

National Sustainable Energy Policy

[Revised]

Government of Barbados

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1 Introduction

- 1.1 This document establishes the **National Sustainable Energy Policy of Barbados**. The National Sustainable Energy Policy is issued to address the growing concerns about the predominance of imported fossil fuels in the country's energy sector, and increase the efficiency and sustainability of energy supply and demand. This National Sustainable Energy Policy builds on the draft National Energy Policy of Barbados, prepared by the Energy Policy Committee of the Ministry of Energy and the Environment in 2006, and presented to Parliament in 2007.
- 1.2 Barbados' primary energy requirements are met almost entirely through the use of **fossil fuel resources**, most of which are imported. Oil-derived products contribute an overwhelming proportion of these primary energy requirements, making up 97.4 percent of the total—of which approximately 90 percent is imported, and 10 percent produced domestically. Assuming prices of BDS\$200 per barrel, and considering that Barbados imports about nine thousand barrels per day, oil imports amount to around BDS\$1,800,000 per day. Natural gas contributes a further 2.5 percent to the total primary energy requirement, and is domestically produced. Bagasse—a residual product from domestic cane sugar production—makes up the difference.
- 1.3 According to Central Bank of Barbados data, **oil imports** represented about 11 percent of Gross Domestic Product (GDP) in 2011 (more than BDS\$950 million worth of imports per year). The cost of these imports is a concern for the Government both at the macroeconomic level, and at the individual level of consumers; the Government has estimated that per capita energy consumption will increase at an annual rate of four percent in the coming years (although energy intensity—use of energy per unit of GDP—has decreased).
- 1.4 The Government is also concerned about the effects of insufficient diversification of energy resources on the country's energy security, in particular due to the volatility of fossil fuel prices, and about the effects of the use of fossil fuels on local and global environmental sustainability. Each year electricity generation alone emits about 872,000 tons of carbon dioxide (CO₂), accounting for more than half of the country's total CO₂ emissions. Road transportation is the second largest contributor to CO₂ emissions. The remaining emissions are the result of manufacturing, industrial, and agricultural processes; as well as emissions from appliances in the commercial and residential sectors. The use of fossil fuels also has a direct pollution effect on Barbados' natural environment, which is a vital economic resource for the country, particularly for the tourism industry. The use of fossil fuels also negatively impacts air quality, drinking water quality, coastal ecosystems, and the country's appearance. In particular, the Government is concerned about possible oil spills, and the effect of emissions on public health.
- 1.5 In preparation for the National Sustainable Energy Policy, the Government—with support from the Inter-American Development Bank (IDB)—commissioned four main studies between 2009 and 2011 to build and expand on the draft National Energy Policy of 2006:
- A study on a **Sustainable Energy Framework for Barbados**, completed in July 2010. The study contains an assessment of Barbados' renewable energy and energy efficiency potential that is economically viable (meaning,

that can reduce the cost of energy supply to the country); an identification of the barriers that block viable renewable energy and energy efficiency projects from being implemented; and recommendations for overcoming the barriers identified and full achievement of Barbados' sustainable energy potential.

The objectives of the Sustainable Energy Framework are:

"To unlock economically viable investments in Renewable Energy and Energy Efficiency that will reduce Barbados' dependency on fossil fuels, and therefore

- *reduce energy costs,*
- *improve energy security, and*
- *enhance environmental sustainability".*

For purposes of this document, 'sustainable' is any renewable energy or energy efficiency measure (both for electricity and non-electrical energy) that achieves the above objectives. Energy efficiency measures relate to both the production and consumption of energy.

The study concludes that most renewable energy and energy efficiency measures are economically viable in Barbados, and can achieve the objectives of the Sustainable Energy Framework—but that uptake is limited due to various barriers. This National Sustainable Energy Policy incorporates the study's recommendations on how to increase uptake of viable renewable energy and energy efficiency.

- A study on the **Upgrade and Expansion of the Natural Gas Network of Barbados**, completed in July 2011. This four-part study analyzes the future role that natural gas could play in Barbados' energy mix. Specifically, the study assesses the current role that natural gas plays in the energy mix, and the energy efficiency improvements that can be obtained by switching to natural gas in various sectors; the study provides a demand forecast for natural gas by sector, and a strategic marketing plan. The study finds that power generation, transportation, and the industrial/commercial sector represent a significant potential for natural gas in Barbados—while the residential sector represents a much smaller potential. The study recommends an approach that gives priority to rolling out natural gas use for transportation, followed by the industrial and commercial sectors, and supported by a price differentiation strategy.
- A **Strategic Assessment of the Sugarcane Industry in Barbados**, completed in July 2010. This assessment seeks to determine if three proposed alternative development paths for the economically important sugarcane industry in Barbados represent a viable, sustainable plan. The development paths include: (i) do nothing; (ii) restructure the industry; and (iii) abandon sugarcane, and replace with other agricultural, touristic, or leisure activities. The study indicates that industry restructuring is the best option, with alternative higher-value markets—including ethanol distillation and reprocessing—providing future revenue growth.
- A regional study by the **Caribbean Hotel Energy Efficiency Action Program (CHENACT)** on clean energy policy for hotels (with Barbados as the pilot country), completed in June 2011. The program recognizes the

importance of the tourism sector to the economy, as well as being a major consumer of energy and emitter of greenhouse gases. The study provides a summary of current energy policy applicable to hotels in Barbados, and policy and incentive recommendations to encourage clean and efficient use of energy in the hotel sector. The study recommends a clean energy policy for hotels based on best energy and environmental practices, mitigation of greenhouse gases and ozone-depleting substances, public-private partnerships, investment incentives, energy efficiency standards, financing, support to distributed generation, and capacity building.

The National Sustainable Energy Policy is issued consistently with the objectives, analysis, and recommendations of the above studies.

- 1.6 There is potential for renewable energy and energy efficiency in Barbados—but uptake thus far is very limited. Releasing that potential should help Barbados to reduce energy costs, improve energy security, and enhance environmental sustainability, in accordance with the objectives of the Sustainable Energy Framework.
- 1.7 This National Sustainable Energy Policy is structured to set out the Government's intentions regarding:
 - **Core principles guiding sustainable energy initiatives** (section 2)—the six guiding principles that sustainable energy initiatives should adhere to, including: win-win approach where projects are given priority if they both decrease oil dependence and energy costs; cost-benefit analysis to ensure economic viability; international support; technology neutrality; building on existing strengths; and innovation.
 - **Objectives for the National Sustainable Energy Policy** (section 3)—including general objectives, and specific objectives for the Policy's main areas: renewable energy generation; energy efficiency; sustainable supply and demand of fossil fuels; and energy education and awareness.
 - **Renewable Energy Generation** (section 4)—contains policies for the supply side of the power sector including: utility scale renewable power generation; distributed renewable energy generation; grid operations; and renewable energy permitting and planning.
 - **Energy Efficiency** (section 5)—contains policies for measures related to the consumption of energy including: power utility regulation for energy efficiency; energy efficiency in new buildings and facilities; energy efficiency in existing buildings and facilities; import duties and tax incentives for energy efficient equipment; efficient lighting; and efficient transmission and distribution of electricity.
 - **Sustainable Supply and Demand of Fossil Fuels** (section 6)—contains policies for measures related to the efficient exploration, production, storage, distribution, and consumption of fossil fuels, in various sectors: power generation; transportation; industrial; commercial and residential.
 - **Energy Education and Awareness** (section 7)—contains policy measures to inform people about sustainable energy, enabling them to make better choices; and to increase the professional skills in Barbados' public and private sector in the field of sustainable energy.

- 1.8 A separate document entitled *Plan and Principles for Implementation of the National Sustainable Energy Policy* contains:
 - i. An Implementation Plan that shows the sequence of concrete steps (and institutional responsibilities) for implementing the National Sustainable Energy Policy. The Government will update this Plan as needed; and
 - ii. Principles for Implementation of the policies for Renewable Energy Generation and Energy Efficiency. The Government considers that the Policy for Renewable Energy Generation and the Policy for Energy Efficiency should be implemented in line with these principles.

