

















# Saint Lucia Energy Balances (2010 - 2012)

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# Saint Lucia Energy Balances 2010 - 2012

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# **List of Acronyms**

Bbl Barrel

Boe Barrel Oil Equivalent

CAF Development Bank Of Latin America

CO<sub>2</sub> Carbon Dioxide

CARICOM Caribbean Community Secretariat

CARILEC Caribbean Electric Utility Service Corporation

CDB Caribbean Development Bank

CEIS Caribbean Energy Information System

CELAC Community of Latin American and Caribbean States
CIPPET The Caribbean Information Platform on Petroleum

CREDP The Caribbean Renewable Energy Development Programme

DO Diesel Oil

EC\$M East Caribbean Dollar

ECCB Eastern Caribbean Central Bank
ECCs Eastern Caribbean Countries
ECCU Eastern Caribbean Currency Union

ECERA Eastern Caribbean Energy Regulatory Authority

FAO Food and Agricultural Organization of the United States

GDP Gross Domestic Product

GX Gasoline JF Jet Fuel

LA&C Latin American and the Caribbean

LPG Liquefied Petroleum Gas

MoAFF Ministry of Ambient, Forestry and Fisheries

NP The Trinidad and Tobago National Petroleum Company Limited

NREL National Renewable Energy Laboratory

OAS Organization of American States

OECS Organization of Eastern Caribbean States
OLADE Latin American Energy Organization

SL Saint Lucia

USAID United States Agency for International Development

WTTC World Travel and Tourism Council

# i. Introduction

As stated in the Lima Action Plan adopted during the First Meeting of Energy Ministers of CELAC, OLADE was requested to participate as Technical Advisor. Subsequently, during the V Meeting of Energy Ministers of OLADE, the OLADE's Cooperation with CELAC was approved. The agreement included a study project for developing Energy Balances of six Caribbean Member Countries of CELAC that are Non-Member Countries of OLADE. The Development Bank of Latin America (CAF) funded the project (CELAC, 2013 and OLADE, 2013).

Considering the need to analyze and enhance knowledge related to the regional energy integration debate and real options, the preparation of energy balances is fundamental to rise up a baseline about supply and demand on the energy sector. Energy balances will permit "the identification of surpluses or deficits, potential of exchanges of energy, prospects for energy demand and possibilities for change of the energy matrix from which it is possible to establish development plans and regional energy policies, imply the availability of up-to-date official information, homogeneous and consistent to allow an adequate knowledge of the characteristics of the energy systems of the countries, comparative analysis and consolidation of information for built-in features of the region, whereas the national energy balances as the basic element" (OLADE, 2013).

The present report is focused on Saint Lucia's Energy Balance. This document and results were prepared after a compilation process on available energy information and data collection from accurate primary sources such as surveys, interviews, Government published material, census records and reports or studies carried out by international energy and cooperation agencies. The guidelines and recommendations to develop this research were based on OLADE's Energy Balance Methodology.

Based on the stakeholder analysis and mapping of the structure of the energy sector, several forms and surveys were applied to the most representative public and private institutions that participate in the main phases of the energy chain of the country, such as suppliers and consumers.

The document is divided into nine sections: The first section deals with the country's general information that includes a description on geography, climate, socio-economic characteristics, and the overall energy sector. The second section provides an overview of the concepts defined by the OLADE's Energy Balances Methodology. The third section contains the description of the data gathering process. The fourth section describes the technical visit to the country. The fifth section outlines the main issues related to the data processing. The sixth section provides the results on the Energy Balances that were elaborated for the periods of 2010, 2011 and 2012. The seventh section presents the country's Greenhouse Gases Emission Inventories (2010-2012) by following the technology approach. The eight section shows economic and energy indicators built by using the energy balance results. The last section describes the final conclusions and recommendations on the Saint Lucia's Report. By the end of the ninth sections, more additional details can be found in the Annex.

# ii. Background

The First Meeting of Energy Ministers of CELAC was held in Lima, Peru, on November 16, 2012, where the Lima Action Plan was adopted and OLADE was requested to participate as Technical Advisor. Subsequently, the V Meeting of Ministers of the Latin American Energy Organization (OLADE) was held in Quito, Ecuador, on May 17, 2013, approving the participation of OLADE as a Technical Advisor of the Meeting of Ministers of CELAC. This meeting of Ministers also accepted the working program (OLADE's cooperation to CELAC), which was presented previously at the V Meeting of Coordinators of CELAC on May 9-10, in Havana, Cuba.

The working program approved by the 5th extraordinary meeting of Ministers of OLADE included the Reduction of asymmetries in the CELAC energy sector information. Since there isn't a source of consistent information that could be used to analyze the supply and demand situations of some CELAC's Member States and to develop projects to diversify their energy matrix, OLADE presented the action plan for the elaboration of the Energy balance of Saint Lucia, Antigua & Barbuda, Bahamas, Dominica, Saint Kitts and Nevis, Saint Vincent and the Grenadines. This project has the financial support of the non-refundable technical cooperation with the Development Bank of Latin America – CAF" (OLADE, 2013).

Saint Lucia is highly dependent on imports of oil products to meet its energy needs, which makes these energy sources a fundamental basis of the economy and national development. On the other hand, the country is committed to diversifying its energy mix by developing renewable energy projects under a sustainable framework and an independent scope. When referring to the energy sector in Saint Lucia, the information provided by importers and other energy suppliers is not currently collected on a timely, completely and sustainable basis. The information of the demand side is scattered. In this regard, collecting energy statistics on a regular basis is required for the development of the energy balances so that they can be used as an aid for decision-making and energy planning of Saint Lucia.

Based on the country's necessity of having a sustainable energy development and a tool to aid its decision-making, and the readiness of CELAC in having a deeper understanding of the energy sector in the Eastern Caribbean Member Countries, OLADE has prepared the following report hoping to fulfill both, Saint Lucia and CELAC's requirements.

# I. Country description

# I.1. General profile

Country Saint Lucia
Capital city Castries

Head of State Hon. Dame Pearlette Louisy (since September 17<sup>th</sup>, 1997)

**Head of Government** Kenny Anthony (November 30<sup>th</sup>, 2011)

Languages English (official language), French Creole

**Currency** Eastern Caribbean Dollar (EC\$)

**Exchange rate (2014)**<sup>(1)</sup> 1 US\$ : EC\$ 2.7169

**Economy (2013)**<sup>(1)</sup> Agriculture (2.4%), Manufacturing (5.0%), Tourism and

Services (84.8%)

Resident population (Census 2010)<sup>(2)</sup> 173,720 inhabitants

GDP (Constant 2005 US\$ MM) (2012)<sup>(3)</sup> 1,086 GDP per capita (2012)<sup>(3)</sup> 6,000

Sources: http://www.govt.lc/ (web page visited Feb, 12th 2014); (1) Eastern Caribbean Central Bank – ECCB (www.eccb-centralbank.org, web page visited Jan, 16<sup>th</sup> 2014); (2) Central Statistics Office and (3) World Bank (www.databank.worldbank.org, web page visited Feb, 18<sup>th</sup> 2014).

Saint Lucia is a volcanic island located in the windward group of islands in the Caribbean Sea. It has 43km long with mountains rising to a height of 950m at Mt Gimie, in the center of the island (The Commonwealth Yearbook, 2013). In addition, the Island possesses a number of Valleys relevant to agricultural production and human settlement<sup>1</sup>. About 30% of the land area is under cultivation and forest covers the rest (The Commonwealth Yearbook, 2013).

Since the last Population and Housing Census 2010, the Country has a population of 173,720 inhabitants in 2010, recording a population increase of 5% from May 2001 to May 2010. Distribution female and male population remains at around 50% each. According to the geographic distribution, 40% reside in Castries, the Capital City (Central Statistics Office, 2011).

The island is divided into ten Districts: Castries (with 60,263 inhab.), Anse La Raye, Canaries, Soufriere, Choiseul, Laborie, Vieux Fort, Micoud, Dennery and Gros Islet.

Country's economy is characterized by being vulnerable to external shocks such as oil market prices, financial crisis and changing trading regimes (Government of Saint Lucia, 2011a).

<sup>1</sup> "Climate Change Technology Needs Assessments for Saint Lucia" available at http://unfccc.int (Web page visited Jan, 14<sup>th</sup> 2014)

Main activities are tourism, construction, agriculture and to a lesser extent small–scale industry.

# I.2. Geography

 Region
 Eastern Caribbean

 Location
 Between Martinique, Saint Vincent and the Grenadines and Barbados

 Latitude
 13° 59' N

 Longitude
 61° 00' W

 Surface area
 617 km² (238 sq ml)



Sources: (1) Google earth (web page visited Nov, 23<sup>th</sup>2013)

# I.3. Climate

Saint Lucia experiences a moderate tropical maritime climate all year round. The dry season is between December and May, and the rainy season from June to November.

Warm air temperature average approximately 28°C, while amounts of rainfall vary from about 1,265mm to 3,420mm. "The quantity of rainfall in the wet season is determined mainly by the frequency and intensity of tropical disturbances (waves, depressions, storms, hurricanes)" (Government of Saint Lucia, 2011a).

Due to its geographic location and topographic profile, Saint Lucia is vulnerable to weather related disasters; such as hurricanes, floods, droughts, fires, storm surge and coastal erosion<sup>2</sup>.

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<sup>&</sup>lt;sup>2</sup> "Climate Change Technology Needs Assessments for Saint Lucia" available at http://unfccc.int (Web page visited Jan, 14<sup>th</sup> 2014)

# I.4. Socio-Economics Characteristics

#### **Current macro-economic results**

Gross Domestic Product – GDP (Constant 2005 US\$ MM) reached 1,086 in 2012 which represents 0.5% in comparison with the previous year. Agriculture (mainly banana exports) and Hotels and Restaurants had a positive impact on economic growth (8.4% and 2.6%, respectively). GDP per capita remained at around USD  $6.000^3$ .

Public debt represented 71.1% in 2012, of which 32.8% corresponded to External debt. Average Inflation Rate was 4.2% while unemployment rate improve from 21.2% to 20.6% in 2012 (Ministry of Finance, Economic Affairs, Planning and Social Security, Report 2012).

## Industry

Manufacturing sector represented around 5.2% of the total GDP from 2010 to 2012. Its added value decreases 4.4% in 2010 but the next year recovered to 7.1% (ECCB, 2014).

Main manufacturing sub–sectors include clothing, assembly of electronic components, food processing, production of beverages, corrugated cardboard boxes and processing of coconuts and limes. Dominant sub–sectors are food and beverages. Rum and coconut oil are the most widely exported products<sup>4</sup>.

