Contact details for the Manager:

In the event of an emergency the following contact numbers should be used:

5. Proposed Workplan

Week 1/Day 1:

Week 2/Day 2:

6. Other Information (quarterly progress reports)

Copies sent to:

1. Mr. Mark Hill, CEO of BIDC

Email: mhill@bidc.org

2. Dr. Terrell Thompson, Life Sciences Coordinator, BIDC

Email: tthompson@bidc.org

3. Mr. Neville Rice, Manager, Quality Infrastructure, BIDC

Email: nrice@bidc.org