2 Core Principles

Six core principles inform the National Sustainable Energy Policy of Barbados:

- 2.1 **Core Principle 1—Win-win approach.** The Government of Barbados will give top priority to those sustainable energy measures that both increase sustainability and reduce the cost of energy to the economy.
- 2.2 The National Sustainable Energy Policy focuses on promoting technologies that reduce energy costs (that is, technologies that are economically viable) while also reducing oil dependency and decreasing the potential impacts of local environmental pollution and global warming.
- 2.3 **Core Principle 2—Cost-benefit analysis.** Where a sustainable energy measure could increase energy security and environmental sustainability but would also increase costs to the economy, the Government of Barbados will pursue it when the energy security, environmental sustainability, and other local economic benefits (including other positive economic externalities, contribution to the country's economy and competitiveness of its commercial and industrial sectors, and quality of life) exceed the economic costs, creating net economic benefits for the country. Support to sustainable energy measures will depend on their economic costs and benefits.
- 2.4 There are a number of sustainable energy measures that could reduce oil imports and CO₂ emissions, but would, if deployed, increase the cost of energy to the country. Given the extensive range of sustainable energy options that would either reduce energy costs or be fully justified by the savings they would yield, and the fact that energy costs in Barbados are already very high by world standards, the Government does not intend to pursue sustainable energy options that increase the cost of energy in the country. The Government will consider particular measures on a case-by-case basis, but will need to be convinced that the energy security, environmental sustainability, and other economic benefits to Barbados offset the additional costs imposed on the taxpayers and energy users of Barbados.
- 2.5 The Government will examine the potential for maximizing value creation and retention through the domestic production of sustainable energy products and related services—including the invention, development, manufacturing, and assembly of renewable energy and energy efficiency technologies; the production of biofuels and other alternative fuels; and the supply of related services such as energy efficiency retrofits, and installation and maintenance of renewable energy technologies. Based on this assessment, the Government will consider appropriate measures to support and encourage the domestic production of sustainable energy products and provision of related services.
- 2.6 **Core Principle 3—International support.** The Government will work to ensure that Barbados has full access to international support for sustainable energy measures, in the form of concessional finance, grants, carbon credits, and regional integration initiatives.
- 2.7 Global mechanisms to address climate change include the Clean Development Mechanism, and carbon mitigation strategies supported by grants and concessional loans provided by entities such as the Inter-American Development Bank, the Global Environment Facility, and the United Nations Environment Program. These mechanisms can allow for further cost reductions for Barbados

in pursuing sustainable energy measures. They may also increase the range of sustainable energy measures that are viable in Barbados, by reducing the cost of certain measures, and so ensuring that they can be implemented without increasing energy costs for citizens of Barbados. The Government believes that these global responses are appropriate for global problems, since they recognize that developing island nations such as Barbados are put at risk by a phenomenon that is largely caused by much bigger, richer, and less vulnerable countries. Therefore, the Government will work with international agencies to take full advantage of the global assistance available to Barbados.

- 2.8 The Government also intends to pursue regional energy integration with other Caribbean countries to the extent that this may create benefits for Barbados' energy sector, and help the country reach the objectives of the National Sustainable Energy Policy. Key benefits include meeting future energy supply requirements, improving reliability of energy supply, and providing access to cleaner regional energy resources, while reducing energy costs. Regional energy integration may be implemented through: (i) regional infrastructure projects (including underwater pipelines and power transmission lines); (ii) sharing of research and development on sustainable energy; (iii) harmonization of policies (including a Regional Energy Policy and Regional Sustainable Energy Strategy under the Caribbean Community), laws, regulations, and standards on sustainable energy projects. The Government also notes that regional integration will act to build resilience to predicted climate change impacts through geographical diversification of the energy supply. For example, a predicted increase in hurricane intensity may have a greater destructive impact on local energy infrastructure during a 'hit', but through geographical diversification, energy supplied from neighboring countries would assist in minimizing the effects of the impact and allow the economy to continue to function.
- 2.9 **Core Principle 4—Technology neutrality.** The Government of Barbados will promote all sustainable energy measures that reduce costs and increase sustainability, rather than favor particular technologies.
- 2.10 Notwithstanding the principle of technology neutrality, the Government may give priority to implementing those economically viable technologies that may generate higher value to the economy of Barbados than other economically viable technologies.
- 2.11 **Core Principle 5—Building on existing strengths.** In implementing this Policy, the Government will support and develop elements of Barbados' energy sector that serve the country well for promoting sustainable energy. Barbados' energy sector is lower cost and more reliable than most of its Caribbean neighbors. Making the energy sector more environmentally sustainable must not put this achievement at risk. Rather, the National Sustainable Energy Policy is designed to build on existing strengths.
- 2.12 In particular, the Government is mindful of the need to ensure that the electric utility continue to operate as a professional, financially viable electricity utility. For this purpose, the National Sustainable Energy Policy recognizes that the electric utility should be authorized to supply electricity in Barbados for a timeframe that is fully consistent with any and all obligations deriving from the National Sustainable Energy Policy itself. The Government is also mindful of the need to ensure that regulatory decisions be made by the electricity regulator in accordance with its statutory mandates.

- 2.13 The National Sustainable Energy Policy respects the independence and autonomy of the electric utility and the electricity regulator.
- 2.14 The Government recognizes that progress towards developing sustainable energy solutions is already being made by other public and private entities, such as the Barbados National Oil Company, Limited; the National Petroleum Corporation; the Barbados National Standards Institution; the Government Electrical Engineering Department; the Building Standards Authority; and others. The Government intends to implement the National Sustainable Energy Policy in cooperation with all entities involved in the energy sector.
- 2.15 The Government also recognizes the value of a broad participatory approach to policymaking that also involves, in addition to the entities listed above, the entire population of Barbados. This National Sustainable Energy Policy aims to build on Barbados' tradition of participation by including all stakeholders in Government, private businesses, households, and civil society.
- 2.16 **Core Principle 6—Innovation.** The Government shall support cost-effective research and development for achieving innovation in sustainable energy. In doing so, the Government recognizes the advantages of economies of scale that regional cooperation may offer in research and development.

3 Objectives for National Sustainable Energy Policy

- 3.1 The **general objectives** of the National Sustainable Energy Policy are, consistent with Barbados' Sustainable Energy Framework:

To unlock economically viable investments in sustainable energy that will reduce Barbados' dependency on fossil fuels, and therefore

- *Reduce energy costs,*
- *Improve energy security, and*
- *Enhance environmental sustainability.*

- 3.2 Consistent with the core policy principles, the primary objective is to **decrease energy costs** for Barbados while maintaining a **reliable and effective** energy supply. In achieving this primary objective, the Government also recognizes the benefits from **enhanced energy security** through a diverse supply of energy, as well as the benefits derived from **environmentally sustainable** sources and efficient uses of energy.

- 3.3 The Government intends to meet these general objectives by pursuing **specific objectives** for the key areas of the National Sustainable Energy Policy:

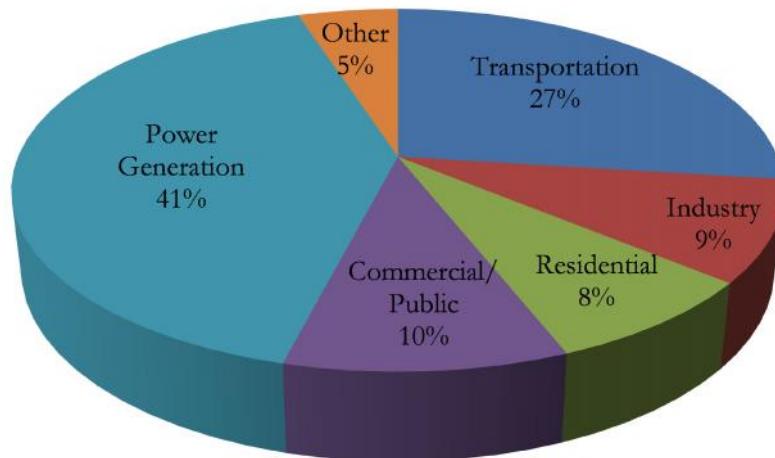
- Renewable Energy—it is the Government's objective to increase the share of economically viable renewable energy in Barbados' energy mix, with an indicative target of about 29 percent of all electricity consumption to be generated from renewable sources by 2029;
- Electric Energy Efficiency—it is the Government's objective to achieve savings in the country's consumption of electricity, with an indicative overall target of 22 percent savings by 2029 compared to a 'business as usual' scenario;
- Efficiency in the use of Non-Electric Energy—it is the Government's objective to achieve an indicative target of 29 percent savings in transportation and other non-electric energy uses by 2029;
- Sustainable Supply and Demand of Fossil Fuels—it is the Government's objective to increase the sustainability and efficiency of fossil fuel exploration, production, transportation, storage, and use across all sectors;
- Energy Education and Awareness—it is the Government's objective to increase the awareness and skills of the people of Barbados for sustainable energy matters, and to ensure that they have the knowledge and ability to implement economically viable sustainable energy measures.

- 3.4 To achieve these objectives the Government will use legal instruments, regulatory instruments (such as energy performance standards, energy efficiency labels, and building codes and standards), and other instruments (such as tax incentives). Further, the Government will use instruments to ensure that a reliable and effective energy supply is maintained, and that Barbados' natural environment is safeguarded, while pursuing the specific objectives of the National Sustainable Energy Policy. Where the development and application of relevant instruments falls within the mandate of independent entities (such as, for example, the

electricity regulator), the Government will encourage such entities to develop instruments that are consistent with the Government's policy.

- 3.5 The National Sustainable Energy Policy recognizes that the objectives will address energy sustainability in all the sectors that are important producers, transformers, and consumers of energy. These sectors are able to benefit from some, or all, of the objectives described above.
- 3.6 The figure below provides a summary of the relative composition of end uses of energy in Barbados for 2010, based on site visits conducted as part of the Sustainable Energy Framework Study. End uses of energy include both direct fossil fuels and electricity, broken down by sector. Power generation is the largest end user of energy accounting for 41 percent of total end use; the transportation sector is second at 27 percent; the commercial and public sector uses 10 percent; industry uses 9 percent; and the residential sector accounts for 8 percent of total end use. All of these sectors rely heavily on imported oil-derived fossil fuels.