It is a sector affected by rising costs, including electricity, fuel and raw materials (Government of Saint Lucia, 2012a).

Added Value (EC\$M) Constant (2006) <sup>(1)</sup>	138.26	
Added Value as % of GDP <sup>(1)</sup>	5.3	
Number of electricity consumers (2)	100	
Electricity consumption (MWh) (2012) <sup>(2)</sup>	17.68	

Table 1. Industrial Summary - 2012

Source: (1) Eastern Caribbean Central Bank, 2013 and (2) LUCELEC AR, 2012.

## Agriculture, Fishing and Mining

Agriculture sector contributes 2.33% to Country's GDP, while Crops 1.96%, Livestock 0.33% and Forestry 0.03%. Fishing barely adds 0.77% and Mining 0.50%.

Agriculture products are mainly bananas, coconuts, vegetables, citrus, root crops and cocoa.

<sup>3</sup> http://data.worldbank.org/ (Web page visited on March 18<sup>th</sup>, 2014)

<sup>&</sup>lt;sup>4</sup> http://www.commonwealthofnations.org (Web page visited on March 18<sup>th</sup>, 2014)

Saint Lucia has a relevant Agricultural Censuses long tradition, accounting for six editions being the last in 2007 prepared with the support of FAO and other important public and private stakeholders. This has permitted to track the evolution of the agricultural sector. One of the main findings is the decline in number and area of agricultural holdings (Ministry of Agriculture, Forestry and Fisheries, 2007).

Land uses<sup>5</sup> declined from 72,100 in 1996 to 30,200 in 2007, within which Agricultural land represents 81.2%.

Machinery and equipment owned and used consists mainly on Sprayers (Sprinkles, Pumps and Ploughs were also reported), and to a lesser extent Trucks/Vans and Tractors.

Added Value (EC\$M) Constant (2006) (2012)(1)	93.75	
Added Value as % of GDP (2012) <sup>(1)</sup>	3.6	
Agricultural area (ha) (2007)	9,900	

Table 2. Agriculture, Fishing and Mining Summary

Source: (1) Eastern Caribbean Central Bank, 2013; and (2) Ministry of Agriculture, Forestry and Fisheries, 2007.

Agriculture activity notably decreases in 2010 and 2011 as a result of the Hurricane Tomas<sup>6</sup>, affecting in particular the banana industry. Banana production fell by 55% while exports to the United Kingdom declined by 70%, with earnings of USD 13.2 million (Ministry of Finance, Economic Affairs, Planning and Social Security, 2012). In terms of the GDP, the sector slowed down both years, by 26.0% and 16.8%, respectively. For the following year (2012), banana exports to UK (tonnes) increased from 6,556 in 2011 to 12,126 (Ministry of Finance, Economic Affairs, Planning and Social Security, 2012).

#### Commercial, Services and Public Sector

As it is the case in many other Caribbean Countries, Tourist Sector has a key role in Saint Lucia's GDP. The *direct contribution* of Travel and Tourist to the GDP was near to 13% in 2013<sup>7</sup>. It generated 14,000 jobs directly (hotels, travel agents, airlines and other passengers transportation services, restaurants and leisure industries), which represents 18.6% of total employment. The total contribution of Travel and Tourism to employment was 31,500 jobs in 2013 (WTTC, 2014).

<sup>&</sup>lt;sup>5</sup> Following FAO World Programme for the Census of Agriculture 2010, classification of Land Uses includes: *Agricultural land* (which considers Cropland and Permanent meadows and pastures), *Forest and Woodland* and *Other Land* (Government of Saint Lucia, 2008).

<sup>&</sup>lt;sup>6</sup> Hurricane Tomas, which reached category 2 intensity, was the latest hurricane on record (1851 – present) in the calendar year to strike the Windward Islands. It caused significant damage, mainly in Saint Lucia, additional fatality in Curacao and in Martinique (taken from http://www.nhc.noaa.gov/pdf/TCR-AL212010\_Tomas.pdf. Web page visited March, 18<sup>th</sup> 2014).

<sup>&</sup>lt;sup>7</sup> The direct contribution of Travel & Tourism to GDP is calculated to be consistent with the output, as expressed in National Accounting, of tourism-characteristic sectors such as hotels, airlines, airports, travel agents and leisure and recreation services that deal directly with tourists. The direct contribution of Travel & Tourism to GDP is calculated from total internal spending by 'netting out' the purchases made by the different tourism sectors. This measure is consistent with the definition of Tourism GDP, specified in the 2008 Tourism Satellite Account: Recommended Methodological Framework (TSA: RMF 2008) (WTTC, 2013).

Added Value (EC\$M) Constant (2006) <sup>(1)</sup>	1,707.74
Added Value % GDP (1)	65.4
Number of electricity consumers (2)	6,639
Electricity consumption (MWh) (2)	203.34

Table 3. Commercial, Services and Public – 2012

Source: (1) Eastern Caribbean Central Bank, 2013 and (2) LUCELEC AR, 2012.

#### **Transport**

Saint Lucia accounts a total of around 1,200 km of roads. The main cross – island route are located between Castries in the north and Vieux Fort in the south. The country does not have railway, however bus services are available in the north (The Commonwealth Yearbook, 2013).

There are two main airports: Hewanorra International Airport, which mainly provides long-haul international flights, and George Charles Airport which concentrates on regional flights within the Caribbean. Castries hosts the seaport while Vieux Fort serves as the main anchorage for container ships<sup>8</sup>.

Added Value (EC\$M) Constant (2006) <sup>(1)</sup>	493.39	
As % of GDP <sup>(1)</sup>	18.95	

Table 4. Transport Summary – 2012

Source: (1) Eastern Caribbean Central Bank, 2013

The Climate Change Technology Needs Assessment for Saint Lucia reports that most of the Country's Greenhouse Gas emissions come from the energy generation and transportation sectors.

#### **Construction and Others**

Construction sector fell by 5.0% in 2012 because of declines in both public and private sectors. In the first case, activity declined due to a slowdown in public expenditure (28.7%) in 2012, as a result of lower outlays on road infrastructure, community works among others related to the rehabilitation following the passage of the Hurricane Tomas (Ministry of Finance, Economic Affairs, Planning and Social Security, Report 2012).

Added Value (EC\$M) Constant (2006) (1)	239.11	
Added Value as % of GDP (1)	9.2	

**Table 5. Constructions and Others Summary – 2012** 

Source: (1) Eastern Caribbean Central Bank, 2013

<sup>&</sup>lt;sup>8</sup> http://www.commonwealthofnations.org/ (Web page visited on March 18<sup>th</sup>, 2014)

# I.5. Energy sector

Saint Lucia does not have downstream fossil fuel potential. Like most of the Eastern Caribbean Countries, is a net importer of around 98% of its overall energy supply. The remaining percentage corresponds to some renewables and waste. Final consumption is dominated by the electricity and the transport sector (IDB, 2013).

In 2012, electricity consumption reached 333 GWh and the installed capacity was 88.6MW (LUCELEC AR, 2012). The electrification level is estimated at 98% approximately<sup>9</sup>.

Renewable energy potential in solar, wind, geothermal and biomass energy has not yet been exploited.

# I.5.1. Institutional structure

## **National Level**

Ministry of Physical Development and the Environment: The Ministry drafted the island's National Energy Policy. The Ministry in charge of energy planning is the responsible party for coordinating the energy sector and formulating and monitoring the National Energy Policy and Strategy, and the resulting plans.

Other functions include: Compiling energy information useful for sectoral planning; evaluating implemented initiatives; fostering the development of the appropriate legal framework for the electricity, oil and gas sub-sectors; encouraging private sector participation in renewable energy technologies, among others (Government of Saint Lucia, 2010a).

❖ Ministry of Sustainable Development, Energy, Science and Technology<sup>10</sup>: Is the responsible for protecting consumer interests by ensuring an efficient, reliable and cost-effective energy service is provided (Government of Saint Lucia, 2010a). The Public Utilities Department<sup>11</sup> is the responsible for regulation of the sector. It can intervene at a policy level to regulate the actions of LUCELEC, which is the Electricity Utility. Further, major policy decisions may be taken at the Cabinet or Prime-Ministerial level.

<sup>&</sup>lt;sup>9</sup> http://www.reegle.info/countries/st-lucia-energy-profile/LC (web page visited Feb, 19<sup>th</sup> 2014)

<sup>&</sup>lt;sup>10</sup> http://sustainabledevelopment.govt.lc/ (web page visited Feb, 17<sup>th</sup> 2014)

<sup>&</sup>lt;sup>11</sup> http://www.reegle.info/ (web page visited Feb, 18<sup>th</sup> 2014)

# Regional Level (Eastern Caribbean)

# i. Electricity Sector

- ❖ Caribbean Electric Utility Services Corporation –CARILEC-<sup>12</sup>: The CARILEC Secretariat strives to enhance communication among its members and to serve as the focal point for general and technical information. The Secretariat takes the lead in advocating for change in the electric utility industry in the Caribbean and in this regard produces a number of information products and provides a range of services to members.
- ❖ The Caribbean Renewable Energy Development Programme –CREDP–<sup>13</sup>: The CREDP is a joint project of CARICOM and the German International Cooperation GIZ. It is financed by the German Federal Ministry of Economic Cooperation and Development BMZ and implemented by the consortium of Projekt-Consult GmbH, Germany and Entec AG, Switzerland, on behalf of the GIZ. CREDP seeks to remove barriers for the use of Renewable Energy and application of Energy Efficiency measures in the Caribbean Region.
- ❖ Eastern Caribbean Energy Regulatory Authority –ECERA–<sup>14</sup>: ECERA is expected to provide arms-length regulation and oversight of the electricity utilities to achieve cost efficiency in electricity supply and by extension lower electricity rates to consumers in the medium to long term. Another associated benefit of ECERA is the provision of advisory services to Governments on renewable energy development, electricity sector plans and cross border interconnection, which is critical for geothermal development within the OECS.

## ii. Oil Sector

❖ The Caribbean Information Platform on Petroleum –CIPPET–<sup>15</sup>: CIPPET was developed by the Scientific Research Council –SRC–, located in Kingston Jamaica, as a regional focal point for the Caribbean Energy Information System –CEIS–. The CEIS is a network of 18 Caribbean Countries with responsibility for the coordination, gathering and dissemination of energy information for these countries to facilitate sharing of energy information among each other and to aid policy decision–making.

CIPPET is managed by CEIS and will serve as a tool to facilitate the provision of Caribbean Petroleum Energy Information and Statistics to member countries of CEIS and other users of information related to petroleum. It creates a central access point through which member countries can submit their requests for information, it also allows users to "Be in the Know" on past and current issues relevant to the petroleum industry.

