

# An assessment of fiscal and regulatory barriers to the deployment of energy efficiency and renewable energy technologies in Saint Lucia

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## Executive Summary

Energy represents a fundamental input for modern economies and social life. The world today faces two main threats related to energy. Firstly inadequate and insecure supplies at affordable prices and secondly global warming due primarily to the over-consumption of fossil fuels. Coupled with this, is that the prospects for global energy markets, heighten concerns around energy security and the impact of climate change on energy-dependent small island states such as those in the Caribbean. Small island developing States (SIDS) are unique because of their small size and geographical location – but SIDS also are vulnerable to the high cost of imported fossil fuels.

The energy sector in Saint Lucia is not unlike other Caribbean countries as there exists a high dependence on fossil fuels. The energy sector is dominated by the electricity and transportation sub-sectors, which are the largest users of energy. Grid access in Saint Lucia is over 98 per cent. The electrical utility has an installed capacity of about 88.4 MW. Electricity generation is characterized by total dependence on diesel-powered generators. In the recent years there has been significant expansion of the 11kV distribution network. With respect to rural electrification, the distribution network has been expanded and its carrying capacity increased at various points.

The Government of Saint Lucia continues to take a strategic approach to the development of the energy sector and to this end, in 2010 developed a comprehensive national energy policy. The policy states that “the Government will ensure the development, and/or exploitation, of new and renewable energy resources as an important measure in its efforts to establish Saint Lucia as a sustainable energy demonstration country”. This study is in direct support of the energy policy and many of the goals and strategies identified in the policy.

This study was undertaken to identify fiscal and regulatory barriers to implementing renewable energy (RE) technologies and energy conservation and efficiency strategies and to recommend options for the removal of these barriers. This report presents the findings of the study. The preparation of the report was facilitated by a comprehensive desk review of relevant documents and by consultations with key persons in the public and private sectors and civil society. The report presents a range of policy options that could be considered by the Government of Saint Lucia as it seeks to implement its National Energy Policy 2010. The recommendations are designed to advance both renewable energy and energy conservation and efficiency priorities and build on the strategies identified in the National Energy Policy.

The National Energy Policy 2010 of Saint Lucia provides a sound framework for identifying policies to address many of the barriers that the country faces with respect to advancing both energy

conservation and renewable energy development. As such, the recommendations presented in this paper for consideration by the Government of Saint Lucia are aligned to the country’s national energy policy and as such these policy recommendations can support many of the strategies articulated in the policy.

With respect to renewable energy and indigenous energy resources, a range of preliminary studies have been undertaken in Saint Lucia, showing that the island possesses significant potential for the development of solar, wind, geothermal and biomass energy. Hydropower and waste-to-energy are also viable options that can be explored. Despite very considerable renewable energy potential, the only renewable resources that are currently in use is solar energy for heating water and a small percentage of photovoltaic. The actual renewable energy potential of Saint Lucia has not yet been fully quantified. The Government has a strong interest in renewable energy and has set a target of 30 per cent of electricity generated by 2020 to be derived from renewables. This is expected to be advanced with the revision of the power supply regulation which will be amended to make Saint Lucia Electricity Services Limited (LUCELEC) responsible for ensuring that this quota is achieved either through its own generation or purchasing renewable electricity from adequate generation facilities.

Improvements in energy conservation and efficiency can play a significant role in addressing energy security and achieving environmental and economic objectives. Globally, in the last few years, renewable energy technologies (RETs) have experienced substantial improvements in cost, performance, and reliability, making them competitive today in a range of applications. Led by wind and photovoltaic (PV) technologies, they represent the fastest growing of all energy industries (though starting from a relatively low base). The momentum for renewable energy worldwide is strong, and the prospects for these technologies virtually untapped. The fact that today the renewable energy potential of nations is far from maximized is due in large part to a number of outstanding barriers which put renewable energy at an economic, regulatory, or institutional disadvantage relative to other forms of energy.

Based on consultations in Saint Lucia with key stakeholders as well as an assessment of the energy sector in that country, barriers to energy efficiency as well as deployment of renewable energy technologies were identified. Some of these include: lack of mature markets and favorable policy, regulatory, and legal frameworks to encourage the development of and investment in renewable energy; weaknesses in the regulation of the electricity sector; higher initial costs of the technologies; inadequate institutional capacity; and imperfect capital markets.

Additionally, to support renewable energy and energy efficiency development, the creation of a legislative framework that provides a facilitative environment is critical. For increased energy efficiency, this includes the development of new regulations and policies that, for example, mandate minimum energy performance standards or labelling requirements. For renewable energy penetration, it is critical to create the legal framework to expand existing opportunities for incorporating independent electricity producers using solar power into the national electricity sector structure. Accomplishing this involves revision of current legislation such as the Electricity Supply Act, as well as the development of new legislation and regulations related, for example, to distributed generation and power sector restructuring. Financial and fiscal incentives that address the issues related to the relatively high cost of renewable energy and energy efficient (EE) systems and are critical to promoting both energy efficiency and renewable energy. Recommended incentives include tax credits (some of which already exist) and use of soft loans.

While the development of the National Energy Policy form the foundation of the energy agenda of Saint Lucia, the recommendations of this study can assist in accelerating progress towards achieving the country’s energy goal to “enable all citizens and residents of Saint Lucia to have access to affordable, efficient, reliable, socially and environmentally responsible forms of energy and enable Saint Lucia to become a sustainable energy demonstration country.

## I. Introduction

Energy represents a fundamental input for modern economies and social life. The world today faces two main threats related to energy. Firstly, inadequate and insecure supplies at affordable prices and secondly, global warming due primarily to the over-consumption of fossil fuels. Coupled with this, is that the prospects for global energy markets, heighten concerns around energy security and the impact of climate change on energy-dependent small island States such as those in the Caribbean. Small island developing States (SIDS) are unique because of their small size and geographical location – but SIDS also are vulnerable to the high cost of imported fossil fuels.

Most Caribbean countries are almost entirely dependent on imported petroleum as their primary source of energy. Also, in almost all of the countries, transport and electricity generation account for the largest consumer of petroleum. In almost all cases, countries in the region have taken a strategic approach to long-term planning in the energy sector towards creating higher levels of efficiency on both the demand and supply side as well as diversification in the energy mix either through the use of alternatives such as liquid natural gas (LNG) or through deployment of renewable energy based on countries' own indigenous supplies. The thrust by Governments towards diversification of the energy mix in almost all Caribbean countries as other SIDS is being aggressively pursued as a means of advancing energy security, international competitiveness and affordability of energy supplies to homes and communities as well as the productive sectors.