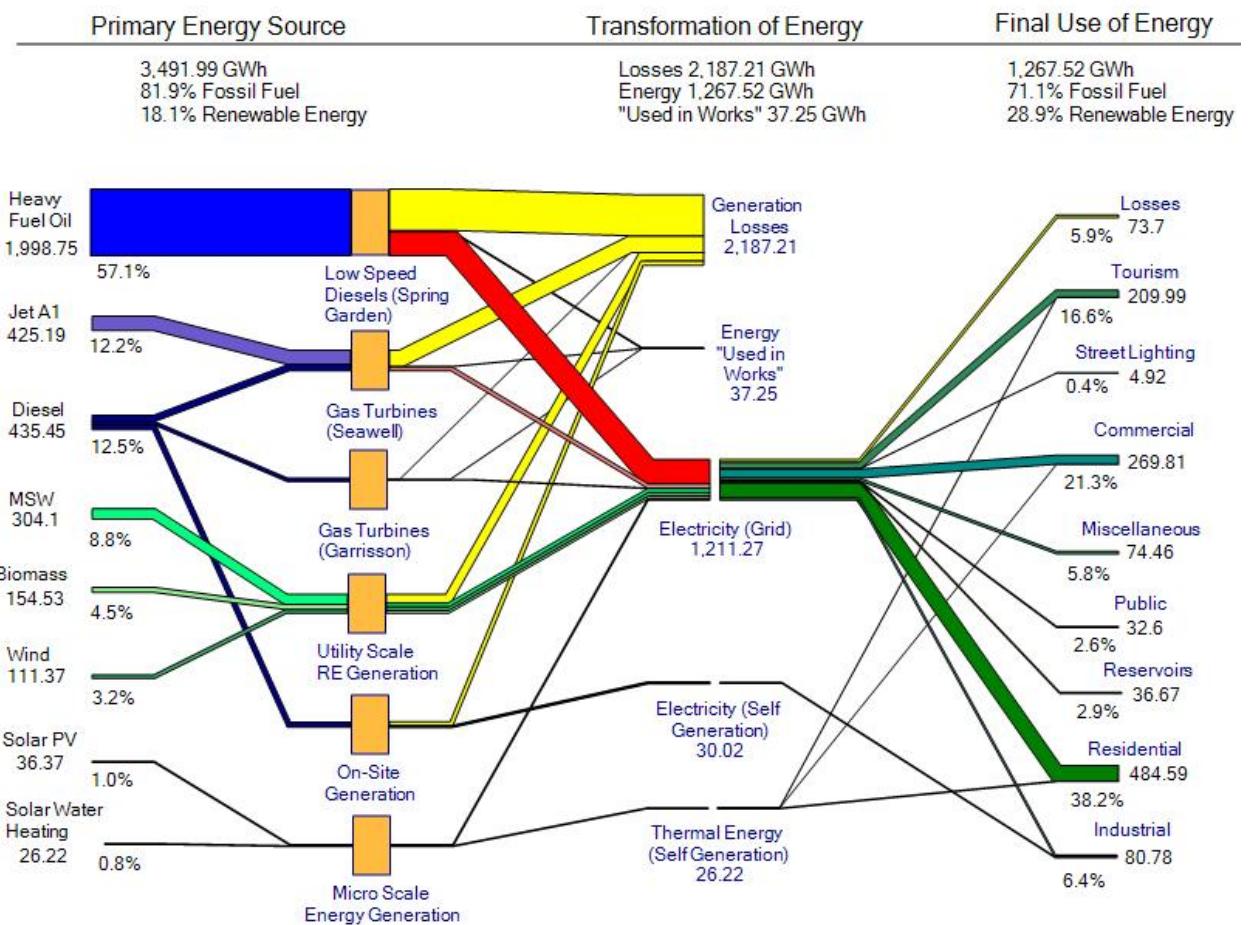
End Uses of Energy in Barbados (2010)



- 3.7 The Government's objectives in the power sector are illustrated by the Sustainable Energy Matrix for Barbados' electricity sector (shown below), which was developed under the study for a Sustainable Energy Framework. The Sustainable Energy Matrix is divided into three main parts:
 - a. Primary energy sources (left), showing the various options (conventional and renewable) that may contribute to Barbados' power sector mix;
 - b. Transformation of energy (center), showing how primary sources are used for generating electricity and thermal energy, as well as losses of the energy content of primary energy sources during transformation into electricity; and
 - c. Final use of energy (right), showing how electricity is consumed across Barbados' sectors, as well as losses of electricity distributed through the grid.

The Sustainable Energy Matrix shows the overall objectives for 2029 for (i) renewable energy generation to represent 28.9 percent of consumption; and (ii) energy efficiency savings of about 22 percent compared to a 'business as usual' scenario.

Sustainable Energy Matrix for Barbados (Electricity)



The remainder of this section focuses on the specific objectives within each of the key areas of the National Sustainable Energy Policy.

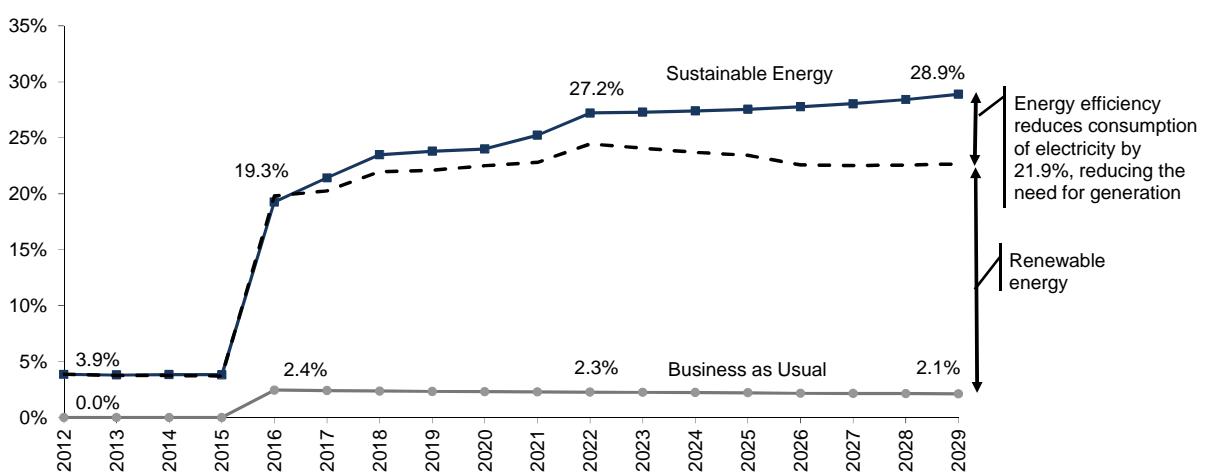
Objectives for Renewable Energy Production

- 3.8 Based on the Sustainable Energy Matrix, the Government's objective in pursuing its National Sustainable Energy Policy is for renewable energy to account for about 28.9 percent of all electricity consumption by 2029. As shown in the figure, the key renewable energy technologies that are expected to contribute to reaching this objective are:
- i. Waste to energy;
 - ii. Biomass cogeneration;
 - iii. Wind energy;
 - iv. Solar photovoltaic; and
 - v. Solar water heaters.
- 3.9 The figure below shows the share of electricity that could be generated from these technologies during the period 2009-2029 under a 'sustainable energy' scenario that achieves Barbados' economically viable potential for renewable

energy and energy efficiency, as compared to a ‘business as usual’ scenario. Increasing the proportion of renewable energy to 28.9 percent of consumption by 2029 could reduce fuel costs by about BDS\$1,338 million over the same period (assuming a discount rate of 6 percent).