<sup>&</sup>lt;sup>12</sup> http://carilec.com/ (web page visited Nov, 25<sup>th</sup> 2013)

http://credp-gtz.org/ (web page visited Nov, 25<sup>th</sup> 2013)

<sup>&</sup>lt;sup>14</sup> http://www.oecs.org/our-work/projects/ecera(web page visited Nov, 25<sup>th</sup> 2013)

<sup>15</sup> http://www.ceis-caribenergy.org/(web page visited Nov, 25<sup>th</sup> 2013)

# I.5.2. Legal and policy framework

- ❖ National Energy Policy -NEP-: Drafted by the Ministry of Physical Development and the Environment, the NEP has as key objective the creation of an institutional and regulatory framework for the introduction of renewable energy; diversify the energy matrix; thus achieving energy security and independence (Government of Saint Lucia, 2010a). It is linked to the launched Sustainable Energy Plan.
- ❖ Sustainable Energy Plan -SEP-<sup>16</sup>: Approved by the Cabinet Conclusion N° 695, this policy instrument responds to Saint Lucia Government's purpose to become a "Sustainable Energy Demonstration Country" within the coming decade. It outlines a management strategy that seeks to promote energy conservation and efficiency, through the following objectives:
  - Ensure the existence of adequate energy supplies to sustain economic development, while meeting current and projected power demand;
  - Provide for stable and reliable electricity supplies for all customers;
  - Enhance the security of energy supply and use for all sectors of the economy;
  - Protect the local and global environment by maximizing the use of renewable energy and energy efficiency alternatives where viable.
- ❖ Electricity Supply Act: Saint Lucia Electricity Company Limited was created under the commercial code in 1964, and granted an exclusive license by Ordinance №27 of 1964. The Electricity Supply Act then replaced this document in 1994, and LUCELEC became public.

# I.5.3. Electricity

The electricity sector is characterized by a government-licensed monopoly, responsible for generation, transmission and distribution of electricity (OAS, 2010 pp15). LUCELEC is a public – private corporation regulated since 1964, and has an exclusive statutory license till 2045, under the Electricity Supply Act. Independent Power Producers –IPP– and Self Generators are allowed.

The current installed capacity is around 88 MW, conformed by internal combustion engines running with Diesel Oil.

<sup>&</sup>lt;sup>16</sup> http://archive.stlucia.gov.lc/ (web page visited Feb, 18<sup>th</sup> 2014)

Costumers	61,849
Energy Supply (GWh)	384.8
Installed capacity (MW)	88.6
Tariff sales (US\$ Cents per kWh) <sup>(1)</sup>	32
Demand growth	1.1%

Table 6. Electricity - General Information (2012)

Sources: LUCELEC, 2012; (1) OAS, 2010.

**St. Lucia Electricity Company Limited –LUCELEC–**<sup>17</sup>. According to the 1964 Power Supply Regulation, LUCELEC is the sole license holder for the generation, transmission, distribution and sale of electricity until 2045. Later replaced by the Electricity Supply Act N° 10 of 1994 and then again in 2001, this monopoly position is granted by a guarantee rate of return of at least 15% of the average of the company's debt and equity (UNDP, 2010). The current shareholders include Light and Power Holdings Ltd. (20%), First Citizens Bank Ltd. (20%), National Insurance Corporation (16.8%), Castries City Council (16.3%), Government of Saint Lucia (12.4%), and individual shareholders (14.4%). LUCELEC's shares are traded on the Eastern Caribbean Securities Exchange.

Cul-de-Sac Power Station hosts nine generators with an overall available capacity of 88.6MW and a recorded Peak Demand of near 60 MW, in 2012. The consumption of Diesel fuel was of 176,790 Imp. Gall. Electricity sales registered an average annual growth of 3.2% in the last ten years.

#### Consumers

**Electricity – Operating Statistics Number of Customers** Sector 2010 2011 2012 Residential 53,566 54,415 55,110 Commercial 6,557 6,641 6,629 Industrial 100 101 100 Street Lighting 9 9 10 60,232 61,166 61,849 **TOTAL** Growth (%) 1.6 1.1 1.1 **Energy Demand (kWh)** Residential 113,757 113,505 112,272 188,640 190,846 192,847 Commercial Industrial 18,373 18,761 17,679 Street Lighting 9,959 10,263 10,526 **TOTAL** 330,729 333,375 333,324 Growth (%) 4.9 1.1 -0.1

Table 7. Electricity Operations Statistics, 2010 – 2012

Source: LUCELEC Annual Report 2012

<sup>&</sup>lt;sup>17</sup> http://lucelec.com/ (web page visited Feb, 18<sup>th</sup> 2014) and Organization of American States, 2010.

# I.5.4. Hydrocarbons

High dependency on fossil fuels Imports make the country vulnerable to external shocks such variation of worldwide oil market fluctuations and weather conditions. Shipment and storage adds an additional factor to be considered. Diesel oil is mainly imported for the transport sector and electricity production (Van den Akker, 2011). Saint Lucia hosts 9 million-barrels transshipment terminal owned by Hess Oil (OAS, 2010), until December 2013 when Buckeye Partners completed its purchase (Buckeye, 2013).

The five oil companies were operating down-stream in storage, marketing and distribution of Gasoline, LPG, Lubricants, Jet Fuel, Diesel Oil and Bunker (Sprytex) during 2010 - 2012.

A total of five companies, described below, used to import, store, distribute and sell oil-refined products:

1. Hess Oil St. Lucia Company Limited (HOSL): Hess Corporation is a leading global independent energy company primarily engaged in the exploration and production of crude oil and natural gas. This private company, located in Castries, leads the imported refined petroleum products (oil and natural gas) on the island and was responsible for the manufacturing, refining and distribution of these products. The company supported a substantial oil storage infrastructure, with 14 tanks which have a combined capacity of 9 million barrels for crude oil and its products. It owns a total of 19 petrol stations around the island.

Whilst HOSL is the only marine facility handling with terminal operations of imported fuel, other companies participate in subsequent stages of the downstream oil process<sup>18</sup>. Hess Oil was the exclusive supplier of fuel to the island utility company, LUCELEC (IDB, 2013); but now it is under the new ownership of Buckeye Partners.

2. **Buckeye Partners**: Is an independent pipeline of refined petroleum products. The Company receives petroleum products from refineries, connecting pipelines, and marine terminals, and transports those products to other locations. Buckeye Partners LP (BPL) closed in December 2013 the purchase of Hess Corp (HES) terminals on the US East Coast and in Saint Lucia<sup>19</sup>.

The terminal of St. Lucia has approximately 10 million barrels of crude oil and refined petroleum products storage capacity and has deep-water access (Buckeye, 2013).

3. **RUBIS West Indies Ltd**: Consists of a Service Station Network of oil-refined products such as Gasoline, Oil Fuel and Lubricants.

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<sup>&</sup>lt;sup>18</sup> http://www.commonwealthofnations.org/ (web page visited Feb, 18<sup>th</sup> 2013)

<sup>&</sup>lt;sup>19</sup> http://www.bloomberg.com/ (web page visited Feb, 18<sup>th</sup> 2013)

- 4. **Sol EC Ltd**: Distributes and supplies fuels and LPG through Sol branded stations, a service station network which uses the Shell brand under license<sup>18</sup>. *Sol Gas*, the brand for LPG distribution, is sold for domestic cooking and use in the industry sector<sup>20</sup>.
- 5. **Island Oil Ltd**: The Company primarily dealt with the marine bunker and lubricant trading<sup>21</sup>. Operations in Saint Lucia consist in selling to consumers<sup>18</sup>. Now-a-days, the company just sells tires for road vehicles.

# I.5.5. Renewable Energy

In terms of renewable energy, Saint Lucia is characterized by having a significant geothermal potential, as well as some wind and solar resources (OAS, 2010). Some efforts have been made, to become a *Sustainable Energy Demonstration Country*. In 1999, the Cabinet Conclusion N° 464 eliminated all import duties and consumption taxes on renewable energy technology. Solar water heaters were introduced in 2001. The Cabinet of Ministers approved the *Sustainable Energy Plan*, which identified the need to enhance security of energy supply and use in all sectors of the economy. The *National Energy Plan* proposed the creation of a regulatory and institutional framework, for the introduction of indigenous renewable energy to the national energy matrix (Government of Saint Lucia, 2010).

Since 1998 the CARICOM has created the *CARICOM Renewable Energy Development Programme* (CREDP). Conceived with the support of 13 Caribbean countries, it aims to reduce barriers to the increased use of renewable energy, thus reducing the dependence on fossil fuels while contributing to the reduction of greenhouse gas emissions<sup>22</sup>.

Hydro	Wind	Geothermal	Solar PV	Biomass	Total Potential
0.2	40	170	36	Unknown	246.2

Table 8. Technical Potential for Renewable Energy Developments (MW)

Source: OAS, 2012

The CREDP supported St. Lucia with Technical Assistance for the development of the Sugar Mill Wind Farm, for the mini hydro power plant at the John Compton Dam and for the tendering and installation of three PV demonstrative projects in Pigeon Island, Castries and Vieux Fort. This project also allowed the Country drafting the National Energy Policy –in which renewable energy policy has been included–, building awareness on energy, photovoltaic, among others (Van den Akker, 2011).

<sup>&</sup>lt;sup>20</sup> http://solpetroleum.com/products-services (web page visited Feb, 18<sup>th</sup> 2013)

http://island-oil.com/page.php?pageID=9 (web page visited Feb, 18<sup>th</sup> 2013)

<sup>&</sup>lt;sup>22</sup>http://caricom.org/ (web page visited Dec, 13<sup>th</sup> 2013)

# II. Structure of energy balance, sources and activities definition<sup>23</sup>

# II.1. General structure of the Balance

The energy balance of OLADE is comprised by a double-entry matrix where the columns indicate the energy sources and the rows correspond to the activities, which form part of the energy system.

A barrel of oil equivalent (Boe) is the calorific unit used to display the energy balance.

The basic components of the energy balance are:

- Energy sources
  - Primary energy
  - Secondary energy
- Activities
  - o Supply
  - o Transformation
  - o Demand

The energy balance matrix developed by OLADE, in terms of final energy, reflects the relations among all of the stages of the energy process.

In the Table 9, three stages described below can be distinguished:

•	Supply	Energy supply through the combination of production, importation, exportation and variation in stocks.
•	Transformation	Physical, chemical and/or biochemical modification of one energy source or form to another, in a transformation center.
•	Demand	Consumption of energy sources by final consumers in the different sectors, priori to some chemical or physical conversion of energy.