Dependence on imported fossil fuels within the Caribbean Community (CARICOM) has created significant macroeconomic challenges for the fuel importing countries. The value of energy imports compared to total imports in the importing Member States have progressively increased over the years. This scenario has had a deleterious impact on macroeconomic sustainability in countries in the region. Petroleum-derivative imports account for between 40 per cent and 60 per cent of total export earnings for countries such as Jamaica and Guyana with a larger industrial base. For the tourism / service oriented Member States such as Belize, Grenada, Saint Vincent and the Grenadines and Barbados, petroleum imports range from 13 per cent to 30 per cent of export earnings.

Table 1 shows the characteristics of energy markets in some SIDS in the Caribbean.

**TABLE 1**  
**CHARACTERISTICS OF ENERGY MARKETS IN SOME CARIBBEAN SIDS**

Country	TPES (PJ)	Electricity use per capita (KWH)	Electricity access (%)	Fossil fuel dependency (%) (2009)
Antigua and Barbuda	6.9	1 264	100.0	100
Barbados	21.3	3 481	100.0	89
Dominica	2.0	1 229	90.0	92
Dominican Republic	338.8	1 358	95.9	72
Grenada	4.2	1 777	99.5	93
Saint Lucia	5.6	2 040	98.0	98
Saint Vincent and the Grenadines	2.7	634	91.0	94
Saint Kitts and Nevis	4.2	2 095	95.0	88

Source: International Renewable Energy Agency, 2012

## **A. Profile of the energy sector in Saint Lucia – issues and challenges**

Saint Lucia is an island country in the eastern Caribbean Sea on the boundary with the Atlantic Ocean. Part of the Lesser Antilles; it is located north/northeast of the island of Saint Vincent, northwest of Barbados and south of Martinique. It covers a land area of 620 km<sup>2</sup> and has an estimated population of 173,765 according to the 2009 census.

The energy sector in Saint Lucia is not unlike other Caribbean countries as there exists a high dependence on fossil fuels. The energy sector is dominated by the electricity and transportation sub-sectors, which are the largest users of energy. Grid access is over 98 per cent. The electrical utility has an installed capacity of about 88.4 MW and total primary energy supply is 126.0 ktoe. Electricity generation is characterized by total dependence on diesel-powered generators.

Peak demand in 2008 of Saint Lucia was 54 MW, with net generation of over 350 GWh. By 2028 peak demand is projected to increase around 115 MW, with net generation increasing to around 650 GWh (increase rate of 3.2 per cent)<sup>1</sup>. System losses<sup>2</sup> were 9.6 per cent in 2012 compared to 10.25 per cent in 2008<sup>3</sup>, as seen in Figure 1.

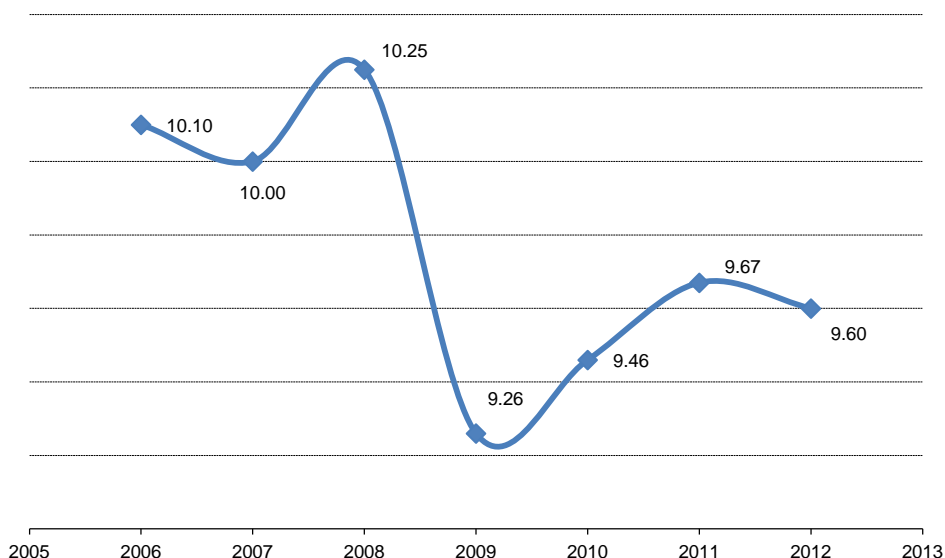
<sup>1</sup> Saint Lucia National Energy Policy

<sup>2</sup> System losses are total electric energy losses in the electrical system.

<sup>3</sup> LUCELEC Annual Report 2012



**FIGURE 1**  
**SYSTEM LOSSES 2006 – 2012**  
*(Percentages)*



Source: LUCELEC Annual Report, 2012

Saint Lucia is a net importer of fossil-based energy with the power and transport sectors relying completely on imported oil derivatives. All economic sectors have been affected by increasing and volatile oil prices over the last couple of years – all of this having negative impacts on the country’s balance of trade. The effects of energy supply interruptions and oil price shocks on economic performance are therefore of major concern given the island’s almost complete dependence on imported energy.

Saint Lucia enjoys a very high electrification rate of about 98 per cent<sup>4</sup>. In the recent years there has been significant expansion of the 11kV distribution network. With respect to rural electrification, the distribution network has been expanded and its carrying capacity increased at numerous points.

The price of electricity (tariff structure) in Saint Lucia ranged in 2013 from US\$ 0.34/kWh for domestic consumers to US\$ 0.39/kWh for commercial consumers and hotels<sup>5</sup>. The high price of electricity reduces the competitiveness of the economy. Generally, the volatility of the price for fuel in the international market has a significant effect on the local market. The Global Competitiveness Report identifies the quality of electricity supply and the price of electricity as important contributors to economic growth. Within this context it may be important to reduce production costs and the average price of electricity to consumers. Lowering energy costs will be of fundamental importance to the economic development of the country and the long-term competitiveness of its productive enterprises.

<sup>4</sup> CARICOM Regional Energy Policy

<sup>5</sup> Rates available at: <http://www.lucelec.com/content/energy-rates>

## **B. Renewable energy and indigenous energy sources**

With respect to renewable energy and indigenous energy resources, a range of preliminary studies have been undertaken in Saint Lucia, showing that the island possesses significant potential for the developments of solar, wind, geothermal and biomass energy. Hydropower and waste-to-energy are also viable options that can be explored. Despite very considerable renewable energy potential, the only renewable resource that is currently in use is solar energy for heating water and a small percentage of photovoltaic. The actual renewable energy potential of Saint Lucia has not yet been fully quantified. The Government has a strong interest in renewable energy and has set a target of 30 per cent of electricity generated by 2020 to be derived from renewables. This is expected to be advanced with the revision of the Power Supply Regulation which will be amended to make LUCELEC responsible for ensuring that this quota is achieved either through its own generation or purchasing renewable electricity from adequate generation facilities.