Share of Electricity Generated from Renewable Energy Technologies as a percentage of total consumption

(Business as Usual and Sustainable Energy Scenarios)

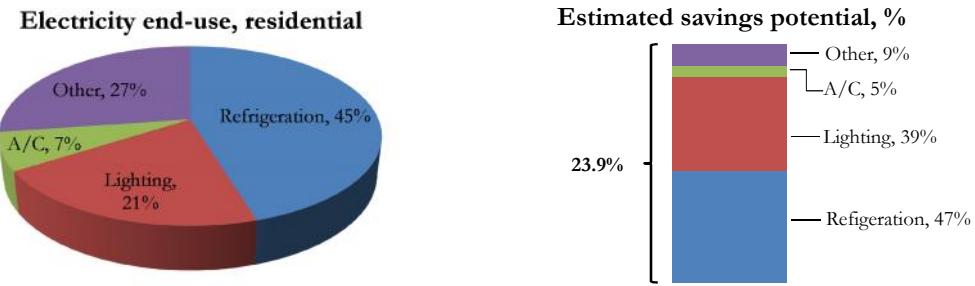


- 3.10 The 28.9 percent objective stated in the Sustainable Energy Matrix and shown in the figure above represents the Government’s indicative target—not a fixed target to be achieved at any cost. Setting a fixed target would be counter to the principles of the National Sustainable Energy Policy, in that a fixed target would risk increasing energy costs for Barbados by: (i) implementing renewable energy technologies that are not economically viable for the purpose of meeting the target; or (ii) implementing technologies that may or may not be economically viable, but that are not needed to meet demand, and that would create stranded generation assets for the electric utility (the cost of which, ultimately, would have to be borne by customers). Rather, the objective stated above represents an adjustable objective for guiding the National Sustainable Energy Policy, based on economic viability of technologies.
- 3.11 The Sustainable Energy Matrix shown above is based on a mix of fossil fuel generation that does not include natural gas. As part of its commitment to providing adequate and affordable energy to all citizens and all sectors in Barbados, the Government is seeking to increase the inclusion of natural gas in Barbados’ energy mix. If made available for power generation in Barbados, natural gas may affect the viability of renewable energy technologies, and reduce the range of economically viable renewable energy options. Nevertheless, the Government recognizes that even if gas were made available, and it were the least cost option for electricity generation, Barbados would benefit from introducing a more diversified electricity generation portfolio, including some share of renewable energy that is cost-benefit justified, perhaps in combination with economically viable energy storage technology.

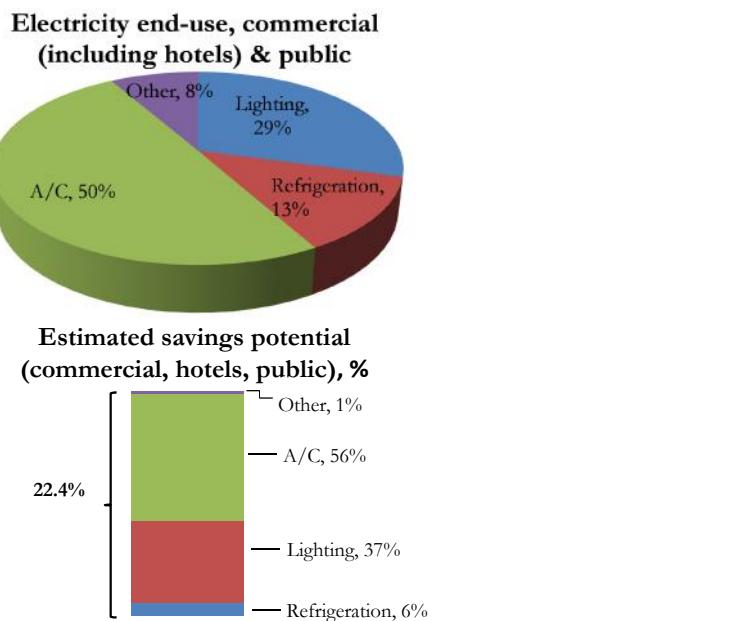
Objectives for Energy Efficiency

- 3.12 It is the Government's intention to achieve improvements in the efficiency of the country's energy consumption. The Government has set targets for savings in electricity consumption, as well as for savings in transportation and other non-electric energy uses; and intends to further explore the potential for non-electric energy efficiency.
- 3.13 Based on the Sustainable Energy Matrix, the Government's objective in pursuing its National Sustainable Energy Policy is to achieve overall savings in the country's electricity consumption of about 22 percent by 2029, compared to a 'business as usual' scenario. As shown in the figure, this overall objective would be a result of sector-specific potential savings, including:
- iii. 12 percent savings in the public sector;
 - iv. 24 percent savings in the residential sector;
 - v. 22 percent savings in the commercial sector;
 - vi. 12 percent savings in the industrial sector;
 - vii. 22 percent savings in the tourism sector; and
 - viii. 48 percent savings in street lighting.
- 3.14 The Government intends to achieve an indicative target of 22 percent in transportation and other non-electric energy uses. The Government intends to explore in detail the baseline situation of non-electric energy uses (including, in particular, transportation), and the possibility of pursuing a higher target.
- 3.15 The Government will treat these objectives as indicative, adjustable targets to help guide the formulation and implementation of energy efficiency projects and programs in the country's various sectors, based on the economic viability of the underlying energy efficiency technologies. These objectives are not fixed targets to be achieved at any cost; this would be counter to the objectives of the National Sustainable Energy Policy. Energy audits and studies prepared for specific energy efficiency projects or programs will establish detailed targets.
- 3.16 The National Sustainable Energy Policy recognizes that key opportunities for savings lie with the largest end-uses of energy. In the residential sector, the key savings potential is likely to be for refrigeration, air conditioning, and lighting; in the commercial and public sector, for air conditioning, followed by refrigeration and lighting; in the industrial sector, for electromotive uses, followed by refrigeration. Water pumping and distribution—which is embedded in electromotive end-uses of the industrial sector—represents the single largest use of electricity in Barbados, and is commonly not optimized for efficiency: it is therefore a major opportunity for savings. Street lighting—in spite of a savings potential of 48 percent, which could be achieved by retrofitting high-pressure sodium lamps—only represents about 1 percent of overall demand in Barbados.
- 3.17 The figures below show key end-uses of electricity for the residential, commercial and public, and industrial sectors in Barbados based on the Demand Side Management study conducted by the electric utility in 1999 (the figure showing electricity end-uses for the hotel sector is based on data from the Caribbean Hotel Energy Efficiency Action Program); as well as the breakdown of estimated savings by end-use within each sector.

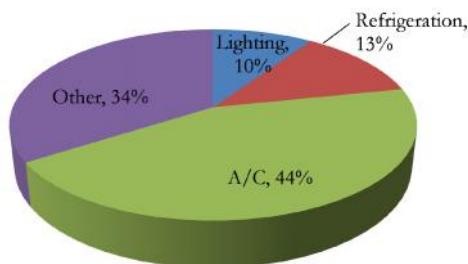
Residential Sector

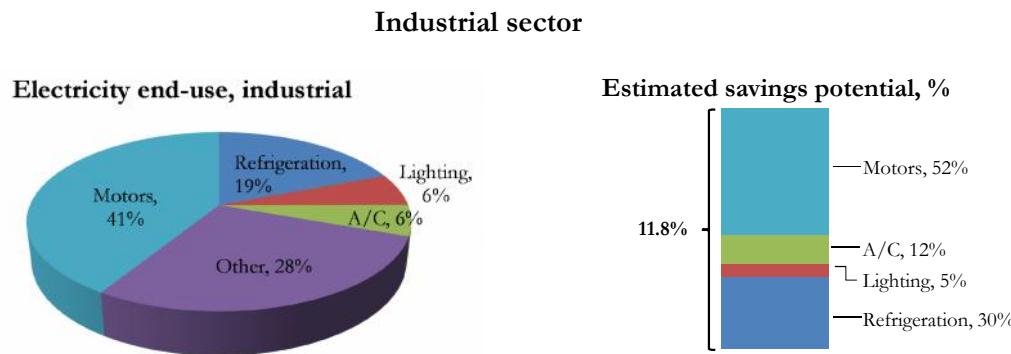


Commercial (including hotels) and public sector



Electricity end-use (hotels only)

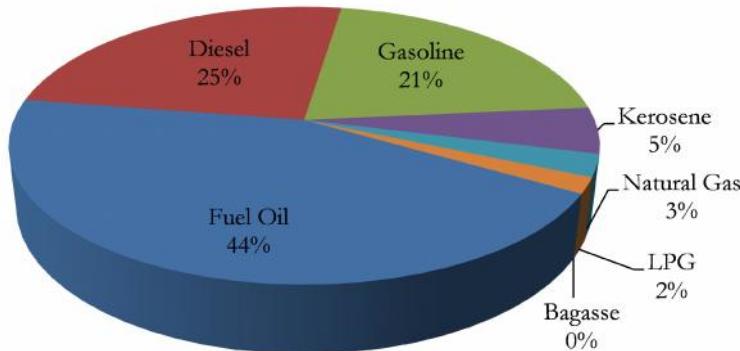




Objectives for Sustainable Supply and Demand of Fossil Fuels

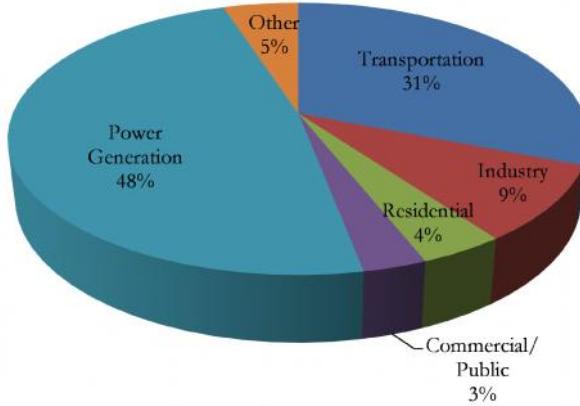
- 3.18 The Government's objective in pursuing its National Sustainable Energy Policy is to increase the sustainability and efficiency of fossil fuel supply and demand across multiple sectors. Barbados is highly dependent on oil-derived fossil fuels, which make up 97.4 percent of the total primary energy mix in Barbados (as shown in the chart below)—where primary energy is defined as the direct use of fossil fuels.