<sup>&</sup>lt;sup>23</sup> OLADE Methodology for Preparing Energy Balances, October 1995.

			PRIMARY SOURCES									SECONDARY SOURCES												
		١	ION RENEWA	ABLE SOURCE	ES		RENEWABLI	SOURCES																TOTAL
		Petroleum	Natural Gas	Coal	Fission Fuels	Hydroenergy	Geothermal	Firewood	Sugar Cane	Other Primary	Total Primary	Electricity	L.P.G.	Gasoline / Alcohol	Kerosene	Diesel Oil	Fuel Oil	Coke	Charcoal	Gases	Other Secondary	Non-Energy	Total Secondary	101712
		kBoe	kBoe	kBoe	kBoe	kBoe	kBoe	kBoe	kBoe	kBoe	kBoe	kBoe	kBoe	kBoe	kBoe	kBoe	kBoe	kBoe	kBoe	kBoe	kBoe	kBoe	kBoe	kBoe
	PRODUCTION (PP)																							
	IMPORT (IM)																							
₽	EXPORT (X)																							
S	INVENTORIES (IV)																							
	UNUSED (UN)																							
	TOTAL SUPLY																							
	REFINERY																							
	POWER PLANTS																							
S	SELF PRODUCERS																							
TRANSFORMATION	GAS TREATM.PLANT																							
ORN	CHARCOAL PLANT																							
NSF	COKE/BLAST FURNAC																							
TRA	DISTILLERY																							
,	OTHER CENTERS																							
	TOTAL TRANSFORMATION																							
	OWN CONSUMPTION																							
	LOSSES																							
	ADJUSTMENT																							
NO	TRANSPORTATION																							
ΙĐ	INDUSTRY																							
S	RESIDENTIAL																							
	COMMERC.,SERV.PUB																							
AL C	AGRIC.,FISH.MIN.																							
E	CONSTRUCTION,OTH.																							
	ENERGY CONSUMPTION																							
	NON ENERGY CONSUM																							
	FINAL CONSUMPTION																							

Table 9. Structure of an Energy Balance

Source: OLADE (2004)

# II.2. Sources

# II.2.1. Primary energy sources

Primary energy sources are obtained directly from nature or following an extraction process. Directly: water energy, solar energy, wind, firewood and other vegetable fuels. After an extraction process: petroleum, natural gas, coal, geothermal energy, etc.

The primary energy sources considered in this methodology are listed and defined as follows:

# i. Non-renewable energy sources

Crude oil: This is a complex mixture of hydrocarbons having different molecular weights, in which there are usually a small proportion of compounds containing sulphur and nitrogen. The composition of petroleum is variable and may be divided into three types, according to distillation residues: paraffin, asphalt or a mixture of the two.

Crude oil is used as a feedstock in refineries, where it is processed to obtain derivatives.

- ❖ Natural gas (free and associated): This is a mixture of gaseous fuels and includes both free natural gas and, present in coal mines or geopressure zones. Herein, both (the net free and associated gas produced) are placed under the same heading due to their similar nature and uses.
  - Free Natural Gas

A gaseous mixture of hydrocarbons made up primarily of methane obtained from gas fields. Since it generally does not contain condensates, it is commonly called "dry gas".

#### Associated Natural Gas:

This is a gaseous mixture of hydrocarbons that is produced in association with crude oil. It generally contains fractions of light liquid hydrocarbons (condensates), so is frequently called "wet gas".

Coal: This is a black or dark brown solid fuel mineral that essentially contains carbon, as well as small amounts of hydrogen and oxygen, nitrogen, sulfur and other elements. It results from the degradation of the remains of plant organisms during long periods, due to the action of heat, pressure, and other natural physical-chemical phenomena.

Due to the different degrees of change in the process, coal is not a uniform mineral and is classified by ranks according to its degree of degradation, in series that range from lignites and anthracites, which have considerable differences in their volatile contents, fixed carbon and caloric value.

❖ Fissionable Fuel or Nuclear Energy: This energy is obtained from the mineral uranium following a purification and/or enrichment process. What is considered

primary energy as "nuclear fuels" is not the mineral uranium in and of itself, but the contents of the fissionable material that is what feeds the nuclear plants.

# ii. Renewable Energy Sources

- Hydroenergy: The energy potential of a water flow
- ❖ Geoenergy: Geothermal energy is stored under the earth's surface in the form of heat, which can be transmitted to the surface through a fluid that is in contact with the heated rock. This fluid is generally made up of water in liquid state, steam, or a combination of both. Only the portion of this energy source that is used in power generation is considered.
- Wind energy: This energy is produced by the wind and can be used jointly with a turbine-generator
- ❖ Firewood: This energy is obtained directly from forest resources. It includes tree trunks and branches, but excludes timber industry wastes, which are included under the definition of "plant wastes" used for energy purposes.
- ❖ Sugarcane products (molasses, juice, and bagasse for energy purposes): These include sugar cane products for energy purposes. They include bagasse, the sugarcane juice and the molasses.
- Other primary sources (animal waste and other vegetable waste, recovered energy, etc.)
  - Animal Wastes: This refers to wastes from farm activities and urban wastes.
     These may be used directly as a fuel in dry form or converted to biogas, through a process of fermentation or decomposition method.
  - Vegetable wastes: These are energy sources obtained from farm and forestry wastes. This includes all farm wastes (except for sugarcane bagasse), such as: rice husks rice husks, coffee husks, palm nut husks, etc., sawmill wastes (not included under the heading of firewood nor bagasse, etc.), for energy purposes.
  - Industrial or Recovered Wastes: Substances with energy contents produced in industrial plants as a byproduct of the production process, such as black pulp liquor, chemical industry wastes (except for petrochemicals, which should be considered secondary products because they come from natural gas or petroleum derivatives), etc.
  - Other Primary Energy Sources: These include solar (water heating in households and hotels, grain drying, lighting with photovoltaic cells), urban wastes (garbage or liquid wastes) and any other primary source that is not mentioned in the descriptions above, but are relevant to the energy structure of the country.

# II.2.2. Secondary energy sources

Secondary energy refers to the different energy products whose origin is the different transformation centers, after undergoing a physical, chemical or biochemical process, and whose destination are the diverse consumption sectors, and/or other transformation centers.

The secondary energy sources considered in this methodology are listed and defined bellow.

- ❖ Liquefied gas (LPG): This consists of a combination of light hydrocarbons that are obtained from distilling oil and/or treating natural gas.
  - They can be of three types:
  - a) Combination of hydrocarbons from the C3 group (propane, propene, propylene)
  - b) Combination of hydrocarbons from the C4 group (butane, butylene)
  - c) Combination of C3 and C4 in any proportions
- ❖ Gasoline and Naphtha (aviation gasoline, motor gasoline, natural gasoline and naphthas): A combination of light liquid hydrocarbons obtained by distilling oil and/or treating natural gas, whose boiling range is generally between 30–200 degrees Celsius. It also includes the alcohol obtained from distilleries that is used as an energy product. This group includes:
  - Aviation Fuel: This is a combination of reformed naphthas of high-octane, high volatility and stability, and high freezing point, used in propeller-driven aircraft with piston motors.
  - Motor Gasoline: A complex mixture of relatively volatile hydrocarbons used, with or without additives (such as lead tetra-ethyl) for operating internal combustion engines.
  - Natural Gasoline: A product of natural gas processing, used as a raw material for industrial processes (petrochemical) in refineries or mixed directly with naphthas.
- ❖ Alcohol: Includes both ethanol (ethyl alcohol) and methanol (methyl alcohol) used as fuels.
  - Ethanol: is a colorless liquid that can be produced by fermentation of plant
    materials with a high sugar content, such as sugarcane juice or molasses;
    plant materials with high starch content, such as cassava, corn, etc.; and
    materials with high cellulose content: firewood, plant wastes. It can be used
    as anhydrous or hydrated alcohol, alone or mixed with gasoline in internal
    combustion engines.
  - *Methanol:* is also a colorless liquid that can be produced from several raw materials such as firewood, plant wastes, methane, natural gas, coal, etc. It is used in internal combustion engines.

#### Kerosene and Jet fuel:

- Kerosene: A liquid fuel made up of the oil fraction that is distilled between 150 and 300 degrees Celsius. It is used as a fuel for cooking foods, lighting, in motors, in refrigeration equipment, and as a solvent for domestic waxes and insecticides.
- Jet fuel: This is kerosene with a special degree of refining, with a freezing point below that of common kerosene. It is used in reaction motors and turbo propellers.
- ❖ Diesel oil (also including gas oil): Liquid fuels obtained from atmospheric distilling of oil from 200 to 380 degrees Celsius, are heavier than kerosene and are utilized in diesel engines and other compression—ignition engines.
- ❖ Fuel Oil or Heavy Fuels: This is waste from refining oil, which includes all heavy products and is generally used in boilers, power plants and navigation.
- ❖ Coke: The general term "coke" applies to a solid, non–smelting material with high carbon content, obtained as a result of the destructive distilling of coal, oil and other carbon materials. There are different types of coke that are normally identified by adding the name of the material of origin to the end. Included in this source are oil coke and coke oven coke.
- ❖ *Electricity*: This is energy transmitted by electrons in movement. It includes electric energy generated with any resource, whether primary or secondary, in hydroelectric, thermal, geothermal or nuclear plants.
- Charcoal: This fuel is obtained from the destructive distilling of wood in absence of oxygen, in charcoal plants. This product absorbs humidity rapidly, and often contains 10 to 15 % water, besides 0.5 to 1.0 % hydrogen and 2 to 3 % ash, with lower caloric power of around 6,500 Kcal / Kg. These characteristics may vary according to the quality of the firewood of origin. In some cases it can substitute coke in foundry processes, and be consumed in industries such as brick making, and in the residential sector for cooking.
- ❖ Gases (biogas, coke gas, furnace gas, refinery gas): Included in this category are gaseous fuels obtained as by–products of refining activities, coke ovens and blast furnaces. It also includes the gas obtained in bio–digesters.
  - Refinery Gas: Non-condensable gas obtained from refining crude oil.
     Consists primarily of hydrogen, methane and ethane used mostly in refining processes.
  - Blast furnace Gas: Obtained as a by–product of steel production in blast furnaces, being used generally as a fuel for heating purposes in the plant.
  - Coke Oven Gas: The gas obtained as a by–product in the intense heating of coal or coke, with a combination of air and steam, in coke ovens. Composed of carbon monoxide, nitrogen and small amounts of hydrogen and carbon dioxide.

