

## TERMS OF REFERENCE

### *Assessment of the Market Variables, Technology and Enabling Environment for Sustainable Domestic Water Heating in Barbados*

#### I. INTRODUCTION

1.1 Under the Sustainable Energy Framework for Barbados the Government of Barbados has (GoB) developed a comprehensive suite of technical and policy based activities aimed at unlocking viable investments in Renewable Energy (RE) and Energy Efficiency (EE) while reducing energy costs and an overall dependency on imported fossil fuels. This framework has been the platform for the execution of Policy Based Loans such as (BA-L1021; and BA-L1022) and investment loans such as (BA-L1020; and BA-L1025. It has also supported RE and EE projects such as the Caribbean Hotel Energy Efficiency Action Program (CHENACT) ATN/OC-11465-RG, and the Advanced Program, CHENACT-AP, the Public Sector Smart Energy Program; Loan 2748/OC-BA and the Sustainable Energy Investment Program (Smart Fund) Loan 2748.

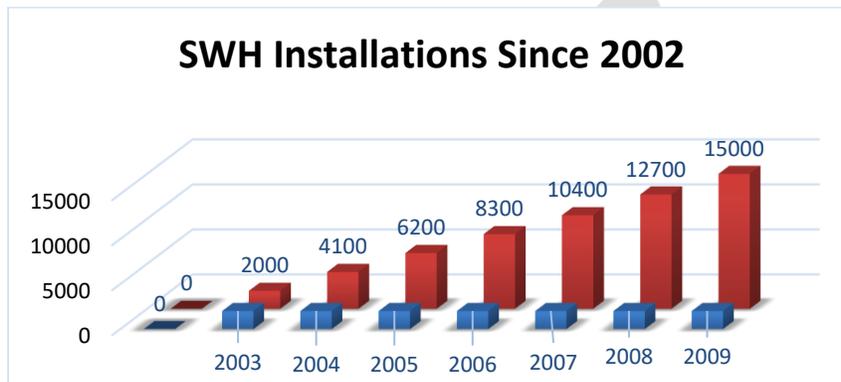
1.2 The CHENACT program was a three year program funded by the Inter-American Development Bank, European Union, United Nations Environmental Program and GIZ. The program was aimed at promoting energy efficiency in the hotel sector. To achieve this energy audits were conducted and recommended next steps were presented to participants of the project.

1.3 The Smart Fund was signed between the Government of Barbados and the Inter-American Development Bank on February 7, 2011. The objective of the Program was to promote the increased use of Renewable Energy (RE) and the implementation of Energy Efficiency (EE) measures in the private sector. Under the rebate component of the project the public was able to benefit from rebates on their purchases of energy efficient and renewable energy technologies such as LED lights, efficient refrigerators and solar water heaters. The program also offered a package of financial instruments and technical assistance to support investments in RE and EE for the private sector. The total program budget was US\$10,000,000.00

1.4. The Government proposes to element fossil fuel imports by 2030. It is proposed that future energy generation will be more decentralized in an effort to increase resilience. In 2015 the Government introduced the Electric Light and Power Act which facilitates the generation of electricity by independent power producers in line with the policy target.

## 2. BACKGROUND

2.1 In 2010 an evaluation of Barbados' solar water heater industry was conducted by USAID which showed that between 1974 and 2002 Barbados saved 130,000boe from 35,000 systems installed during the period. It is estimated that these households saved US\$130 million collectively. System installations continued at a steadily between 2003 and 2009 with an additional 15,000 total during the period<sup>1</sup>.



2.2 Based on the 2010 Population and Housing Census by the end of the above period there were approximately 79,936 occupied domestic units. Out of these units 26,456 (33%) had solar water heating systems, 11,597 (15%) use alternative technologies to heat their water. This implies that 40,833 units (51%) were without any technology for heating water as at the time of the census.

## III. CONSULTANCY OVERVIEW

3.1 Since 2010 local manufactures have indicated that sales have declined significantly and the long-term outlook of the sale of the current flat panel technology is questionable in the current environment. At the national level the Government of Barbados is in the process of developing a Sustainable Energy policy which seeks to reduce the dependency on fossil fuels via the deployment of technologies which are proven, financially viable and economically beneficial. The Government of Barbados therefore wishes to conduct tiered consultancy which provides a comprehensive analysis of the industry and subsequently informs a policy-based approach to water heating.

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<sup>1</sup> The Central Bank of Barbados reported that total savings to the country from solar water heaters between 2002 and 2009 were US\$280 million.

3.2 This consultancy shall conduct an assessment of the benefits of the solar water heating industry to date, identify the opportunities and feasibility of further market penetration of sustainable water heating technologies and ultimately present an informed path for the industry and the country.

#### **IV. CONSULTANCY'S OBJECTIVE**

4.1 The **general objective** of the Consultancy "Assess the Market Variables, Technology and Enabling Environment for Sustainable Domestic Water Heating in Barbados," is to conduct a holistic review of the barriers and opportunities for the further reduction of domestic water heating from fossil-based sources. The consultancy will present opportunities for development which support the overall National Energy Policy targets.