Barbados' Primary Energy Mix, 2010



- 3.19 The primary energy mix then supplies the direct fuel demands of all sectors. A breakdown of the primary energy used by sector is shown in the following chart.

Barbados' Primary Energy Demand by Sector



- 3.20 The National Sustainable Energy Policy recognizes that the efficient use of oil-derived products will continue to play a major role in supplying future energy requirements. However, the Government supports a prudent diversification of the primary fuel supply of the country into other fossil fuels—such as natural gas, or alternative fuels such as biofuels or solid waste—where the following three criteria are met:
- i. The alternative fuel source is least-cost (cheaper than oil-derived products);
 - ii. The alternative fuel is readily available and sufficient in quantity; and
 - iii. The alternative fuel can be produced or procured reliably, without disruption.
- 3.21 The sectors that have the greatest opportunities for increased efficiency in fossil fuel supply and demand are the following, addressed in further detail below:
- i. Onshore and offshore exploration, production, storage, transportation, and distribution of fossil fuels—the Government recognizes the need to ensure the highest efficiency and sustainability in these activities related to oil and natural gas in Barbados;
 - ii. Power sector—power generation is the single largest consumer of fossil fuels. High efficiency power plants and heat recovery technologies provide high potential for efficiency;
 - iii. Transportation sector—this represents the second largest consumption of fossil fuels;
 - iv. Industrial sector—a large user of fossil fuels with the potential for electric energy efficiency increases of up to 12 percent (as shown in the ‘Energy Matrix for Barbados’ figure);
 - v. Commercial sector—a significant energy user, mostly for air conditioning, lighting, and refrigeration (particularly the hotel sector, which accounts for about 30 percent of commercial sector electricity consumption, and about 9 percent of total sales of the electric utility), and with a potential for electric energy efficiency of up to 22.4 percent; and
 - vi. Residential sector—the Government recognizes this as a key sector for reducing the cost of energy for Barbadians.

Exploration, Production, Storage, Transportation, and Distribution of Fossil Fuels

- 3.22 The National Sustainable Energy Policy recognizes that domestic resources of oil and natural gas are limited, and that their exploration, production, storage, transportation, and distribution may pose threats to the local environment. It is the Government's objective to ensure that exploration and production of oil and natural gas be efficient, and that it avoid or mitigate negative environmental effects.

Power Sector

- 3.23 The National Sustainable Energy Policy recognizes that the key opportunities for the efficient use of fossil fuels lie with the largest consumers. The power sector is the largest consumer of fossil fuels, making up 41 percent of total primary fuel consumption, with power generation based predominantly on fuel oil. The Government supports efficient use of fossil fuels achieved through the introduction of high efficiency power plants (which, according to the study on the Upgrade and Expansion of the Natural Gas Network, can increase efficiency by up to 21 percent); energy efficient generation technologies such as heat recovery systems, where energy savings potential exists; and continued operation and maintenance of an efficient electricity transmission and distribution system.
- 3.24 Government support for energy efficient generation does not come at any cost—the objective stated above could represent a guiding principle for the electric utility to develop Integrated Resource Plans that identify the combination of new firm and non-firm generation capacity, energy efficiency, and energy storage solutions that satisfies forecast demand at least cost; and for the electricity regulator to approve the electric utility's plans, based on the economic viability of available supply and demand side technologies, as well as stakeholder involvement.

Transportation Sector

- 3.25 The transportation sector is the second largest user of fossil fuels after the electric sector, representing 31 percent of total fuel consumption. The Government intends to improve the efficiency of fossil fuel use in transportation (thereby reducing fossil fuel consumption for transportation), including the following:

- Public transport;
- Private transport;
- Transportation infrastructure; and
- Alternative modes of transportation, including non-motorized transport.

The Government intends to improve the efficiency of fossil fuel use in transportation through measures such as encouraging the purchase of fuel efficient and alternative fuel vehicles, promoting driver awareness, encouraging public and alternative modes of transportation, improving transportation planning, and increasing traffic and parking efficiency.

- 3.26 Government support for efficient use of fossil fuels in transportation will be consistent with the core principles of the NSEP (based on the economic viability of individual interventions the Government may enact, consistent with the core principles of the National Sustainable Energy Policy).

Industrial Sector

- 3.27 The National Sustainable Energy Policy recognizes that the industrial sector represents an important potential for increased efficiency in the use of fossil fuels, given that it represents 9 percent of total primary energy use. Based on information gathered as part of site visits conducted under the Sustainable Energy Framework Study, much of this fossil fuel use is used for generating process heat.
- 3.28 The Government will promote increased efficiency of process heat generation in the industrial sector. Increased efficiency in process heat generation may be achieved, among other things, by more efficient boiler systems; pre-heating; and waste heat recovery from boiler systems and onsite power generators that industrial companies operate.
- 3.29 The Government also supports a sustainable development of Barbados' sugarcane industry, balancing economic, social, and environmental considerations. The National Sustainable Energy Policy recognizes that the sugarcane industry is an important component of Barbados' economy and society, and that promoting co-generation using sugarcane bagasse reduces fossil fuel requirements of the country, and is thus an important part of the policy on efficient use of fossil fuels.

Commercial Sector

- 3.30 The National Sustainable Energy Policy recognizes that the commercial sector holds significant potential for energy efficient use of fossil fuels. The commercial sector represents the largest consumer of electricity in Barbados, with over 40 percent of total sales (about a third of which are to the hotel sector); and 10 percent of total energy use when significant electrical loads, such as air conditioning and refrigeration (which may also be provided through direct consumption of fuel, and which are key end uses in the hotel sector), are taken into account. The Government will support increased efficiency of the commercial sector through more efficient air conditioning and refrigeration systems. This may include the direct combustion of fossil fuels, or coupling of onsite electricity generation if available, where overall system efficiency (including power system inefficiencies) is increased. It is, however, the Government's policy to maintain its position on technology neutrality, in accordance with the core principles.

Residential Sector

- 3.31 It is the Government's objective to support efficient use of fossil fuels in the residential sector, and to upgrade and expand the natural gas network for residential customers. While the residential sector is a relatively small user of fossil fuels from a national perspective, increased efficiency in households is critical to achieving greater welfare for the population of Barbados—and is therefore a priority of this policy. The National Sustainable Energy Policy acknowledges the progress that the National Petroleum Corporation has made in delivering natural gas to Barbadians to align with the Government's policy to reduce the cost of living.

Objectives for Energy Education and Awareness

- 3.32 The Government recognizes the need for increased education on, and awareness of sustainable energy in order to meet its objectives for renewable energy, energy efficiency, and efficient supply and demand of fossil fuels as outlined in the

National Sustainable Energy Policy. It is therefore the Government's objective to increase the level of education and awareness of the population around sustainable energy practices, particularly through:

- Increased knowledge about costs, benefits, and performance of sustainable energy measures for making better informed choices;
- Increased inclusion of the population in the policy process for developing and implementing the National Sustainable Energy Policy;
- Increased ability of the population to know about, and make use of Government policies and programs in support of sustainable energy; and
- Increased professional qualifications through an improved framework for training, certification, and licensing for working in businesses related to sustainable energy.

4 Policy on Renewable Energy

- 4.1 This section contains the Government’s policy on renewable energy generation; where ‘renewable energy generation’ is defined as the generation of electric and non-electric (thermal) energy from renewable resources.
- 4.2 Generating energy from renewable resources is an important component of the National Sustainable Energy Policy for lowering the cost of energy and ensuring security and stability of energy supply given the dependence of energy generation on imported oil-derived fossil fuels.
- 4.3 The Government’s policy on renewable energy generation is composed of the following six areas:
- **Utility Scale Renewable Energy Generation**—this presents the Government’s policy on regulating the electric utility to encourage development of utility scale renewable energy for electricity generation;
 - **Distributed Renewable Energy Generation**—this presents the Government’s policy on encouraging the development of distributed renewable energy;
 - **Grid Operation**—this presents the Government’s policy on the responsibility of the electric utility to retain control of the electricity grid, but develop a Grid Code in cooperation with other relevant entities;
 - **Renewable Energy Permitting, Planning, and Environmental Sustainability**—this presents the Government’s policy on permitting and planning, including in particular regulations for safeguarding Barbados’ natural environment while developing renewable energy projects;
 - **Development and Value Retention of Renewable Energy Products and Services**—this presents the Government’s policy on encouraging and supporting the domestic invention, development, manufacturing, and assembly of renewable energy products, and the domestic provision of services related to renewable energy; and
 - **Non Electrical Energy from RE.**

The remainder of this section describes the specific policies within each of the six areas for renewable energy generation.