With respect to solar, Saint Lucia receives an almost constant supply of surface solar radiation throughout the year. This, in addition to a fairly high temperature which averages near 28°C, provides an excellent environment for the use of solar energy. As a result, solar energy can be used for both electricity generation and heating. Solar water heating holds much scope for use in both the domestic and hotel sectors in particular. Solar photovoltaic potential is estimated at 36 MW of installed capacity. Currently, there is 0.07 per cent of solar photovoltaic on the grid with 10,000 square meters installed (solar footprint). There are many barriers to the uptake of solar photovoltaic and solar water heaters; chief among these is the price of the equipment and the initial capital investment that also includes installation.

Saint Lucia lies in the path of north-easterly trade wind belts. These reliable winds create a good wind regime for wind energy exploitation. The best wind sites can be found on the east coast and on the northern and southern tips of the island.

Geothermal energy is considered to be a viable alternative for electricity generation due to the island's volcanic nature. Most of the volcanic activity on the island is concentrated in the south-west part in the town of Soufriere. The fumaroles at the Sulphur Springs are a manifestation of the location of geothermal potential. Geothermal energy is expected to provide a significant and reliable energy source for Saint Lucia in the near future. One environmental concern that has surfaced is the need for the development of the geothermal potential of the country to be developed in an environmentally sound manner as the Piton Management Area World Heritage Site is nearby the location.

Although most of the island's rivers are quite small, there is some potential for mini hydro power applications, such as those that can be used in the agricultural industry. Preliminary research has also suggested that the Roseau dam could be used to produce electricity.

Consideration also is being given to the development of biomass energy especially from plant and animal materials. For example the waste from pigs is being considered for use in biogas digesters.

Consideration also is being given to the waste to energy potential of the country. Direct waste utilization through incineration or gasification is being strongly considered. Waste from the Deglos Sanitary landfill is being considered for conversion to an energy source as well. The capture of landfill gas, if undertaken, would not only produce a fuel source, but would also directly reduce the amount of methane.

Saint Lucia has participated in a number of renewable energy initiatives regionally. For example, the country has been involved in the Eastern Caribbean Geothermal Development Project (Geo-Caraibes) funded by the Organization of American States. The project addresses the development of geothermal energy on the islands of Dominica, Saint Lucia, and Saint Kitts and Nevis. The Geo-Caraibes Project seeks to reduce the risk-costs linked to geothermal utilization and create the conditions for its commercial development in the region. The country is part of the Global Energy Island Initiative (GSEII), a consortium of international non-governmental organizations and multi-

lateral institutions that supports small island States and potential donors by bringing renewable energy and energy efficient projects together. Saint Lucia signed two multilateral environmental agreements that indirectly support the development of renewable energy.

### **C. Policy and regulatory framework**

The island’s electricity market is dominated by LUCELEC which is the sole electricity provider on the island. LUCELEC operates power stations equipped with diesel generators. LUCELEC has an installed capacity of approximately 88.4 MW. It is a vertically integrated company and currently has a monopoly in generation, transmission and distribution. This monopoly enjoyed by LUCELEC provides it with an exclusive license to operate and to be the sole provider of electricity till 2045. The company has a wide coverage: it supplies power to nearly all the commercial, industrial, and domestic establishments in Saint Lucia. Owing to the rising tariff to the customer, there have been pressures to deregulate the industry and end the monopoly.

LUCELEC is a publicly held company and the composition of its shareholders includes: Light and Power Holdings Ltd. (20 per cent), First Citizens Bank Ltd. (20 per cent), National Insurance Corporation (16.79 per cent), Castries City Council (16.33 per cent), Government of Saint Lucia (12.44 per cent), and individual shareholders (14.44 per cent).

In June 2010, the Cabinet of Saint Lucia approved the official National Energy Policy (NEP).

Among other things, the policy provides for private participation in generation, encourages the establishment of small-scale renewable energy systems and proposes the establishment of an Independent Regulatory Commission for the electricity sector. Another key objective of the policy is to create an enabling environment, both regulatory and institutional for the introduction of indigenous renewable energy to the national energy mix towards achieving greater levels of energy security.

According to the 1964 Power Supply Regulation, LUCELEC holds a universal licence for generating, transmitting, distributing and selling electricity until 2045. While the 1964 regulation was superseded by the 1994 Electricity Supply Act, the LUCELEC exclusive licence was preserved by this new act. Currently the Electricity Supply Act of 1994 is the main piece of legislation that governs the operations of the power sector on the island. The Act gives LUCELEC, exclusive rights to generate, transmit and distribute electricity on the island. As such, LUCELEC is largely responsible for setting tariffs and ensuring its own standards of service as is set out in the Electricity Supply Act.

The Electricity Supply Act 1994 is currently being updated to facilitate a more competitive environment. Some of these amendments will require LUCELEC for example to set up separate cost centres for the generation, transmission and distribution in order to ensure that costs related to each of these different operations are accurately determined. Additionally, the revised regulation is expected to stipulate that the LUCELEC long-term expansion plan take into account renewable energy projects. The Minister with responsibility for energy can intervene at a policy level to regulate the actions of LUCELEC. Further, major policy decisions may be taken at the Cabinet or Prime-Ministerial level.

Currently, Saint Lucia does not have an independent electricity regulator although there are plans to put one in place. Like Grenada, Saint Lucia will by the end of 2013 participate in the Eastern Caribbean Energy Regulatory Authority (ECERA) and by so doing enable the independent regulation for the uptake of renewable energy technologies, especially the appropriate, economically viable pricing tariff for the stakeholders involved. The participation in ECERA also calls for the revision of the Electricity Supply Act and will assist in removing the current barriers to renewables as a result of the current Act.

## **D. Energy conservation and efficiency**

The focus of energy conservation and efficiency must be both on the demand and supply side. Energy efficiency and conservation represents the best immediate hope to reduce the nation's use of oil and the attendant negative environmental impacts. Many schools of thought have advocated for energy conservation to be considered to have two main components - energy efficiency and renewable energy. Saint Lucians, both residential and commercial customers have been making investments in energy efficient lightning, primarily in compact fluorescent bulbs and in LEDs. Also the government continues to make information related to energy conservation and efficiency available to consumers. For example the Government has developed an energy efficiency guide that provides easy and simple tips to reduce the consumption of energy. This user-friendly guide was originally targeted for the commercial and hotel sector, however, given the useful content and easy to read and understand information contained therein, it can be used by private households who are looking for the most effective way to save energy consumption and reduce the country's carbon footprint.