4.2 The **specific objectives** are: to (i) provide an assessment of the current water heating market (ii) provide an assessment of water heating technologies, manufacturing processes and cost components (ii) provide a comparative assessment of the overall enabling environment for all water heating technologies (iii) present best practice opportunities appropriate for the local and regional environment (iii) Present the most viable opportunities for the reduction of fossil fuel consumption for water heating.

#### **V. MAIN ACTIVITIES**

5.1 Under the supervision of the Research Unit of the Ministry of Energy and Water Resources the activities for this consultancy shall include, but not be limited to the following:

##### **Work Package A – Industry Assessment**

- Consolidate and review all available studies, submissions consultations relevant to the local industry;
- Gather relevant information/data from key industry stakeholders giving consideration to sales and maintenance trends since 2010;
- Conduct relevant market research on the penetration rates for various water heating technologies as well as the reasons for technology selection;
- Conduct an analysis of the legislative, regulatory and policy environment which currently governs the industry and identify current barriers and opportunities for the industry;
- Provide an inception report including an overview of the development and current status of the water heating industry with consideration given to time periods, socioeconomic variables and sectoral differences;
- Provide an comparative economic analysis of the effects of the solar water heating industry in Barbados to 2016;
- Provide an assessment of projected future demand for domestic water heating making provisions for business as usual, likely, optimistic and disaster scenarios;

### **Work Package B – Technology and Value Chain Assessment**

- Conduct an assessment of the current technologies available for thermal water heating giving consideration to manufacturing inputs, costs, reliability, disposal and waste management;
- Conduct an assessment of the current human and capital in infrastructure with consideration given to training and built capacity, product components, opportunities for synergy, innovation, recycling & disposal, etc ;
- Assess value chains for viable alternatives to inputs or technologies presently used in the market as well as supporting requirements and projected costs associated with various technology options or innovations;

### **Work Package C – Roadmap Development**

Building upon the outcomes of work packages A & B the main activities shall be:

- Develop an options matrix for the reduction of dependence on fossil fuels for water heating;
- Present recommend up to three (3) options for development of the industry;
- Provide a detailed roadmap of one (1) selected option giving consideration to the policy targets and objectives of the national policy;

## **IV. REPORTS / DELIVERABLES**

### **Work Package A**

**First Deliverable** - Inception Report including market survey data set and giving consideration to additional information and analysis conducted under the assignment;

**Second Deliverable:** Draft Economic Analysis of the Solar Water Heating Industry to 2016;

**Third Deliverable:** Draft Industry Assessment Report

**Fourth Deliverable:** Final Industry Assessment Report

[Every report must be submitted in hard copy and one electronic copy to the Ministry of Energy and Water Resources.

### **Work Package B**

**First Deliverable** - Draft Technology and Value Chain Assessment

**Second Deliverable** – Final Technology and Value Chain Assessment

Work Package C

**First Deliverable** – Options Matrix and Industry Development Options

**Second Deliverable** – Draft Water Heating Roadmap

**Third Deliverable** – Final Water Heating Roadmap

## **V. SUPERVISION AND COORDINATION**

5.1 The Research Unit will have the coordination responsibility of the execution of this consultancy as well as the approval of the deliverables presented by the consultant. The technical coordination for this consultancy rests with Research and Planning Unit of the Ministry of Energy and Water Resources phone: (246) 535-2536.

### **CHARACTERISTICS OF THE CONSULTANCY**

- Consultancy Category & Modality: Individual or Firm;
- Contract Duration: 6 months
- Place(s) of work: Barbados
- Language: The consultant must be fluent in English.

### **VII. QUALIFICATIONS:**

7.1 The consultant must have a graduate degree in Engineering and/or an advanced degree in Economics, Energy, Environmental Management, Science other related discipline

7.2 The consultant must have relevant experience in research and research methods as applied to energy technologies and infrastructure

7.3 The consultant should have no less than 5 years of experience in Renewable Energy and Energy Conservation, Manufacture Engineering, Project Management and Design or related discipline.

7.4 Experience working with the public sector on issues such as renewable energy, energy efficiency, energy conservation or project planning is desirable.

7.5 Excellent interpersonal and communication skills are essential for this position. Skills should also include research and analytical skills and publications.

7.6 Strong planning, organization, reporting and time management skills are desirable;

**VIII. EXPECTED DELIVERABLES AND PAYMENT:**

8.1 Payments will be made for each work package based upon approval of deliverables as detailed below:

<b>Work Package A</b>
First Deliverable – 30% on acceptance and approval of deliverable;
Second Deliverable – 20% on acceptance and approval of deliverable
Third Deliverable – 20% on acceptance and approval of deliverable
Fourth Deliverable – 30% on acceptance and approval of deliverable

<b>Work Package B</b>
First Deliverable – 40% on acceptance and approval of deliverable;
Second Deliverable – 60% on acceptance and approval of deliverable

<b>Work Package C</b>
First Deliverable – 30% on acceptance and approval of deliverable;
Second Deliverable – 40% on acceptance and approval of deliverable
Second Deliverable – 30% on acceptance and approval of deliverable

**IX. PAYMENT AND CONDITIONS OF EMPLOYMENT**

9.1 The work will be carried out in Barbados. The candidate will be responsible for all visa and all work related permits and requirements.