Utility Scale Renewable Energy Generation

- 4.4 This section contains the Government’s policy on regulating the electric utility in a way that encourages the development of utility scale renewable energy that is economically viable. ‘Utility scale’ electricity generation technologies are those technologies that need to be installed at a dedicated site, and that supply power over the transmission grid.
- 4.5 It is the Government’s policy that Barbados’ electricity sector should develop in a way that promotes the use of renewable energy while lowering the cost of power, to the greatest extent possible. In line with this policy, the Government considers that the following would be desirable:
- i. That the electric utility be required to demonstrate that it has considered a range of renewable energy, demand side management, and efficient generation options in preparing its investment and operating plans, and

- demonstrate that it has developed a plan likely to deliver electricity at the lowest cost, while also taking into account a prudent diversification of the electricity generation portfolio that may effectively address risks and enhance energy security.
- ii. That the electric utility continue operating as a professional, financially viable power utility providing reliable power service while fully recovering its cost and earning an allowable return on its investment.
 - iii. That the electric utility continue operating as a vertically integrated power utility in charge of generation, transmission, and distribution—but that where additional generation is required (for meeting current or future demand), and parties other than the electric utility are able to generate the required power from renewable sources, and to do so reliably (under a financial and technical point of view), the electric utility be required to purchase power from these parties, and to pass on any resulting reduction in costs to its customers. This consideration should apply to third party generation with renewable energy (or cogeneration) at utility scale, as well as at distributed scale, as described below.
- 4.6 The regulatory regime applying to the electric utility is intended to ensure that customers pay no more than is reasonably necessary for electricity, while also allowing the utility to recover its reasonable costs and earn an allowable return on its investment.
- ### Distributed Renewable Energy Generation
- 4.7 This section presents the Government's policy on encouraging the development of distributed renewable energy that is economically viable. 'Distributed' generation technologies are those technologies that are located at customer premises, in close proximity to the load being served.
- 4.8 Barbados has been a leader in the Caribbean in the manufacturing, sale, and use of solar water heaters, a distributed generation technology that produces heat. The Government has encouraged the solar water heater sector by introducing fiscal and customs incentives, as well as financial incentives. These policies have been successful, as the high rate of penetration of solar water heaters in the country demonstrates. However, the remaining unrealized potential is significant. The Government recognizes that solar water heaters are the most cost-effective of all renewable technologies over project lifetime, as suggested by the Study on a Sustainable Energy Framework for Barbados. It is the Government's policy to continue supporting solar water heating manufacturing, use, and export, building on Barbados' successful experience.
- 4.9 Recent reductions in the cost of small distributed scale renewable energy technologies that generate electricity mean that customers in Barbados may find it attractive to install these technologies on their premises, as they have found it attractive to install solar water heaters. The savings on their power bills could, under current tariffs, provide a reasonable return on their investment.
- 4.10 When customers install distributed generation systems, their consumption of the power that the electric utility generates with fossil fuels decreases. At the same time, because the distributed renewable power is intermittent, and often will not fully meet customer's demands, those customers may continue to demand that the electric utility maintain their connection to the power grid, and expect the electric utility to supply them with power when generation from the customer's

own system is not enough. Customers may also at times generate power in excess of their own needs. This power can be made available to the grid, and customers will expect to be paid for it.

- 4.11 The Government considers that it would be in Barbados' interest to develop a regulatory and tariff structure that facilitates efficient investment in distributed renewable generation. At the same time, the regulatory regime should not give incentives for inefficient investments that would increase the total cost of electricity supply in the country. The Government will therefore encourage the development a regulatory and tariff structure that facilitates efficient investment in distributed RE generation to achieve these twin objectives. It would be desirable that the electric utility develop, and the electricity regulator review and approve):
- i. A disaggregated, cost-reflective tariff; and
 - ii. Renewable energy riders and metering rules for distributed generation.
- 4.12 The disaggregated cost-reflective tariff and renewable energy riders should be developed in accordance with the principles outlined in sections 3.5 and 3.6 of the Principles for Implementation of the Policy on Renewable Energy Generation.
- 4.13 The Government will also create the necessary enabling environment through tax and other concessions to facilitate this component of the policy. It is the Government's intention to provide both grants and loans at favorable rates for implementing distributed scale renewable energy (including technologies that generate heat, as well as those that generate electricity). This will include, but will not be limited to:
- i. An Energy Smart Fund to provide technical assistance, grants, rebates, and loans at favorable rates to promote increased use of renewable energy for the private sector, including both households and businesses;
 - ii. A Public Sector Smart Energy Program to promote increased use of renewable energy in the public sector; and
 - iii. Grants under pilot programs for installing distributed renewable energy systems in private and public premises, for example under the Sustainable Energy Framework Pilot Program.

Grid Operation

- 4.14 It is the Government's policy that the electric utility that controls the grid ensures safety, reliability, and power quality, while at the same time allowing third parties to generate cost-effective renewable power and sell it to the grid. The Grid Code shall be subject to the approval of the Electricity Regulator and the Chief Electrical officer/GEED.
- 4.15 It is the Government's policy that the electric utility consider advanced metering and smart grid technologies, to optimize electricity generation by itself and independent third parties, and electricity consumption by customers, to the extent that these technologies reduce overall cost of service and enable customer savings.

Renewable Energy Permitting, Planning, and Environmental Sustainability

- 4.16 It is the Government's policy that Barbados' natural environment and public welfare be safeguarded while renewable energy resources are developed and exploited.
- 4.17 The Town and Country Development Planning Office (TCDPO) shall be responsible for developing new standard permitting and planning regulations for renewable energy projects (both utility and distributed scale), based on elements listed in section 3.8 of the Principles for Implementation of the Policy on Renewable Energy Generation.
- 4.18 The Government Electrical Engineering Department shall continue to be responsible for enforcing compliance with rules for distributed renewable energy systems installed on buildings, in cooperation with the electric utility as appropriate.
- 4.19 It is the Government's policy to ensure that adequate regulations and processes are in place for the appropriate disposal, reuse, and recycling of renewable energy technologies.

Development and Value Retention of Renewable Energy Products and Services

- 4.20 It is the Government's policy to encourage and support the domestic invention, development, manufacturing, and assembly of renewable energy products, and the domestic provision of services related to renewable energy (such as the installation and maintenance of renewable energy products).
- 4.21 It is the Government's intention to set an agenda for developing measures that encourage and support the domestic supply of renewable energy products (and related services)—such as fiscal, trade, regulatory, and training measures, as well as providing technical assistance to local firms; and measures to protect intellectual property rights. Consistent with the core principles of the National Sustainable Energy Policy, the Government will assess the costs and benefits of such measures (including impacts on value creation and retention through the reduction of imports and increase of exports of goods and services).

5 Policy on Energy Efficiency

- 5.1 This section contains the Government's policy on electric energy efficiency. Electric energy efficiency is an important component of the National Sustainable Energy Policy for lowering the cost of energy given the dependence of power generation on imported oil-derived fossil fuels. Accordingly, the Government's policy encourages the development of regulatory instruments that promote the efficient production, distribution, and consumption of energy.
- 5.2 The Government's policy on energy efficiency is composed of the following seven areas:
- **Power Utility Regulation for Energy Efficiency**—this describes the Government's policy on cost recovery for efficient generation;
 - **Energy Efficiency in New Buildings and Facilities**—this presents the Government's policy on the provision of energy efficient building standards in new buildings;
 - **Energy Efficiency in Existing Buildings and Facilities**—this presents the Government's policy on retrofitting existing buildings for increased energy efficiency and tools for implementation;
 - **Energy Efficient Lighting**—this describes the Government's policy on phasing out inefficient lights and replacing them with energy efficient ones;
 - **Efficient Electricity Transmission and Distribution**—this recognizes the need to continue the ongoing trend of efficient transmission and distribution of electricity;
 - **Environmental Sustainability of Energy Efficiency Products**—this describes the Government's policy on safeguarding Barbados' natural environment throughout the production, use, disposal, reuse, and recycling of energy efficiency products; and
 - **Development and Value Retention of Energy Efficiency Products and Services**—this presents the Government's policy on encouraging and supporting the domestic invention, development, manufacturing, and assembly of energy efficiency products, and related services, to maximize the creation and retention of value from energy efficiency in Barbados.

The remainder of this section focuses on the specific policies within each of the seven areas for electric energy efficiency.

Power Utility Regulation for Energy Efficiency

- 5.3 It is the Government's policy that utility scale electricity generation should be stable and reliable, while encouraging the electric utility to invest in energy efficient generation; and that the regulatory process be such as to enable the electric utility to recover any capital investment it makes for efficient generation or efficient consumption, and to make a reasonable return on such investment.
- 5.4 The Government will give consideration to procuring a study that assesses net costs and benefits to the country of maintaining the current network voltage and frequency, or adopting a different one.

Energy Efficiency in New Buildings and Facilities

- 5.5 New buildings in Barbados should be built according to prescribed energy efficiency standards based on best practices in energy efficient construction.
- 5.6 The Barbados National Standards Institution (BNSI) shall be responsible for setting building standards and energy efficiency standards for electrical equipment to mandate energy efficiency measures, following the Government's policy, and in accordance with section 4.2 of the Principles for Implementation of the Policy on Electric Energy Efficiency—which sets out the guidelines for developing a Building Code consistent with the Government's policy.
- 5.7 The Government shall also consider the potential for an incentive, or recognition, for facilities that exceed the energy efficiency standards mandated in the Building Code.
- 5.8 The Barbados Buildings Standards Authority shall be responsible for enforcing the Building Code, including mandatory energy efficiency measures.