## II. Approach and methodology

The preparation of this report was facilitated by a comprehensive desk review of relevant documents and consultations with key officials in the public and private sectors as well as with civil society organizations towards gathering information on:

- The profile of the energy sector in Saint Lucia with a particular focus on factors of relevance to renewable energy and energy efficiency
- Barriers that exist in Saint Lucia to deploying renewable energy and advancing energy conservation and efficiency strategies
- Suggested policy options that could effectively address the identified barriers.

Stakeholder consultations were held to inform the preparation of a draft report and also to review the draft, verifying the information and confirming that the recommendations were appropriate for the Government of Saint Lucia.

This report presents a range of policy options that could be considered by the Government of Saint Lucia as it seeks to implement its National Energy Policy 2010 and advance both energy conservation and renewable energy priorities.



### **III. Results - Barriers to the deployment of renewable energy technologies and energy conservation and efficiency strategies in Saint Lucia**

Improvements in energy conservation and efficiency can play a significant role in addressing energy security and achieving environmental and economic objectives. Many studies over the years have identified major barriers to the implementation of energy conservation and efficiency initiatives on a sustained basis in developing countries. These barriers include:

- Insufficient channels for information dissemination and limited access to information about energy conservation and a general lack of information on energy conserving or efficient products and services
- Limited certification schemes both for energy efficiency equipment and renewable energy technologies
- Limited numbers of trained personnel or technical or managerial expertise to effectively develop and implement energy conservation and efficiency strategies. There is limited energy efficiency training programmes for utility personnel, hotel developers and engineers and other relevant stakeholders to effectively support energy efficiency. Coupled with this is the need to improve the training of automotive mechanics and driving instructors with respect to energy conservation and efficiency.
- Below long-run marginal cost pricing and other price distortions – this is also common in the transport sector where there is a lack of beneficial tax systems to promote the purchase of more energy efficient vehicles, including the purchase of hybrid vehicles.
- Regulatory biases or absence of regulations to support energy development
- High transaction costs and limited fiscal incentives for the purchase of energy efficient equipment. It should be noted here (and will be included in the section below) that the Ministry of Sustainable Development, Energy, Science and Technology with the assistance of the Ministry of Finance is currently reviewing a range of incentives for

energy efficiency equipment and renewable energy technologies as a means of enhancing greater levels of deployment of these technologies.

- High initial costs of energy efficient technologies coupled with lack of access to credit
- High user discount rates
- Higher perceived risks of the more-efficient technologies
- Limited information on energy efficiency in the transport sector
- Lack of a revised energy efficiency building code which limits Government efforts to put measures in place to encourage energy efficiency in new and existing buildings.
- On the supply side, there is need for more stringent transmission loss reduction programmes.

The areas of focus for advancing energy conservation and efficiency in a country include: public sector, private sector (households, industrial, commercial, and tourism), electricity, transport, codes and standards, energy conservation and efficiency market, renewable energy technologies, environment, institutional framework and technical capacity development.

With respect to renewable energy technologies (RETs), in the last few years, these technologies have experienced substantial improvements in cost, performance, and reliability, making them more competitive today in a range of applications. Led by wind and photovoltaic technologies, they represent the fastest growing of all energy industries (though starting from a relatively low base). The momentum for renewable energy worldwide is strong, and the prospects for these technologies virtually untapped.

The fact that today the renewable energy potential of nations is far from maximized is due in large part to a number of outstanding barriers which put renewable energy at an economic, regulatory, or institutional disadvantage relative to other forms of energy. Based on consultations in Saint Lucia with key stakeholders as well as an assessment of the energy sector in that country, the following barriers were identified:

1. Lack of mature markets and favorable policy, regulatory, and legal frameworks to encourage the development of, and investment in renewable energy. This for example calls for a revision of the current regulatory framework as well as for the introduction of modern legislation such as electricity feed in laws and portfolio standards to facilitate the effective deployment of renewables. The existing monopoly governing LUCELEC can also be seen as a barrier to renewable energy deployment, even though LUCELEC has shown a strong interest in investing in renewable energy to generate electricity.
2. There also exist weaknesses in the regulation of the electricity sector in that Saint Lucia currently does not have an independent electricity regulator and the power sector is to a large extent self-regulated by LUCELEC.
3. The higher initial costs of the technologies (despite cost reductions) in a number of applications; renewable energy systems have higher upfront capital costs than conventional alternatives, though lower operation and maintenance costs.
4. Inadequate institutional capacity for some aspects of renewable energy project/program design, development, and implementation, including lack of skills and knowledge around renewable energy technologies generally.
5. Imperfect capital markets; insufficient access to affordable financing for project developers, entrepreneurs, and consumers; and financing risks and uncertainties.
6. Low levels of awareness and understanding of the benefits, costs, and applications of renewable energy among policymakers, the local private sector, finance institutions, and



prospective customers. Whilst there is some information available to consumers, this can be enhanced and expanded to include available technology options as well as available technical expertise for installation and maintenance in-country.

7. Whilst there is information on the renewable energy resource potential there is the need for additional studies on renewable resources such as mapping exercises, for example in the area of geothermal.

Notwithstanding these barriers, there are a number of drivers spurring market growth in renewable energy globally. Most notably, investments in technology research, development, and demonstration, primarily by industrialized nations; supportive policy and regulatory frameworks; energy security issues; environmental and climate change concerns; and local and regional development opportunities that these technologies offer. Price spikes and supply concerns over fossil based technologies are further increasing interest in and demand for the technologies.

## **A. The role of the National Energy Policy of Saint Lucia in removing fiscal and regulatory barriers to advancing energy conservation and efficiency and renewable energy deployment**

The National Energy Policy 2010 of Saint Lucia provides a sound framework for identifying policies to address many of the barriers that the country faces with respect to advancing both energy conservation and renewable energy development. The policy states that “the Government will ensure the development, and/or exploitation, of new and renewable energy resources as an important measure in its efforts to establish Saint Lucia as a sustainable energy demonstration country”. The policy prescriptions presented here for consideration by the Government of Saint Lucia in the section immediately following will support the development and achievement of the following strategies as articulated in the National Energy Policy. The strategies that will be supported (aligned to the policy goals are) are:

- Energy security and reliability
- Diversification of the energy base
- Exploitation of indigenous renewable energy resources
- Higher efficiency in energy production, conversion and use with the overall objective of reducing energy intensity
- Reduction of adverse environmental effects and pollution by rehabilitating existing energy sector facilities and introducing new standards for energy-related products
- Implementation of appropriate pricing policies to ensure that adequate energy supplies are efficiently delivered to all economic sectors, and fostering an environment to facilitate an improved and sustained energy supply network with sufficient incentives to encourage private sector investments
- Establishment of an appropriate regulatory framework to set clear guidelines for investors and protect the interests of consumers.