- Urban Gas: Gas produced by the total carbonization or gasification of petroleum derivatives, with or without enrichment. Used fundamentally for food cooking in households, although it may have some industrial type uses.
- Biogas The gas, primarily methane, obtained from the anaerobic fermentation of biomass wastes.
- Other Gases All those not mentioned, having an energy use.
- Other Energy Fuels: All the secondary energy products that have not been included in the above definitions and have a share in the energy structure of a country.
- ❖ Non-Energy Products All products that are not used for energy purposes, although they contain a considerable energy content, among which are the asphalts, solvents, naphthas, oils and greases, lubricants, etc.
  - Naphtha: A volatile liquid obtained from processing oil and/or natural gas.
    Used as a raw material in refineries, as a solvent in manufacturing paints
    and varnishes, and as a cleansing agent. Also used in petrochemistry and
    the production of fertilizers.

# II.3. Activities

# II.3.1. Supply

## **Production**

# i. Primary Energy Production

All energy, extracted, exploited, harvested, etc., is considered to be of importance to country, and of course that it has been produced within the national territory.

## ii. Secondary Energy Production

It refers to the amount of energy that is generated from primary energy processing and/or in transformation plants before accounting for self-consumption. If any part of the production is recycled to the same transformation center that it comes from, this should be deducted from production.

All secondary energy production should be accounted at the transformation center where each energy product is produced.

# **Imports and Exports of Primary and Secondary Products**

This explanation is valid for any energy source that can be imported and/or exported. The most common ones that are exchanged among countries are oil, natural gas, coal, nuclear fuel, other primary sources, electricity, liquefied gas, gasoline / alcohol,

kerosene / jet fuel, diesel oil, fuel oil, charcoal, non-energy sources, and other secondary products.

# i. Imports

It includes all primary and secondary energy sources originated outside the borders and that come into the country to be part of the total energy supply system.

## ii. Exports

It is the amount of primary and secondary energy that a country spends on the foreign trade. Some countries follow the practice of considering the aviation gasoline and jet fuel sold to foreign aircraft, as well as the bunker sold to foreign ships as exports. OLADE does not recommend this procedure, because in order to be consistent, it would have to take what domestic ships and craft load abroad as imports.

According to OLADE's conception, the amount purchased by a consumer within a country is assumed to be part of final consumption although the physical process of consumption may take place in international spaces or waters. The same occurs when a vehicle loads gasoline in one country and then crosses the border consumes it in a neighboring country.

# Stock change

Stock change is the difference between initial stocks (at January 1) minus final stocks (at December 31) for a given year, in the storage facilities for different products.

Inventory variation is considered according to its nature. Thus, an inventory increase means a reduction in the total supply and vice—versa.

## Unused

This unused energy is the amount of energy that is presently not being used due to the technical and/or economic feasibility of developing it. Those most commonly dealt with under this heading are:

- Spilled crude oil
- Unused natural gas In countries that are large producers of oil—associated gas, it is common for a large part of that gas to be burned in the open. This is the unused natural gas, and the reasons for its non—use may be:
- Insufficient market
- The market exists, but there is no gas pipeline to transport the gas to the user's doors
- ❖ The market and the gas pipeline exist, but oil extraction requires that the amount of gas produced be greater than the demand can use

In any of these cases, unused natural gas represents a waste of an energy product that is highly valued by consumer sectors. Other Unused Primary Energy Sources You should take into account the amounts of "other primary sources" that have been

considered as production but that do not reach final consumption.

# **Transformation Centers**

This refers to energy that enters special processors called transformation centers for modification; these centers produce physical or chemical changes from one energy source to another or others, seeking in this way to improve the use of energy.

One of the paths that TOTAL SUPPLY can follow is as feed for transformation centers. In the case of primary energy, the flow is called TRANSFORMATION; if it is secondary, RECYCLING.

## i. Refinery

It is a processing plant where oil is transformed into derivatives. Refineries basically separate crude oil into its different components (Figure No. 4). This methodology will treat all refineries as if they were a single processing unit. Although this representation does not allow you to completely describe the transformation center in terms of refining, or analyze the internal flexibility of each refinery, it suffices to establish the input and output ratios for the balance that proposed herein. There are different types of refineries with different types of processes, which do not always obtain the same products.

## ii. Power Plants

Depending on the case, these transformation centers may consist of hydroelectric plants, conventional thermoelectric plants with steam turbines, gas turbines and internal combustion engines, nuclear power plants and geothermoelectric plants.

#### iii. Gas Treatment Center

In treatment plants, natural or associated gas is processed for the primary purpose of recovering compound liquid hydrocarbons such as gasoline and naphthas, pure hydrocarbons such as butane, propane, ethane or a combination thereof, and non-energy products such as carbon through a process of physical separation of gas components.

#### iv. Charcoal Plants

This is essentially a furnace where partial combustion of firewood is achieved, producing charcoal, non-volatile and volatile products, and generally the latter are not used. Note that wood, in the form of charcoal, has a greater caloric value.

## v. Coke/Blast furnaces

These are found in the foundry industry. Coal is transformed into coke and coke oven gas in the coke oven. The coke then goes to a blast furnace, from which pig iron and blast furnace gas are obtained. Coke ovens for coal treatment produce coke, coke oven gas and non–energy products (benzols, tars, etc.). Part of the coke is obtained in the production of blast furnace gas, and the other part is consumed in the mineral reduction process in the blast furnace.

## vi. Distillery

These are centers where mostly sugarcane juice is treated to produce alcohol. Likewise, they include alcohol distilleries that process other raw materials such as beets, cassava, or other products with high starch or cellulose contents.

## vii. Other Centers

These may the anaerobic digesters and pyrolysis furnaces, etc., which take farm, animal, forest, agroindustial, and urban wastes, plus those from energy plants or any other transformation centers that are included in the country's balance and that are not among the above.

#### viii. Total Transformation

The total transformation is the sum of both primary and secondary energy for all inputs into transformation centers. When there is no energy source feed to transformation centers, the total is zero.

Note: OLADE's Energy Balance uses the negative sign as a convention for inputs from energy sources to transformation centers to transform them into other energy sources. Inputs for power generation are an example.

# **Self-Consumption**

This is one of the four possible paths for SUPPLY. Self–consumption is the part of primary and secondary energy that the energy sector itself uses for its operations.

# **Statistical Adjustment**

This line serves primarily, in some cases, to make up for differences due to conversion of different sources, from their original measurement units to units that are compatible for preparing the balance; and in other cases to make up for differences that are imperceptible and very difficult to find. In all cases, adjustment should not be greater than 5 % of the total supply.

Adjustment = Domestic Supply - Total Transformation - Losses - Total Final Consumption

# II.3.2. Demand

## i. Transportation Sector

The final consumption of a country's transportation sector is the total amount of fuel required to move its vehicle fleet. The modes of transportation may be: a) Highway, b) Railroad, c) Air, d) River, and e) Maritime.

#### ii. Industrial Sector

An industry is an establishment classified as such in the "large division 3" of the Standard Industrial Classification.

Final consumption of the industrial sector consists of any energy source used in

the processes that are carried out within the limits of the establishment, in which certain raw materials are transformed into final products.

This definition leaves out certain fuels that the industries purchase to facilitate delivery of their products to the market. It is common for certain industries such as beverages to distribute their products using their own vehicle fleet. However, that consumption belongs to the transportation sector.

Sometimes the distinction between industry and agriculture may not be very clear: the recommended criteria to solve doubtful cases is to consider as agricultural all activities carried out within the farm and as industry otherwise.

#### iii. Residential Sector

The final consumption of this sector pertains to a country's urban and rural households. A household is what the population census defines as such, and there are as many households as the census and derivative mechanisms have determined. It is important to emphasize that the energy balance has no particular definitions for population parameters, and is based on the definitions of available demographic studies, even when those definitions may be or appear incorrect.

#### iv. Commercial. Service and Public Sectors

The sector information unit is an establishment belonging to one of the following groups from the Standard Industrial Classification:

Div. 4 = Electricity, gas and water; Note: Electricity and gas are not counted here, as they belong to the energy sector (self– consumption), which leaves only water.

Div. 6 = Wholesalers, retailers, restaurants, and hotels.

Div. 7 = Transportation and communications; only business establishments but not vehicle fleets, whether or not they belong to the above.

Div. 8 = Financial establishments (banks), insurance companies, and services provided to other companies.

Div. 9 = Social and community services, such as schools, universities, health, churches, movies, theaters, repair businesses, public administration, defense, etc.

Final consumption for this sector is that of all establishments listed above, provided it is produced within the building where the establishment is located. This excludes vehicle consumption. For a complete description, consult the Standard Industrial Classification (revision 2).

#### v. Agriculture, Fishing and Mining Sectors

The informational unit of the farming, fishing and mining sectors is an establishment defined as follows in the Standard Industrial Classification data code:

Div. 11 = Agriculture and hunting

Div. 12 = Forestry and saw mills

Div. 13 = Fishing

Div. 2 = Extraction of minerals and metals

When it is difficult to separate agriculture from agroindustry, fishing from the fishing industry, and mining from metallurgy, the Standard Industrial Classification method supposes that the establishment is classified according to the group that most of its activities fall under. The best recommendation is to adopt the rule followed by the office in charge of developing national accounts.

## vi. Construction and Other Sectors

This sector consists of two sub-sectors: Construction and Other Sectors.

Construction includes:

- New buildings and remodeling of old buildings;
- New industrial establishments;
- Civil works, such as bridges, reservoirs, tunnels, etc.;
- New roads and maintenance of the existing road system.

Other Sectors refers to any energy consumer that is not specified in the identified sectors; this item is generally used to complete consumption and as such should not be very large. If it were over 5 % of all final consumption, for example, this would mean that your country's balance is not well disaggregated.

# vii. Final Energy Sector Consumption

This refers to the total amount of primary and secondary products used by all the aforementioned consumption sectors to meet their energy needs, and is therefore the sum total of all energy consuming sectors.

## viii. Final Non-Energy Consumption

This sector is defined by the consumers that use energy sources as raw material for the manufacture of non-energy source goods. Here are some examples:

- Natural gas and petroleum derivatives (naphtha, reformatting, refinery gas, etc.), consumed in petrochemistry to make plastics, solvents, polymers, rubber, etc.
- Bagasse for making paper or pressed board
- Animal waste as fertilizers
- Plant wastes as feed for cattle

## ix. Total Demand

This is all energy that is delivered to the consumption sectors, both for use as energy sources and as non-energy sources. The sum of all energy

consumption (Line No 25) plus non-energy consumption (Line No 26) is the result of this sum.