Policy on Energy Efficiency in Existing Buildings and Facilities

- 5.9 The Government shall support the retrofitting of existing buildings, both private and public, to ensure energy efficiency. The Government will also create the necessary enabling environment through tax and other concessions to facilitate this component of the policy.
- 5.10 The Government intends to support a variety of initiatives, including the establishment of an Energy Smart Fund to promote increased use of energy efficient technologies (as well as small renewable energy systems).
- 5.11 The Government intends to retrofit its own buildings and facilities. For doing so, the Government shall:
 - i. Commission energy audits for buildings and facilities it owns.
 - ii. Consider using a performance-based contracting model for procuring works and services contractors (including Energy Services Companies, ESCOs) to retrofit buildings and facilities it owns or pays for.
 - iii. Establish a Public Sector Smart Energy Program (separate from the Energy Smart Fund) for funding energy efficiency measures in the public sector, including retrofitting of street lights.
 - iv. Give consideration to encouraging financial institutions to provide preferential financing to individuals and organizations for energy efficiency activities.
- 5.12 The Government shall also support energy labeling in a regional context. Energy labeling is an important factor in identifying energy efficient equipment and influencing consumer decisions to purchase efficient appliances. The Government shall encourage the easy recognition of energy efficient systems through the placement of marks such as labels, or performance data in the product information of appliances.

Energy Efficient Lighting

- 5.13 It is the Government's policy to phase out energy inefficient light bulbs as well as other energy inefficient lighting and to ensure that there is an adequate environmental framework for disposing safely of new efficient lighting technologies such as CFLs

- 5.14 The Government intends to gradually phase out inefficient light bulbs, as well as other energy inefficient lighting, by restricting import and sales of such lighting. To do this, the Government shall introduce a Phase-Out Plan for Energy Inefficient Lighting, based on gradually increasing Minimum Energy Performance Standards (MEPS), expressed in lumens per watt.
- 5.15 The Government will promote light bulb technologies that comply with required efficiency levels.

Efficient Electricity Transmission and Distribution

- 5.16 It is the Government's policy to encourage efficiency in electricity transmission and distribution networks. It is the Government's policy to continue to build on this strength by continuing to monitor transmission and distribution standards in Barbados, regionally, and globally, to guarantee that the country is performing at the highest international standards.

Environmental Sustainability of Energy Efficiency Products

- 5.17 It is the Government's policy to ensure that Barbados' natural environment be safeguarded as energy efficiency products are produced, installed, used, and disposed of in Barbados.
- 5.18 In cases where energy efficient products are likely to have a negative environmental or health impact (for example, CFLs, which contain mercury), the Government shall ensure that there are adequate disposal facilities or mechanisms in place, as well as public awareness and education campaigns for the public on how to dispose of used or broken products in a way that is safe for health and sustainable for the environment. In such cases, the Government may also reconsider the viability of its policy, and adjust it as necessary to safeguard the health of the population and the sustainability of the environment of Barbados.

Development and Value Retention of Energy Efficiency Products and Services

- 5.19 It is the Government's policy to encourage and support the domestic invention, development, manufacturing, and assembly of energy efficiency products, and the domestic supply of energy efficiency services (such as energy audits and energy efficiency retrofits).
- 5.20 It is the Government's intention to set a agenda for developing measures that encourage and support the domestic supply of energy efficiency products (and related services)—such as fiscal, trade, regulatory, and training measures, as well as providing technical assistance to local firms; and measures to protect intellectual property rights. Consistent with the core principles of the National Sustainable Energy Policy, the Government will assess the costs and benefits of such measures (including impacts on value creation and retention through the reduction of imports and increase of exports of goods and services).

6 Policy on Sustainable Supply and Demand of Fossil Fuels

6.1 This section contains the Government's policy on the sustainable supply and demand of fossil fuels. This is an important component of the National Sustainable Energy Policy given the dependence of the economy of Barbados on predominantly imported oil-derived fossil fuels, and limited domestic resources of oil and gas. The Government's policy on sustainable supply and demand of fossil fuels is composed of the following seven areas:

- **Sustainable Exploration, Production, Storage, and Distribution of Fossil Fuels**—this policy aims to ensure efficiency and sustainability in exploring, producing, storing, and distributing oil and natural gas;
- **Security of Supply of Fossil Fuels**—this policy recognizes the Government's objective to improve the supply of fossil fuels and making it more secure;
- **Efficient Conventional Power Generation**—this policy focuses on ensuring that efficient fossil fuel power generation is considered for future capacity expansions;
- **Efficient Use of Fossil Fuels in Transportation**—this policy focuses on encouraging fuel economy in the public and private sectors, through infrastructure planning, and through alternative modes of transportation;
- **Efficient Use of Fossil Fuels in Industry**—this policy focuses on tools for promoting fossil fuel energy efficiency in industrial processes;
- **Efficient Use of Fossil Fuels in the Commercial Sector**—this policy focuses on tools for promoting efficient provision of air conditioning and refrigeration; and
- **Efficient Use of Fossil Fuels in the Residential Sector**—this policy recognizes the Government's objective to promote energy efficiency and decrease the cost of living of households.

Sustainable Exploration, Production, Storage, and Distribution of Fossil Fuels

- 6.2 The Government shall support the ongoing efforts of the Barbados National Oil Company, Limited to identify, assess, and implement best practices for the efficient exploration, production, and storage of natural oil and gas (such as enhanced oil recovery, recovery of natural gas associated with oil, and adequate storage for normal needs and emergency supply), to the extent that these practices are cost-benefit justified from a national perspective. The Government shall also support the ongoing efforts of the Barbados National Oil Company, Limited to ensure that exploration, production, and storage activities comply with domestic regulations and international best practices, and that they preserve the natural environment of Barbados.
- 6.3 It is the Government's policy to grant licenses to outside parties capable of exploiting reserves in Barbados' territorial waters. The selected companies should have outstanding credentials for environmental preservation. Also, selected companies should present plans to train and hire Barbadians for jobs in offshore drilling.

- 6.4 All fossil fuels have the potential to be harmful to the environment. Therefore, it is the Government's policy to set and maintain emissions standards for harmful emissions that result from using petroleum products. Further, the Government will continuously review plans and preparations for containing and cleaning petroleum product spills.

Security of Supply of Fossil Fuels

- 6.5 It is the Government's policy to ensure a secure supply of fossil fuels in Barbados, in order to limit relevant risks related—namely, to limit physical risks such as supply-chain disruptions (to ensure that citizens are able to access the fossil fuels they require, when they require them), and economic risks (to reduce impacts of shocks and changes in the supply of fossil fuels on foreign exchange and the national economy). The Government will continue developing and implementing measures to improve trade, ensure the availability of adequate emergency supply, and improve the procurement of fossil fuels.
- 6.6 It is the Government's policy that supply of petroleum products be diversified, both in terms of products and suppliers, to guarantee a fuel mix that provides fuel security at the lowest possible cost.

Efficient Conventional Power Generation

- 6.7 Conventional power generation is the single largest consumer of oil-derived products, and represents a major opportunity for more efficient use of fossil fuels. It is therefore the Government's policy to support an increase in the overall efficiency of power generation carried out with conventional (fossil fuel-based) technologies.
- 6.8 The Policy on Utility Scale Renewable Power Generation states the following with reference to the electricity regulator, again also applying to conventional power generation:
- “....the Government encourages the electricity regulator to develop a new regulatory regime containing three core elements:*
- i. *Requiring the electric utility to show that its generation expansion plan is determined within an Integrated Resource Plan that identifies the combination of resources that satisfy forecast demand at least cost (while also taking into account a prudent diversification of the generation portfolio)—including new firm and non-firm generation capacity, energy efficiency, and energy storage capacity (which allows for the integration of further intermittent renewable energy);*
 - ii. *Allowing the electric utility to securely recover the costs of investments in renewable generation and fuel efficiency; and*
 - iii. *Requiring the electric utility to purchase renewable and cogenerated power from third party suppliers, where additional power is required under the Integrated Resource Plan (including the decommissioning and replacement of old plants), and where third party supply is cheaper than the electric utility providing the power itself, and does not create risks to power quality or reliability, nor any unreasonable financial risk.....”*

- 6.9 Efficient conventional power generation will be considered together with renewable energy generation under these same conditions. It is the policy of the Government that renewable energy and efficient conventional power generation options be treated under the same criteria of economic efficiency, within an Integrated Resource Planning exercise to be developed by the electric utility and approved by the electricity regulator.