## **IV. Recommendations - Main policy considerations to reduce and/or remove the barriers to renewable energy and to promote energy conservation and efficiency in Saint Lucia**

The recommendations presented in this section for consideration by the Government of Saint Lucia are aligned to the country’s national energy policy and as such these policy recommendations can support many of the strategies articulated in the national energy policy. The policy recommendations also presented here were discussed with key stakeholders at a meeting held in Saint Lucia in November 2013.

### **A. Proposals for advancing energy conservation and efficiency**

For energy efficiency experts, improving energy efficiency reflects the results of actions that aim at reducing the amount of energy used for a given level of services (e.g. lighting, cooling, and transportation), purchase of efficient equipment, retrofitting investments to reduce the consumption of existing buildings and facilities, or avoiding unnecessary consumption of energy. Avoiding unnecessary consumption is certainly a matter of individual behaviour, but it is also, often, a matter of appropriate equipment: control of room temperature or automatic deactivation of lights in unoccupied hotel rooms is a good example of the use of equipment to reduce the influence of individual behaviour.

The energy efficiency policy options presented here for consideration by the Government of Saint Lucia include a range of public interventions (“policy measures”) aimed at improving the energy efficiency of the country, through adequate pricing, institutional setting, regulation and economic or fiscal incentives and more importantly attempts to illustrate ways in which the identified barriers to the successful deployment of energy conservation and efficiency strategies could be attained. Table 2 below lists the barriers to implementating conservation and efficiency strategies in Saint Lucia, as well as some of the policy measures to remove those barriers.

**TABLE 2**  
**BARRIERS TO IMPLEMENTING ENERGY CONSERVATION AND**  
**EFFICIENCY STRATEGIES IN SAINT LUCIA AND SOME**  
**POLICY MEASURES TO REMOVE BARRIERS**

Barriers to implementing energy conservation and efficiency strategies in Saint Lucia	Policy measures to remove barriers
Lack of information	Information centres and services; appliance labelling and consumer information
Lack of trained personnel or technical or managerial expertise	Development and delivery of training programmes
Below long-run marginal cost pricing and other price distortions	Instituting supportive legal, regulatory and policy changes
Regulatory biases or absence of regulations to support energy development	Development of relevant policies and standards
High transaction costs	Market development and commercialization; development of demand-side management programmes, support for the introduction of energy service companies
High initial costs of energy efficient technologies coupled with lack of access to credit	Develop innovative financing mechanisms
High user discount rates	Support for the introduction of energy service companies
Higher perceived risks of the more-efficient technology	Technology research, adaptation, and demonstration; and/or performance contracting

Source: Author's compilation

Specific policy considerations to be elaborated in this section include:

- Regulations and compliance measures such as mandatory labelling for new appliances, new cars and buildings, mandatory energy efficiency standards for new appliances and lamps for lighting, new cars and new buildings, car labels for fuel consumption, revision of the national building code, regulations relating to obligation of maintenance, energy consumption reporting and mandatory installation of solar water heaters for large developments
- Financial and fiscal incentives such as soft loans and reducing the tax to be paid when purchasing energy efficient equipment
- Development and implementation of public sector wide energy conservation and efficiency programmes
- Review and amendment of curricula at key institutes such as the Sir Arthur Lewis College
- Establishment of energy service companies
- Review of government procurement policy to stimulate demand for energy conservation and efficiency as well as renewable energy.

## 1. Regulations and compliance

Regulations for energy efficiency are widely used globally as they have been proven effective in lowering energy consumption of specific appliances and equipment and in speeding up the diffusion of energy efficient equipment, energy savings investments and practices. Regulations represent a powerful instrument to promote energy efficiency but their impact depends on good implementation and effective compliance. For Saint Lucia, regulations that should be considered for energy conservation and efficiency are:

- Mandatory labelling for new appliances, new cars and buildings as well as devising minimum energy efficiency/performance standards for new appliances and lamps for lighting, new cars and new buildings
- Revision of the National Building Code
- Regulations, relating to obligation of maintenance
- Energy consumption reporting
- Mandatory installation of solar water heaters for large developments and government projects
- Government procurement policy and practices
- Development and implementation of public sector wide energy conservation and efficiency programmes

### **Mandatory labelling for new appliances, new cars and buildings as well as devising minimum energy efficiency/performance standards for new appliances and lamps for lighting, new cars and new buildings**

These regulations could take the form of efficiency standards. As is common in developing and emerging countries, labelling is more frequent and is often among the first measures to be introduced, generally for refrigerators. Labelling will encourage consumers to purchase more efficient appliances and suppliers to remove inefficient appliances from the market. It would be important for any labelling programme to be designed with a specific aim of providing consumers with information, which would enable them to compare the energy efficiency of the different appliances available for purchase. Like other developing countries, Saint Lucia should opt to first focus on labelling standards for refrigerators, followed by air conditioners, lamp and lamp ballasts since these account for a large part of household electricity consumption. These can then be followed by labelling standards for washing machines, dryers, water heaters, computers, tyres and window glazes.

With respect to cars and other vehicles, consideration should be given to introducing car labels for fuel consumption (l/100km and /or km/l) and CO<sub>2</sub> emissions (g/km). This is a simple measure as most car manufacturers on the global market have such information already available. This measure should be promoted along with adequate information campaigns. This could also be tied to other fiscal and financial incentives. The energy policy of Saint Lucia does recognize the key importance of linking energy consumption with transportation and has indicated a need to ensure a level of adequate taxation on motor vehicles that is linked to energy efficiency as well as to take measures that will facilitate improved vehicle maintenance. The government is also desirous of introducing hybrid vehicles in the transport sector.

### **National Building Code**

With respect to new buildings, Saint Lucia should make attempts to revise its National Building Code to take into account standards for building design which takes into account energy efficiency of buildings both at the domestic and commercial levels. The development of an energy efficiency building code is included in its national energy policy which articulates the concept of green buildings and the associated energy efficiencies. In the development of this code, the government should ensure that the code is designed to be performance based, and focuses on the whole building as a system that integrates equipment such as air conditioning systems, ventilation and water heaters into building design. The building code could be implemented jointly with the standards and labelling programmes to ensure that there is the dissemination of the most efficient equipment in the design and construction of new buildings and retrofitting of existing buildings. It should be noted that new buildings represent only a small share of the existing building stock, and therefore the revision of the building code should take into account retrofitting of existing buildings. Building codes tend to have a slow impact on the short term, but is significant in the long-term.

## **Regulations, relating to obligation of maintenance**

Regulations, relating to obligation of maintenance (e.g. for boilers, air conditioners, cars), are usually designed for designated consumers (mainly in industry such as the tourism and hotel industry) for reporting on energy consumption and conducting energy audits. Energy audits either through voluntary compliance or a mandatory programme should be considered by the Government of Saint Lucia. For example, energy audits, either in the form of walk-through audits or detailed energy audits for government buildings and other commercial buildings and hotels will enable a better understanding of the current status of energy use and identify potential actions for energy savings. Energy audits and the implementation of various conservation and efficiency measures can lead to savings of 5 to 50 per cent for the participating entities. These regulations if implemented therefore will impose minimum efficiency standards by law and/or promote energy efficient practices, as well as to provide systematic information to consumers (e.g. energy audits and energy labelling).