# II.3.3. Energy Chain

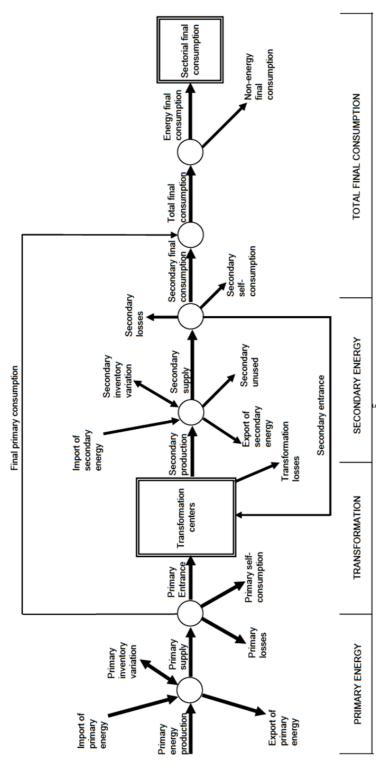


Figure 1. Energy Chain

# III. Gathering information process

Following OLADE's methodology for Energy Balances, the Forms designed for data collecting consider three stages of the energy chain: supply, transformation and consumption.

# III.1.1. Data collection process

The process of data collection consisted in the following steps:

- a) Characterize the energy sector (what to look for? and where to look at?):
  - Energy sources
  - o Energy facilities
  - o Key stakeholders
- b) Identify the most important sources and data requirements of information that will permit to build the metadata, so as to ensure the transparency, traceability, reliability and replicability of Energy Balance preparation;
- c) Design the contact list and agenda for OLADE's technical visit to Saint Lucia with help of the Focal Point; and,
- d) Develop the templates and data collection surveys according to the defined OLADE's methodology for Energy Balances.

# III.1.2. Questionnaires description

## General Energy Variables

## F1 F03 SAINTLUCIA 2014.xls

# Supply, Consumption and Potential of Energy Sources

This *form* allows collecting data about Supply, Consumption and Potential by each of the primary and secondary energy sources. Data is compiled annually and expressed in physical units. The survey is divided into two sections and four sheets as follows:

## Section 1 – Energy Supply and Consumption

This section is oriented to gather information about *Production, Exports, Imports* and *Consumption* for each energy source; *Oil, Natural Gas, Coal, Alcohol, Biodiesel Firewood, Sugar Cane Products, Agricultural Wastes and Electricity.* 

## Section 2 – Reserves, Transformation Capacity and Potential

The section refers to Reserves of Oil, Natural Gas and Coal, Transformation capacity Alcohol and Biodiesel plants and Potential of Hydroenergy, Geothermal, Wind, Photovoltaic and Nuclear.

#### **Sheets Structure**

Sheet	Sections included	
name		
F03A	A General information of the reporting unit	
	Section 1. Energy Supply and Consumption 2010 - 2012 of Oil and	
	Natural Gas.	
F03B	Section 1. Energy Supply and Consumption 2010 - 2012 of Coal,	
	Alcohol Biodiesel, Firewood and Agricultural Wastes.	
F03C	Section 1. Energy Supply and Consumption 2010 – 2012 of Electricity.	
F03D	Section 2. Reserves, Transformation capacity and Potentials.	

## F2 HC SAINTLUCIA 2014.xls

# Storage, Supply and Distribution of Hydrocarbons

The *Hydrocarbons Survey* permits to collect data about Storage, Supply and Sales of Hydrocarbons. Data is compiled annually and expressed in physical units (kbbl). The survey is divided into three sections and four sheets as follows:

## **Section 1 – Storage**

This section is oriented to gather information about the storage capacity of every reported facility.

# Section 2 – Hydrocarbons' Supply Side and Other Variables

This section includes data of Production, Import, Export, Initial and Closing Stocks, Unused and Losses for every type of energy source (Petroleum, Gasoline, Diesel, and Fuel Oil, among others).

# Section 3 – Hydrocarbons' Total Sales

The section enables to identify total sales of each energy source distributed by economic activity (Transport, Industrial, Residential, Service Stations and others).

## **Sheets Structure**

Sheet name	Sections included
HC_General	General information of the reporting unit
	Section 1. Storage capacity by facility reported
HC_2010	Section 2. Hydrocarbons' Supply of year 2010
	Section 3. Hydrocarbons' Total Sales of year 2010
HC_2011	Section 2. Hydrocarbons' Supply of year 2011
	Section 3. Hydrocarbons' Total Sales of year 2011
HC_2012	Section 2. Hydrocarbons' Supply of year 2012
	Section 3. Hydrocarbons' Total Sales of year 2012

# F3 EE SAINTLUCIA 2014.xls

## **Characteristics of Electricity Industry**

This form is designed to identify the main characteristics of the Electricity Sector and Industry both in general and specific terms. It is divided in four sections and fours sheets as follows:

## Section 1 – Power plant description

This section is oriented to power plants general description in terms of location, type of service, year of Commissioning, Ownership type, Number of Units, Nominal Power [MW] and Effective Power [MW].

#### Section 2 – Power plant annual variables

It is referred to Technology Type, Installed Capacity, Plant Factor, Electricity Generation, Fuel Consumption, Own Consumption and Losses

## Section 3 – Hydroenergy technical specifications

The sheet collects information about Reservoir Name, Capacity and Flow, Average Flow, Precipitation Flow, Turbine Flow, among others.

#### Section 4 – Total customers and sales

It gathers data of total customers and sales (GWh) divided for each economic activity.

#### **Sheets Structure**

Sheet name	Sections included
EE_General	General information of the reporting unit
	Section 1. Power plant description
EE_2010	Section 2. Power plant annual variables of year 2010
	Section 3. Hydroenergy technical specifications of year 2010
	Section 4. Total customers and sales of year 2010
EE_2011	Section 2. Power plant annual variables of year 2011
	Section 3. Hydroenergy technical specifications of year 2011
	Section 4. Total customers and sales of year 2011
EE_2012	Section 2. Power plant annual variables of year 2012
	Section 3. Hydroenergy technical specifications of year 2012
	Section 4. Total customers and sales of year 2012

## F4 CTR SAINTLUCIA 2014.xls

## **Characteristics of Transport Sector**

This form is designed to identify the main characteristics of the Transport Sector in general and specific terms. It is divided in three sections and fours sheets as follows:

# Section 1. Characteristics of transport sector

Considering the desegregation of country GDP, the section is oriented to identify the *Added Value* and *Total Fleet* for each of transport categories: *Road, Sea* and *Air Transport*.

# Section 2. Consumption by energy sources

In accordance to transport categories, the section compiles data by energy source: Electricity, Crude Oil, LPG, Kerosene, Gasoline, Diesel Oil, Fuel Oil, Coke, Charcoal and Firewood.

### Section 3. Characterization of transport sub-categories

The Information of this section includes the *Characterization of Vehicle Fleet* by type of Fuel and the *Annual Average of Kilometers Travelled* (km/year).

#### **Sheets Structure**

Sheet name	Sections included
CTR_General	General information of the reporting unit
CTR_2010	Section 1. Characteristics of transport sector of year 2010
	Section 2. Consumption by energy sources of year 2010
	Section 3. Characterization of transport sub-categories of year 2010
CTR_2011	Section 1. Characteristics of transport sector of year 2011
	Section 2. Consumption by energy sources of year 2011
	Section 3. Characterization of transport sub-categories of year 2011
CTR_2012	Section 1. Characteristics of transport sector of year 2012
	Section 2. Consumption by energy sources of year 2012
	Section 3. Characterization of transport sub-categories of year 2012

# F3\_CIN\_SAINTLUCIA\_2014.xls

# **Characteristics of Industrial Sector**

This form is designed to identify the main characteristics of the Industrial Sector in general and specific terms. It is divided in four sections and fours sheets as follows:

#### **Section 1 – Characterization of Industrial Sector**

Considering the desegregation of country GDP, the section is oriented to identify general characteristics such as *Number of Industrial Facilities*, *Added Value*, *Production* and *Number of Employees*.

# **Section 2 – Consumption by Energy Sources**

This section identify information of Energy Consumption for each category of the industry sector (Food products, beverages and tobacco; Textiles and Clothing, Footwear and Leather, Wood and Furniture, among others), by energy source (Electricity – Purchased and Self-Generated –, Crude Oil, Gasoline, Diesel Oil, Fuel Oil, Kerosene, LPG, Coke, Charcoal, Firewood and Others).

#### Section 3 – Great Energy Consumers

In order to establish a detailed level of data collecting, information requested is based on a *List of Great Industries*, which includes *Facility Name* and *Category of Industrial Subsector, Location, Added Value, Production* and *Number of Employees*.

#### **Section 4 – Self–Generators**

The Characterization of Self–Generators is based on the Inputs used for self – generation: Hydro, Diesel Oil, Fuel Oil, Photovoltaic, Bagasse and Others, and a final column added for Self–Generated Electricity.

#### **Sheets Structure**

Sheet name	Sections included
CIN_General	General information of the reporting unit
CIN_2010	Section 1. Characteristics of Industrial Sector of year 2010
	Section 2. Consumption by energy sources of year 2010
	Section 3. Great Energy Consumers of year 2010
	Section 4 – Self–Generators of year 2010
CIN_2011	Section 1. Characteristics of Industrial Sector of year 2011
	Section 2. Consumption by energy sources of year 2011
	Section 3. Great Energy Consumers of year 2011
	Section 4 – Self–Generators of year 2011
CIN_2012	Section 1. Characteristics of Industrial Sector of year 2012
	Section 2. Consumption by energy sources of year 2012
	Section 3. Great Energy Consumers of year 2012
	Section 4 – Self–Generators of year 2012

# F4 CIN2 SAINTLUCIA 2014.xls

### **Characteristics of Industrial Facility**

It is an *Energy Survey of Industrial Sector*, which allows to access key information from *Major Energy Consumers*.

# **Section 1 – Facility General Information**

The section compiles information about the size of the facility (Number of Employees, Total Production Value, etc.).

### **Section 2 – Consumption by Energy Sources**

It gathers data about consumption by energy source by each year.

### **Sheets Structure**

Sheet name	Sections included
CIN2_General	Section 1 – Facility General Information
CIN2_Purchases	Section 2 – Consumption by Energy Sources

# F7 CCO SAINTLUCIA 2014.xls

#### **Characteristics of Commercial Sector**

This questionnaire is designed to identify the main characteristics of the Commercial Sector. Data is compiled annually. It is divided in three sections and fours sheets as follows:

#### Section 1 – Characteristics of Commercial Sector

It compiles information about Commercial Sector in terms of Number of Facilities, Employees, Capacity and Added Value.