Efficient Use of Fossil Fuels in Transportation

- 6.10 Transportation is a major consumer of imported oil-derived products. It is the Government's policy to support the efficient use of fossil fuels, and therefore sustainable transportation, while lowering the overall costs of transportation, and ultimately the annual fuel import bill.
- 6.11 Complementary to existing policies, the Government considers the following to be priority areas for policy action:
- i. Increasing the efficiency of the public motor vehicle fleet by encouraging increased fuel economy, alternative fuels, and more efficient vehicle operation;
 - ii. Increasing the fuel economy of private transport through various Government-supported policies to promote fuel economy of the private fleet, and increased uptake of public transportation;
 - iii. Developing transport infrastructure in a way that integrates efficiency solutions, including through town planning, new road links, and infrastructure for alternative fuelling;
 - iv. Supporting alternative modes of transportation, such as local freight by sea, and non-motorized forms of transportation; and
 - v. Promoting the uptake of environmentally preferable fuels.

Each of these areas is described in more detail in the following paragraphs.

Public Motor Vehicle Fleet Efficiency

- 6.12 The public motor vehicle fleet presents an important opportunity for increasing the efficiency of fossil fuel use. To realize this potential, the Government shall support:
- i. The replacement of public vehicles, when necessary, with more fuel efficient alternatives (particularly for the replacement and disposal of the oldest and most inefficient vehicles); and
 - ii. The use of alternative fuels—such as natural gas, biofuels, and electric—provided that the appropriate fuel is available, cost effective, and reliably supplied.

- 6.13 When the opportunity arises to replace vehicles, the Government shall assess economic costs and benefits for both fuel efficient and alternative fuel vehicles.

- 6.14 The Government shall also support more efficient operation of the public vehicle fleet through vehicle maintenance, driver education for greater fuel efficiency, and audits of gas use in the public sector.

Private Transport Efficiency

- 6.15 The efficiency of private transport may be increased through Government supported policies and in cooperation with private sector initiatives. To achieve greater efficiency in private transport and encourage the use of efficient motor vehicles, the Government shall:

- i. Use customs and fiscal policies for providing incentives to private vehicle buyers to purchase fuel efficient vehicles (based on minimum average fuel economy standards) and alternative fuel vehicles (such as natural gas, biofuels, and electric);

- ii. Support the development, through both public and private initiatives, of public transportation that replaces private transportation and results in more efficient use of fossil fuels; and
- iii. Consider special policies to encourage the replacement and sustainable disposal of the oldest and most inefficient vehicles.

Development of Transportation Infrastructure

6.16 The Government shall support the development of transportation infrastructure to decongest roads, and to provide the means for alternative fuelling:

- i. Decongesting roads shall be pursued through integrating sustainable transportation methods into the town and country development planning process, and the development of new road links; and
- ii. Development of alternative fuelling infrastructure—such as refueling stations for vehicles running on natural gas, biofuels, and electric vehicles—shall be supported for those solutions that are cost-benefit justified from a country perspective.

Alternative Modes of Transportation

6.17 The Government shall promote the use of alternative transportation where practical, safe, and economically viable.

Environmentally Preferable Fuels

6.18 The Government shall promote the procurement, preparation, sale, and use of environmentally preferable fuels for transportation, including but not limited to low-sulfur diesel and low-carbon fuels, to the extent that they are cost-benefit justified.

Efficient Use of Fossil Fuels in Industry

6.19 The industrial sector is a large direct consumer of oil-derived products, particularly for process heat. It is the Government's policy that fossil fuels be used efficiently for producing process heat. The efficiency of process heat can be increased through initiative such as the installation of more efficient boiler systems and combined heat and power units.

6.20 The Government shall use customs and fiscal incentives, and awareness campaigns, to increase the efficiency of process heat in the industrial sector.

6.21 The Government recognizes that both private companies and state-owned enterprises operate industrial processes. In the case of state-owned enterprises, the Government shall instruct the relevant entities to commission audits of process heat efficiency; and support the implementation of energy efficiency measures that are economically justified.

Efficient Use of Fossil Fuels in the Commercial Sector

6.22 The Government shall encourage energy efficient use of fuels in the commercial sector. In the context of this policy, the commercial sector also includes the public sector.

6.23 Energy for the commercial sector is predominantly consumed in the form of electricity, with air conditioning and refrigeration representing significant consumption. However, the commercial sector is also the largest user of natural gas in Barbados. Therefore, there is an opportunity to increase fossil fuel efficiency in these end uses.

- 6.24 The Government recognizes the important role that the hotel and tourism industry plays in Barbados' economy. The Ministry responsible for Energy notes that there are multiple institutions and organizations that contribute to ensuring sustainable energy in the hotel sector, and will ensure that the National Sustainable Energy Policy is carried out in cooperation with the initiatives of those parties. These include the Ministry of Tourism, the Ministry of Finance and Economic Affairs, the Ministry of Environment, the Barbados Hotel and Tourism Association, and the Caribbean Hotel Energy Efficiency Action Program.
- 6.25 In line with the Government policy, and complementary to existing policies, the Government considers the following to be desirable areas for policy action:
- i. That no distortions exist between electrically-driven and alternative fuels and equipment for providing air conditioning and refrigeration;
 - ii. That tax and customs incentives for sustainable energy apply to the tourism industry, in particular incentives for efficient air conditioning and refrigeration; and
 - iii. That building energy efficiency standards be implemented to reduce energy loads in cooperation with the Barbados National Standards Institution.

Efficient Use of Fossil Fuels in the Residential Sector

- 6.26 It is the Government's policy to support fuel efficiency, where possible, in households.
- 6.27 The Government shall also continue to support the adoption of alternative fuels by the residential sector, consistent with current policies to decrease the cost of living to the people of Barbados.

7 Policy on Energy Education and Awareness

- 7.1 This section contains the Government's policy on education on and awareness about sustainable energy. The Government recognizes that educating the population on sustainable energy initiatives, goods, and services is an important component in working towards a sustainable energy future for Barbados. The Government's policy on energy education and awareness is composed of the following two areas:
- i. **Increased Awareness for Informed Choices on Sustainable Energy**—describing the Government's policy on how information on sustainable energy initiatives will be disseminated to the population, identifying some of the key organizations involved
 - ii. **Education for Sustainable Energy Professions**—describing the Government's policy for creating a qualified workforce in the field of sustainable energy, for professions in the public and private sector (including the manufacturing and assembly of sustainable energy goods, and the supply of related services. Dissemination of information on sustainable energy initiatives, learning resources, and administrative processes for obtaining technical and financial support to increase uptake of sustainable energy projects, shall be central to the Government's policy on energy education and awareness.
- 7.2 The Government also recognizes the importance of including the population in the development of sustainable energy policy incentives. Therefore, it is the Government's policy to include both public and private enterprises and individuals in the formulation of sustainable energy policy interventions.

Increased Awareness for Informed Choices on Sustainable Energy

- 7.3 The Government shall prepare and approve a Public Awareness Plan, and implement it to make the general public more aware of how it uses energy, and what options are most suitable in Barbados for households and businesses to save energy and money.
- 7.4 The Government shall also ensure that the general public is effectively informed of all measures and resources (such as the Energy Smart Fund, or fiscal and customs incentives) that are in place to support the development of key sustainable energy options; and that it is fully enabled to apply for, and obtain technical and financial support in accordance with prescribed rules and procedures.
- 7.5 The Government recognizes the importance of cooperating with businesses and non-governmental organizations in the dissemination of information on sustainable energy.

Education for Sustainable Energy Professions

- 7.6 The Government shall create an enabling environment so that individuals who work in the field of sustainable energy, or who wish to do so in the future, may acquire satisfactory knowledge and skills to do so successfully, and that the institutions responsible for energy sector policy and regulation be strengthened to support sustainable energy development in Barbados.
- 7.7 The Government shall support increased qualifications and experience of individuals in the field of sustainable energy through the following measures:

- **Capacity and institutional strengthening for public sector entities**—public sector entities with expanding responsibilities related to the National Sustainable Energy Policy must ensure they are adequately enhancing and training staff to familiarize themselves with new sustainable technologies and deal with new technical and regulatory challenges. The Government shall prepare, approve, and implement a Capacity and Institutional Strengthening Plan for the Energy Sector.
- **Education and professional qualifications**—the Government must ensure that future professionals can be adequately trained in the assessment, design, manufacturing, assembly, installation, operation, maintenance, and disposal of energy efficiency and renewable energy equipment; that the public be adequately informed about the qualifications of professionals thanks to appropriate certifications; and that licensing of professionals operating in the market for sustainable energy goods and services be appropriate. The Government will prepare and implement a Public Education and Professional Strengthening Plan to improve the framework for training (including primary, secondary, and tertiary education, as well as practical instruction), certifications, and licensing for sustainable energy services and, if deemed necessary, the manufacturing and assembly of sustainable energy products in Barbados. This will include the development of National Vocational Qualifications for energy efficiency auditing and distributed scale solar photovoltaic and wind systems, as add-ons to the National Vocational Qualification for Electrical Installations.
- **Vocational training**—The Government shall ensure that appropriate vocational training is available to professionals such as technicians, electricians, plumbers, installers, and engineers who wish to develop or upgrade their skills and capabilities in sustainable energy products and services. The Government shall support skills training and apprenticeships, including those offered through the Barbados Vocational Training Board, for aspiring and current professionals focused on sustainable energy goods and services.