## **Energy consumption reporting**

Energy consumption reporting is another measure that would be useful to the Government of Saint Lucia. This can be done either through voluntary compliance or a mandatory scheme requiring designated or large consumers to report their energy consumption, either directly to the government or in their annual report. So for example, it would require even public agencies such as the Water and Sewerage Company (WASCO) to provide information on its consumption so as to be able to continuously improve its efficiency standards. It would be important to stipulate that government entities also report their measured consumption. This measure should be developed as an incentive to companies and government entities to monitor closely their energy performance. It could also be aligned to government subventions.

## **Mandatory installation of solar water heaters for large developments and Government projects**

It should be noted that even in fairly mature markets, solar water heating systems are not always used even when they are cost effective. The reasons for this include, lack of trust in new technologies, long payback times and reference for immediate savings, insufficient information, lack of motivation and awareness and high transaction costs. In these circumstances, regulations making the use of solar heaters mandatory provide a way of expanding diffusion.

## **Government procurement policy and practices**

Government procurement policy and practices could be used as an effective mechanism to stimulate demand for energy conservation, efficiency as well as renewable energy. This policy can promote sustained and orderly commercial development of renewable energy. Governmental purchase agreements can reduce uncertainty and spur market development through long-term contracts, pre-approved purchasing agreements, and volume purchases. Government purchases of energy efficiency technologies as well as renewable energy technologies in early market stages can help overcome institutional barriers to commercialization, encourage the development of appropriate infrastructure, and provide a “market path” for technologies that require integrated technical, infrastructure, and regulatory changes.

## **Development and implementation of public sector wide energy conservation and efficiency programmes**

Public sector facilities and operations have significant opportunities for energy efficiency improvements. The public sector’s energy demand in Saint Lucia like most other countries is large in size, and public sector actors are also major buyers of energy-using equipment such as office appliances and vehicles. In considering the public sector, it should be noted that a major part of public sector energy use results from energy used by public buildings (offices, healthcare and educational

facilities) for lighting, cooling and ventilation as well as equipment in these buildings (e.g. office equipment, white goods such as boilers in hospitals and refrigerators). Transportation related energy use combines vehicle fleets used in public services (e.g. post or waste collection) and public transportation. Additional energy use in the public sector is related to utility provision (e.g. water and wastewater treatment) and public lighting (including street lighting and traffic lights). Public authorities also manage various other facilities such as prisons that use energy.

Benefits of improved energy efficiency in the public sector are many and include lower energy bills and reduced demand for investments in energy supply systems. Further benefits result from the public sector’s exemplary role (“leading by example”) relative to other sectors.

## **2. Financial and fiscal incentives**

Financial and fiscal incentives provide a very useful mechanism for the diffusion of energy conservation and efficiency strategies and energy efficiency equipment. Economic instruments include financial incentives to promote energy efficiency (e.g. subsidies for energy audits or investment, soft loans), as well as fiscal measures. Economic incentives aimed at encouraging investment in energy efficient equipment and processes by reducing the investment cost, either directly (economic incentives) or indirectly (fiscal incentives). To be effective, financial and fiscal incentives will need to be combined with public information and awareness campaigns (many of these already exist in Saint Lucia and the CARICOM Energy Week in November each year also provides a good opportunity for advancing awareness raising) to stimulate public interest in energy efficient equipment. The economic incentives that Saint Lucia should consider are presented below. It should be noted that Saint Lucia currently has an extensive discussion paper on “Implementation of Energy Incentives based on 2013/2014 Budget Address” before the Ministry of Finance. This paper provides a range of financial and fiscal incentives for a wide variety of energy efficient technologies as well as renewable energy technologies.

### **Soft loans**

The use of soft loans is a good measure to ensure easy access to credit with appropriate conditions for financing initial investments and is a fundamental measure to overcome the initial cost barrier. Soft loans, are loans at subsidised interest rates (i.e. lower than the market rate) to consumers who invest in energy efficient technologies and equipment. Soft loans have the advantage of being easily implemented by banking institutions. In developing soft loans Saint Lucia should consider working with donors to establish credit guarantee schemes to encourage banks to be more active in financing such operations by taking more risk.

### **Tax credits**

A fiscal incentive that should be considered by the Government of Saint Lucia is to reduce the tax to be paid when purchasing energy efficient equipment - that is removal of value added tax (VAT), and some import duties on LEDs, compact fluorescent lights, solar water heaters and energy efficient cars or when investing to improve energy efficiency in buildings (reduction in VAT rate on energy efficient air conditioners and LEDs). Tax credits are recommended here as they are considered better than subsidies, as they are less costly for the government budget. Note that a disadvantage of tax credits is that they do not lower the barrier of the initial upfront payment, and therefore do not help low-income households, quite unlike subsidies. Consideration should now be made to open up these incentives to all and to apply them to a wider range of energy efficient equipment. Consideration also needs to be given to the use of disincentives when persons purchase inefficient equipment, especially in the case of large project developments.

Another area for consideration would be the use of a luxury tax on energy inefficient vehicles, that is, a consumption tax for luxury imports or “non-essential” goods that could range between 15 and 60 percent as is done in many developed countries. The tax is calculated on the CIF price.

### **3. Education and training**

#### **Review and amendment of curricula at training institutes**

The advancement of both energy efficiency technologies as well as renewable energy technologies will require a cadre of trained personnel to be available for installation as well as equipment maintenance. To this end, it would be necessary to infuse energy efficiency issues as well as renewable energy into the the current curricula or to develop new programmes focussed on energy conservation and renewable energy at training institutions such as the Sir Arthur Lewis Community College. Consideration would also need to be given to the infrastructure necessary to support this kind of training such as demonstration equipment, equipment to measure consumption of electricity and very important, lab facilities.

### **4. Energy solutions**

#### **Energy service companies (ESCOs)**

Consideration for the establishment of ESCOs to advance energy conservation and the deployment of energy efficient technologies must also be considered. An energy service company is a commercial business that provides a broad range of comprehensive energy solutions including designs and implementation of energy savings projects, retrofitting, energy conservation, energy infrastructure outsourcing, power generation and energy supply, and risk management. In effect ESCOs can be viewed as innovative financing methods for energy conservation and efficiency. ESCO starts by performing an in-depth audit of the property, and then installs the required pieces of equipment and maintains the system to ensure energy savings during the payback period. The savings in energy costs derived from the changes or new installations are often used to pay back the capital investment of the project over a five- to twenty-year period. The establishment of ESCOs in a country usually is governed by regulations to protect the interest of both ESCO and the consumer.