# **Section 2 – Consumption by Energy Sources**

It gathers data about energy consumption by each hotel categories and restaurants. Energy sources are Electricity, LPG, Diesel Oil, Charcoal, Firewood, Fuel Oil and Others.

### **Section 2 – Major Consumers**

The section is oriented to collect data about energy consumption by major hotels and restaurants. Data consist in Location, Capacity (rooms and beds), Occupation Factor and Added Value.

#### **Sheets Structure**

Sheet name	Sections included
CIN2_General	Section 1 – Facility General Information
CIN2_Purchases	Section 2 – Consumption by Energy Sources

# F8 CCO2 SAINTLUCIA 2014.xls

#### **Description**

This questionnaire is designed to identify the main characteristics of the hotel major consumers. It is divided in two sections and one sheet as follows:

#### Addressed to

**Hotels Major Consumers** 

#### **Section 1 – General description of Hotel**

Collect information about General Characteristics of the Hotel, by providing information on Number of Beds and Rooms, Occupation Factor of Beds and Rooms and Occupation Factor (annual % of bed, annual % of rooms) and Added Value.

# **Section 2 – Energy Purchases**

It gathers data about energy consumption by each Energy Sources (Electricity, LPG, Diesel Oil, Charcoal, Firewood, Fuel Oil and Others).

#### File Structure

Sheet name	Sections included
CCO_Hotels	Section 1 – General description of Hotel for years 2010 - 2012
	Section 2 – Energy Purchases for years 2010 - 2012

### F5 CCO2R SAINTLUCIA 2014.xls

The form corresponds to the same structure than the described for the Form 6, but instead of being addressed to the total Commercial Sector it is oriented to each Restaurant Facility, constituting on a particular *Energy Survey of Restaurant Industry*.

# F6 CRW SAINTLUCIA 2014.xls

#### **General Information (section 1)**

The questionnaire is designed to identify the general characteristics of the Agricultural Sector. Annual key variables include *Added Value*, *Production*, *Number of Agricultural Production Facilities*, *Area Harvested* and *Level of Mechanization*.

### **Consumption by Energy Sources (section 2)**

The section provides information on Energy Consumption of each Agriculture category (Crops 1, 2, etc., and Livestock), by energy source (Electricity –*Purchased* and *Self-Generated*–, *Crude Oil, Gasoline, Diesel Oil, Fuel Oil, Kerosene, LPG, Coke, Charcoal, Firewood* and *Others*). In Fishing activity, consumption of energy sources are focused on four of them: *Gasoline, Diesel Oil, Electricity* and *Others*.

#### **Characterization of the Level of Mechanization (section 3)**

This sheet compiles information on the level of mechanization, typically based on a percentage of the technology involved on agricultural processes such as *Irrigation, Tractors, Harvester and Fumigation,* among others, or a *Global Level*.

#### F7 NV SAINTLUCIA 2014.xls

This Form corresponds to the compilation of National Variables, related to social and economic data. Section 1 compiles information about *Information Units* (Hotels, Restaurants, Public Sector and Services), whilst Section 2 on *Energy Consumption* by energy source.

# IV. Technical Visit

The main objective of the technical visit to Saint Lucia was to gather information from the key public and private institutions of the hydrocarbon, electricity and renewable sub-sectors, as well as information related to the energy consumers through the residential, industrial, commercial and other demand sectors.

Likewise, it is important to make an analysis of the current situation or energy sector diagnosis, prior visiting the country. This preliminary research is essential to identify the sources of information, institutions or organizations to visit, the type of information to be obtained, the universe of the demand side, the sample to be applied to implement strategies for mapping of information, among others. Once the institutions where selected, a pre-analysis of the type of information that could be collected was defined.

In order to arrange the technical visits to the stakeholders, a visit schedule action plan was presented to the country's focal point to endorse the presence of the interviewer. The schedule plan of the technical visits included the name of the institution, the energy sector that it belongs to, date and time of the visit, the name of the contact person that is going to be interviewed, email address, telephone and the survey form to be applied (See annex Agenda for Country Technical Visit page 56).

# **IV.1. Developed Activities**

- Each one of the visited institutions was given a clear description of the background, objectives, importance and benefits of the project.
- Hydrocarbon sector institutions responsible for policies, regulations, prices, production, trade, distribution or supply of fossil fuels were visited.
- Electricity sector institutions responsible for policies, regulations, prices, production, trade, distribution or supply of electricity were interviewed.
- Renewable sector institutions that had relevant information on hydro, sugarcane products, firewood, charcoal, wind and solar were visited.
- Technical visits were made to the institutions that provided information on Population and Housing Census, GDP, Agricultural Production, vehicle fleet, transport and industrial data, wholesale and retail establishments, hotels, restaurants, among others.

While the data was being gathered, a preliminary analysis on the data collected was deployed in order to build two energy flow matrix to facilitate the development of energy balances. The first energy flow matrix contains the relationship between the energy sources and activities available in the country.

	Non Renewable Energy Sources			e Primary Sources			Petroleum and Natural Gas Products							
	Crude Oil	Solar	Wind	F ire wood		E le c tric ity		LPG	Gasolines	Kerosene & Jet Fuel	Diesel Oil	FuelOil	Non Energy Products	Charcoal
	Unit:	Unit:	Unit:	Unit:		Unit:		Unit:	Unit:	Unit:	Unit:	Unit:	Unit:	Unit:
	G Wh	G Wh	GWh	Tons	Ш	K Wh		Kbbl	Kbbl	Kbbl	Kbbl	Kbbl	Kboe	kt
P roduction		00	- 00	00										<b>⊕</b>
Imports	<b>⊕</b>							$\oplus$	<b>⊕</b>	<b>⊕</b>	<b>⊕</b>	<b>⊕</b>	<b>⊕</b>	
Exports	<b>⊕</b>													
Unused														
S tock Change	<b>⊕</b>							$\oplus$	<b>⊕</b>	<b>⊕</b>	<b>⊕</b>	$\oplus$	<b>⊕</b>	<b>(</b>
Bunker														
Transfers														
					Г									
Power Plants Thermal					ш	β					β	β		
S elf- producers		β	β			β					β			
Charcoal Plant				β	L		L							β
Transport sector									©	©	©		©	
In dustrial sector						©					0	©		
Residential sector				©		0		0		C				©
Commercial, Services and Public				©		©		©			©			©
Farming, Forestry and Fishing						©								
Mining and Quarring														
Construction sector and Others													©	
Non Energy Consumption							Ĺ							
Own Consumption						©	f							
Losses	<b>⊕</b>					©		©	©	©	©	©	©	

Saint Lucia's Preliminary Energy Flow

The second energy flow matrix identifies the information units or data providers' relationship with the energy sources that they are involved with.

It is important to mention that even though there was an initial research that mentioned five hydrocarbon providers; the technical visit was carried out just for three companies (Sol, Rubis and Buckeye) because, Buckeye Partners LP bought the storage terminal of Hess and Island Oil Ltd, now-a-days, just sells tires for road vehicles.

In annex 2 Completed forms (page 87) it is possible to check compiled information forms (Facilities' technical inventory and Collected Energy Information) and a list of Other information resources collected during research stage and Technical Visit (page 96).

				INFO	RMATION L	JNITS	
	FUELS	RUBIS	SOL	BUCKEYE	OURGAS	LUCELEC	Self -Producers
1	CRUDE OIL			<b>©</b>			
2	LPG		⊕ ©	⊕ <b>©</b>	⊕ ©		
3	JET FUEL & KERO		⊕ ©	⊕ <b>©</b>			
4	GASOLINE	⊕ ©	⊕ ©	⊕ <b>©</b>			
5	DIESEL OIL	⊕ ©	⊕ ©	⊕ <b>©</b>		β©	
6	FUEL OIL						
7	NON ENERGY PRODUCTS	⊕ ©	⊕ ©	⊕ <b>©</b>			
8	SOLAR						β©
9	WIND						β©

# IV.2. Additional results of the technical visit:

- Saint Lucia's Government awareness on the importance of the data gathering and the benefits of having accurate Energy Balances and GHG Emissions inventory for the decision making process.
- Nineteen public and private institutions were visited and data collection surveys were applied.
- Additional information and documentation was obtained from other institutions that couldn't have a face-to-face interview.
- A facilities' technical inventory of the power plants and fuel storage facilities were obtained (See annex 2 Facilities' technical inventory, page 87).
- The macro energy consumers such as industries and hotels were identified.

Additional comments and findings of the technical visit were given to have a more accurate development of the energy balance.

# V. Data processing

The data collected in order to be useful for the elaboration of energy balances, it is required to analyze such data so that their quality is validated and missing data could be identified and estimated.

After obtaining the statistical data, it was important to organize it according to the energy sources and activities involved. Additionally, documentary information was compiled that was scattered in different organizations. This information served to correlate some findings and definitions with the statistical data from various sources. This type of additional qualitative information collected included energy policies, projects, plans, laws, which helps the decision maker to more clearly interpret trends based on comparisons and prioritize energy planning.

By identifying missing data, there were performed statistical procedures based on OLADE's estimation techniques. The survey data, particularly for industries and commerce, refer only to units in the sample, so it was necessary in some cases to be extended or extrapolated to represent the entire population of Saint Lucia.

It was important to define the validation criteria clearly and ensuring the data integrity. In order to reach this purpose, the quality control of the data according to the OLADE's methodology was used. This quality control includes calculations of efficiencies and energy balance adjustments.

The gathering information process allowed compiling a part of the required data according to the structure of the energy balance, which considers the supply, transformation and consumption of energy. The information available to calculate the Energy Balance was the following:

 The major oil companies fulfilled hydrocarbons' questionnaires: Buckeye, RUBIS and SOL, who are importers and distributors and store Gasoline, Diesel Oil and LPG. Based on this information, we were able to estimate their energy demand (residential, commercial, industrial, agricultural, mining, power generation and gas stations) by each energy source;

- Information on supply, transformation and consumption of electricity came from the annual reports prepared by the Utility LUCELEC and questionnaires;
- Residential consumption of firewood and charcoal was estimated on the basis of OLADE's residential consumption model, using data about population and housing distribution, family size and living arrangements and housing statistics (lighting and cooking), contained in population censuses published by the Central Statistics Office;
- Energy consumption in the transport sector was estimated based on data from the Statistical Diggest 2011 provided by the Central Statistics Office and references of specific fuel consumptions coming from OLADE's methodology.