What sets ESCOs apart from other firms that offer energy efficiency services, like consulting firms and equipment contractors, is the concept of performance-based contracting. When an ESCO undertakes a project, the company's compensation, and often the project's financing, are directly linked to the amount of energy that is actually saved. Typically, the comprehensive energy efficiency retrofits inherent in ESCO projects require a large initial capital investment and offer a relatively long payback period. The customer's debt payments are tied to the energy savings offered under the project so that the customer pays for the capital improvement with the money that comes out of the difference between pre-installation and post-installation energy use and other costs. Another critical service that the ESCO provides is that of education of customers about their own energy use patterns in order to develop an "energy efficiency partnership" between the ESCO and the customer. A primary purpose of this partnership is to help the customer understand how their energy use is related to the business that they conduct.

## **B. Proposals for advancing renewable energy technologies in Saint Lucia**

The need for enacting policies to support renewable energy is attributed to a variety of “barriers” or conditions that prevent investments from occurring. These barriers have been identified in the previous section. Often the result of barriers is to put renewable energy at an economic, regulatory, or institutional disadvantage relative to other forms of energy supply.

Many of these barriers are considered to be “market distortions” that unfairly discriminate against renewable energy, while others have the effect of increasing the costs of renewable energy relative to the alternatives. Barriers are often quite situation-specific in any given region or country.



However, there are a range of policies that can be used to both reduce and remove these barriers. At a stakeholder consultation held in November in Saint Lucia, stakeholders were presented with a wide range of policy options that could be used to reduce and/or remove identified barriers to the deployment of renewable energy technologies and advance of the renewable energy sector. The policies that are applicable to Saint Lucia are presented below.

Policies and strategies that will be presented in this section and whose specific goal is to promote renewable energy fall into three main categories:

- Price-setting and quantity-forcing policies, which mandate prices or quantities
- Investment cost reduction policies, which provide incentives in the form of lower investment costs
- Public investments and market facilitation activities, which offer a wide range of public policies that reduce market barriers and facilitate or accelerate renewable energy markets

## 1. Price-setting and quantity-forcing policies for consideration by the Government of Saint Lucia

### Revision of the Electricity Supply Act (ESA) of 1994

The revision of the Electricity Supply Act will facilitate and encourage electric power production by small power producers using renewable resources towards reducing the dependence on imported fossil fuels of Saint Lucia. The revision of this Act is expected to provide for the legislation of renewable electricity portfolio standards which will set the amount of renewable energy that LUCELEC must use to generate electricity at different points now and in the future towards achieving the national energy policy goal of 30 per cent renewable energy in the energy mix by 2020. The revision of the Act will essentially also require LUCELEC to purchase power from small renewable generators and co-generators, known as “qualifying facilities,” through contracts.

### Electricity portfolio standards

The Government should consider the use of electricity portfolio standards, which will stipulate through a revised ESA the minimum percentage of generation sold installed be provided by renewable energy (this already is a target in the National Energy Policy 2011). LUCELEC will then be required to assist with the achievement of this target and this can be done either through self generation or power purchases from other producers. Two types of standards have emerged over the years in both developed and developing countries: capacity-based standards which set a fixed amount of capacity by a given date, while generation-based standards mandate a given percentage of electricity generation that must come from renewable energy. Both of these standards can be employed in Saint Lucia.

### Electricity feed-in laws

Electricity feed-in laws should also be considered by the Government along with electricity portfolio standards. Electricity feed-in laws set a fixed price for

#### BOX 1 NET METERING AND NET BILLING

##### Net metering

Net metering allows electricity generated by an electric consumer to be fed back into the grid and be credited at the full retail rate (the same retail price the customer pays for power they consume from the grid). Thus customers who produce some or all of their power on-site only pay for their net energy consumption during a set period.

##### Net billing

Net billing allows electricity generated by electric consumers to be fed back into the grid but gives the generating consumers only the “avoided cost” of the power bill, thus paying them the actual cost of producing the excess electricity but not for their portion of the transportation and fixed costs.

utility purchases of renewable energy. For example, renewable energy producers could sell their power to utilities at a determined percentage of the retail market price. LUCELEC could be obligated to purchase the power from the supplier. Feed-in laws tend to lend themselves to a rapid increase in installed capacity and development of commercial renewable energy markets. This may be a good policy to pursue given that Saint Lucia would need to increase renewables in the energy mix by about 28 percentage points over the next seven years.

LUCELEC currently operates a net metering system which allows it to receive excess capacity from generators via a grid-tied system. Excess electricity is “banked” by LUCELEC in the generator’s name and can be used by the generator at any point in the year when it falls short of electricity. The excess that is banked at LUCELEC if not used is not rolled over to a new year but is then “lost”. This system is currently not utilized by many generators since all generators are now required to receive approval by LUCELEC to generate their own electricity. Electricity-feed in laws, coupled with electricity portfolio standards will enable a win-win situation for both the generator and LUCELEC and will have the added advantage of ensuring that the country moves closer to realizing the renewable energy target.

## **2. Investment cost reduction policies for consideration by the government of Saint Lucia**

A number of policies are designed to provide incentives for voluntary investments in renewable energy by reducing the costs of such investments. These policies can be characterized as falling in five broad categories, policies that:

- Reduce capital costs up front (via subsidies and rebates)
- Reduce capital costs after purchase (via tax relief)
- Offset costs through a stream of payments based on power production (via production tax credits)
- Provide concessionary loans and other financial assistance
- Reduce capital and installation costs through economies of bulk procurement

It is well known that the initial cost of investing in renewable technologies can be prohibitive so that there is a need to address ways to advert and/or reduce these costs to consumers. Those investment cost reduction policies that are applicable to Saint Lucia will be presented below.

### **Rebates**

Reduction in the initial capital outlay by consumers for renewable energy systems such as solar water heaters and/or photovoltaic systems, small wind generators, passive solar, biomass, and fuel cells can be accomplished through rebates. These subsidies could be used to “buy down” the initial capital cost of the system, so that the consumer pays a lower price. Consideration for rebates could be given to households and small businesses including hotels. Rebates could be combined with low or no-interest loans or soft loans.

### **Tax relief policies**

Tax Relief policies that can be considered by Saint Lucia for renewable energy advancement includes:

- **Investment tax credits** for renewable energy which are usually offered for businesses and residences. Currently, Saint Lucia provides some level of investment tax credits – however, these could be expanded to the hotel industry, hospitals, and other commercial entities and they could be expanded to also include energy efficient equipment.

- **Accelerated depreciation** would allow renewable energy investors to receive the tax sooner than under standard depreciation rules. The effect of accelerated depreciation is similar to that of investment tax credits whereby businesses would be able to recover investments in solar and wind by depreciating them over a period of five years, rather than the 15- to 20-year depreciation lives of conventional power investments. In pursuing this policy option, Saint Lucia will need to ensure that increasing investments are coupled with long-term operating performance and maintenance.
- **Production tax credits** if implemented will provide the investor or owner of qualifying property with an annual tax credit based on the amount of electricity generated by that facility. By rewarding production, these tax credits encourage improved operating performance.
- **Sales tax incentives** are policies that will provide retail sales tax exemptions for eligible renewable energy systems and renewable fuels
- **Loans** – Soft loan programmes should be considered to offer financing for the purchase of renewable energy equipment. Loans can be market-rate, low-interest (below market rate), or forgivable. Funding could come from a variety of sources, including revolving funds, development partners or even through the PetroCaribe fund is an example. Financing could be a fraction to 100 per cent of a project. Some loan programs have minimum or maximum limits, while others are open-ended. In some developing countries, notably India, China, and Sri Lanka, multilateral loans by lenders such as the World Bank have provided financing for renewable energy, usually in conjunction with commercial lending. One of the most prominent examples is the India Renewable Energy Development Agency (IREDA), which was formed in 1987 to provide assistance in obtaining international multilateral agency loans and in helping private power investors obtain commercial loans. Information on these could be accessed towards obtaining lessons learned and building on the success factors of India. Lessons learned could range from building capacity of banks to assess the risks of providing these kinds of loans to ensuring that the electricity act is attractive enough and contains portfolio standards that would encourage investors to want to invest in renewable energy.

In Latin America and the Caribbean, loans are often done through micro financing. Loans are then made available for retrofitting small and medium-sized enterprises to facilitate energy efficiency, energy conservation and the introduction of alternative energy sources. Renewable energy loans can take many forms. Residential loans may range from US\$ 500 to US\$ 10,000 or more, while commercial and industrial loans may extend to millions.

### **3. Public investments and market facilitation activities for consideration by the Government of Saint Lucia**

#### **Construction and design policies**

Construction and design policies are building-code standards for renewable energy technologies such as photovoltaic installations, design standards evaluated on life-cycle cost basis, and performance requirements. This would require Saint Lucia amending its country national building code to take into account energy efficiency in buildings.

#### **Equipment standards and contractor certification**

Equipment standards and contractor certification should be considered to ensure uniform quality of equipment and installation, increasing the likelihood of positive returns from renewable energy installations. Contractor licensing requirements will then ensure that contractors have the

necessary experience and knowledge to properly install systems. Equipment certifications ensure that equipment meets certain minimum standards of performance or safety. This policy will require building the capacity of the Bureau of Standards to develop standards that support renewable energy equipment and technologies.

### **Government procurement policies**

Government Procurement policies can promote sustained and orderly commercial development of renewable energy. Governmental purchase agreements can reduce uncertainty and spur market development through long-term contracts, pre-approved purchasing agreements, and volume purchases. Government purchases of renewable energy technologies in early market stages can help overcome institutional barriers to commercialization, encourage the development of appropriate infrastructure, and provide a “market path” for technologies that require integrated technical, infrastructure, and regulatory changes.

## **4. Power sector restructuring policies of relevance to the Government of Saint Lucia**

Power sector restructuring could have a profound effect on electric power technologies, costs, prices, institutions, and regulatory frameworks for Saint Lucia.

### **Creation of an independent power producer (IPP) frameworks or self-generation by end-users and distributed generation technologies**

The development of an IPP framework in Saint Lucia will allow more and more end-users, from large industrial customers to small residential users, to generate their own electricity. Their self-generation will offset purchased power allowing the IPPs to even sell surplus power back to the grid. Renewable energy is well suited to self-generation, and IPP frameworks can spur renewable energy investments. The IPP framework will create incentives to self-generate.

## **5. Distributed generation policies that are of relevance to Saint Lucia**

Distributed generation avoids some of the costs of transmission and distribution infrastructure and power losses, which together can total up to half of delivered power costs. Whilst policies to promote distributed generation—including net metering, real-time pricing, and interconnection regulations do not apply only to renewable energy, they can strongly influence renewable energy investments. Net metering will be discussed here.

### **Net metering**

Net metering allows a two-way flow of electricity between the electricity distribution grid and customers with their own generation. When a customer consumes more power than it generates, power flows from the grid and the meter runs forward. When a customer installation generates more power than it consumes, power flows into the grid and the meter runs backward. The customer pays only for the net amount of electricity used in each billing period, and is sometimes allowed to carryover net electricity generated from month to month. Net metering allows customers to receive retail prices for the excess electricity they generate at any given time. This encourages customers to invest in renewable energy because the retail price received for power is usually much greater than it would be if net metering were not allowed and customers had to sell excess power to the utility at wholesale rates or avoided costs. Electricity providers may also benefit from net metering programs, particularly with customer-sited photovoltaics which produces electricity during peak periods. Such peak power can offset the need for new central generation and improve system load factors. As mentioned above, LUCELEC currently operates a net metering system which allows it to receive excess capacity from generators via a grid-tied system.

## **C. Other requirements for deploying re technologies for consideration by the Government of Saint Lucia**

Deploying renewable energy technologies at a rapid pace in Saint Lucia as well as other parts of the the Caribbean will require addressing the many barriers presented above, including:

- Development of supportive policy and regulatory frameworks
- Securing public sector commitment to act as leaders in the deployment of renewable energy technologies in public sector applications such as in hospitals, schools and other government buildings
- Strengthening local capacities and entrepreneurship
- Transferring technologies
- Increasing access to affordable financing and consumer credit
- Transitioning from traditional biomass to modern use of biomass, cleaner fuels,
- Maximizing use of hydro resources (large, small, and micro) in an environmentally sustainable manner
- More efficient use of biomass residues for power generation and transport, including growth of dedicated crops
- Increasing deployment and reducing costs of solar, wind, geothermal, wave, tidal, and other renewable energy sources

## **D. Conclusion**

Saint Lucia, like the rest of the Caribbean region possesses a great potential for power generation from renewable energy sources and improvements in energy efficiency. Saint Lucia as a small island developing state presents many opportunities to demonstrate renewable energy, energy efficiency, and low-carbon energy practices and technologies that could scale up to make a great impact on the rest of the region and indeed in other SIDS. Apart from the environmental benefits, another major opportunity is the reduction of dependence on imported fossil fuels for power generation and use as transport fuel. The high cost of this foreign-sourced power has been a drain on this economy and both energy efficiency and renewable energy deployment presents great opportunities for advancing international competitiveness, economic growth, poverty reduction and environmental sustainability.



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