# **Energy Balance**

# **VI.1. Energy Balance sheets**

# **Principal Balance Sheet**

It registers horizontal subtotals of the matrix of Energy Balance.



	MAIN FORM: BALANCE													
SOURCE		UNIT	kt	COUNTRY										
YEAR	1 TOTAL SUPPLY	2 TOTAL TRANSFORMATION	3 OWN CONSUMPTION	4 LOSSES	5 FINAL CONSUMPTION	1-2-3-4-5 ADJUSTMENT								
2005	-	_			_	-								
2006	-	-			-	-								
2007	-	-			-	-								
2008	-	-			-	-								
2009	-	-			-	-								
2010	-	-			-	-								
2011	=	-			-	=								
2012	-	-			-	-								
2013	-	-			-	-								

**Table 10. Main Balance Sheet** 

#### **Principal Supply Sheet**

Considers the internal energy supply flows formed by: Production, Import, Export, Stock Changes and Unused.

	MAIN FORM: SUPPLY												
SOURCE	Charcoal	UNIT	Kt	COUNTRY									
YEAR	1 PRODUCTION	2 IMPORTS	3 EXPORTS	4 STOCK CHANGE	5 UNUSED	1+2-3+4-5 TOTAL SUPPLY							
2005						-							
2006						-							
2007						-							
2008						-							
2009						-							
2010						-							
2011						-							
2012						-							
2013						-							

**Table 11. Main Supply Sheet** 

# **Principal Transformation Sheet**

The sheet registers data about loads and production coming from processing centers, such as refineries, power plants,—or self-producers—, gas plants, Charcoal plants, cokeries and distilleries.

	MAIN FORM: TRANSFORMATION												
SOURCE	Charcoal	UNIT	kt	COUNTRY									
YEAR	1 REFINERIES	2 POWER PLANTS	3 SELF PRODUCERS	4 GAS PLANTS	5 CHARCOAL PLANTS	6 COKE PLANTS / BLAST FURNACE	7 DISTILLERY	8 OTHER PLANTS	TOTAL TRANSFORMATI ON	TOTAL PRODUCTION			
2005													
2006													
2007													
2008													
2009													
2010													
2011					, and the second								
2012													
2013													

**Table 12. Main Transformation Sheet** 

# **Principal Consumption Sheet**

It aims to register the final energy consumption in economic sectors: Industry, Transportation, Residential, Commercial, Public and Services, Agriculture, Fishing and Mining, and Construction and Others.

	MAIN FORM: FINAL CONSUMPTION													
SOURCE	Charcoal	UNIT	kt	COUNTRY										
YEAR	1 TRANSPORT	2 INDUSTRY	3 RESIDENTIAL	4 COMMERCIAL	5 FARMMING, FISHING AND MINING	6 CONSTRUCTION OTHERS	7 NON ENERGY CONSUMTION	1+2+3+4+5+6+7 FINAL CONSUMPTION						
2005								_						
2006								-						
2007								-						
2008								-						
2009								-						
2010								-						
2011								-						
2012								-						
2013								-						

**Table 13. Main Consumption Sheet** 

# **Auxiliary Sheet**

This form is designed to consolidate data from previous forms when information is available at a more disaggregated level.

	AUXILIARY WORKSHEET:													
SOURCE	-	UNIT		COUNTRY	-									
YEAR	1	2	3	4	5	6	7	TOTAL						
2005 2006														
2007 2008														
2009 2010 2011														
2012 2013														
2014														

**Table 14. Main Auxiliary Sheets** 

# VI.2. Energy Balance results and analysis

In line with OLADE's Methodology, Energy Balances are prepared in terms of physical and calorific units (kBoe).

It is adequate to bring up to the basic goals of an Energy Balance (OLADE, 2004):

- To assess the dynamics of the energy system in concordance with the economy of each country, determining the major economic—energy relations between the different sectors of the national economy.
- To serve as an instrument for energy planning
- To understand in detail the structure of the national energy sector

Conceptually, the energy balance is the accounting of the energy flow between the various transformation processes and economic activities of the energy chain and its balancing relations, for which energy is produced, exchanged with the outside, transformed and consumed; taking as analysis unit, a given country, for a established period (usually one year).

The energy balances are instruments that measure the annual energy sources and consumptions in different economic sectors.

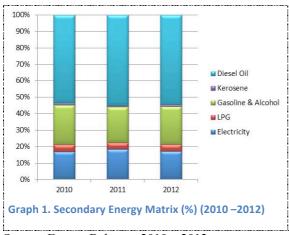
- ❖ To determine the competitive and non–competitive uses of each energy source, in order to promote substitution processes wherever feasible.
- ❖ To create the appropriate bases that will lead to energy information enhancement and systematization.
- ❖ To be utilized to enable energy forecasts and outlooks on the short, medium and long term.

#### **General comments**

In that context, the Energy Balances of Saint Lucia allow determining a wide range of analytics graphs and tables as key inputs for energy policy evaluation, designing and decision making processes.

A general view on the results obtained, enables to remark that the Saint Lucia Energy Supply Matrix depends on secondary sources, which were Diesel Oil (758 kBoe), Electricity (239 kBoe), Gasoline (322 kBoe), LPG (60 kBoe) and Kerosene & Jet Fuel (17 kBoe) for year 2012 (See Graph 1).

Transformation categories correspond to electricity generation in power plants consisting in Internal Combustion Engines.

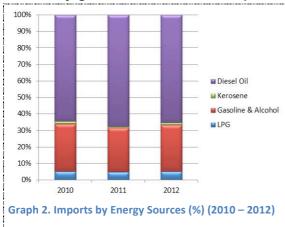


Source: Energy Balances 2010 – 2012

In terms of Final Consumption, Electricity, Gasoline and Diesel Oil are the main energy sources whilst transportation, commercial and residential registers the higher levels of energy consumption.

As seen in the Energy Balance 2010 - 2012 (from pages 48 to 50), the Country is a Net Importer of Energy. Total Energy Supply was based on Imports of Oil Products, especially Diesel Oil and Gasoline / Alcohol.

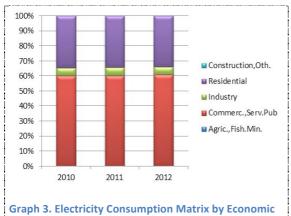
# **Electricity generation and consumption**



In 2012, a total of 1.133 kBoe was imported, from which 739 kBoe was Diesel Oil (65%), mainly used for *Electricity Generation* (75%) (See Graph 2 and Graph 3). Country's electricity is generated by LUCELEC, who owns two Generation Plants named Cul de Sac Power Station (87.4 MW) and Belle Plaine Power Station (2.4 MW).

Source: Energy Balances 2010 - 2012

Activities (%) (2010 - 2012)

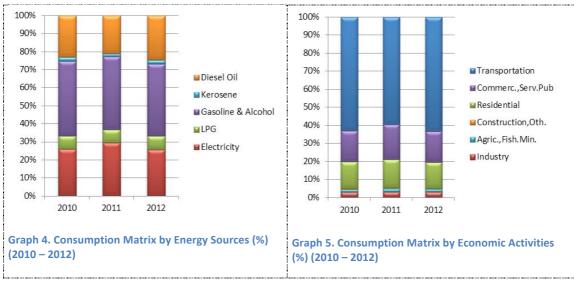


From total *Electricity Consumption* (239 kBoe), Commerc., Serv.Pub sector represents around 53%. Within this economic sector, Commercial has an annual average contribution (2010–2012) of 95%, while Street Lighting the remaining percentage.

### **Final Consumption**

As shown in Graph 4, there are a variety of five energy sources that are being used in Saint Lucia. Gasoline & Alcohol share is around 40%, while Diesel Oil and Electricity share has a similar level of importance in terms of its contribution (25% and 26%, respectively). In fact, they represent near to 91% of Total Energy Consumption. The remaining energy sources, such as Kerosene and LPG, maintain a stable participation on the energy matrix.

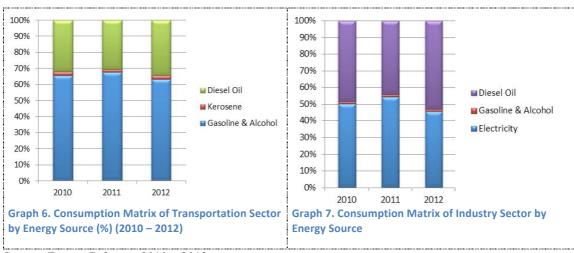
Gasoline and Diesel Oil are mainly used in the Transport Sector, having a share of 63% and 34%, respectively.



Source: Energy Balances 2010 – 2012

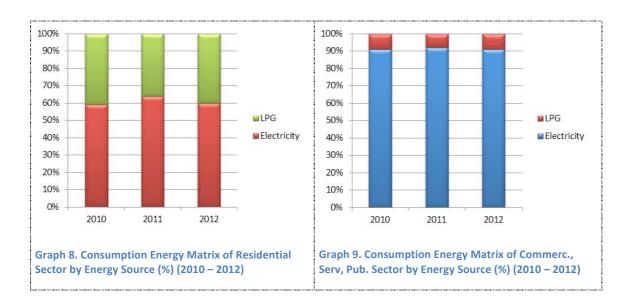
Transport sector is the major consumer of energy (See Graph 5 and Graph 6). In 2012 the consumption of this sector was 548 kbbl, which represented 63% of Total Country Energy consumption. It was followed in importance by Commercial and Residential (with 17% and 14% respectively) and Industrial (3%).

Saint Lucia's industrial sector only consumes electricity and diesel oil (See Graph 7).



Source: Energy Balances 2010 – 2012

In both cases, the Residential and Commercial Sector, Electricity is the most important energy source (See Graph 9) having a share of 60%, followed by LPG with the remaining percentage.



# VI.2.1. Energy Balance - 2012

i. Physical units

		PRIMARY				SECONDARY			
	ACTIVITY	FIREWOOD	ELECTRICITY	LPG	GASOLINE/	KEROSENE	DIESEL OIL	CHARCOAL	NON-
					ALCOHOL				ENERGY
									PRODUCTS
		kt	GWh	kbbl	kbbl	kbbl	kbbl	kt	kBep
	PRODUCTION	61,00	384,90					5,60	
SUPPLY	IMPORT			89,10	356,90	15,90	738,30		3,75
UPF	EXPORT								
S	INVENTORIES			0,90	3,20	1,90	19,00		
	UNUSED								
TOTAL	SUPPLY	61,00	384,90	90,00	360,10	17,80	757,30	5,60	3,75
	REFINERY								
TRANSFORMATION	POWER PLANTS		384,90				(558,80)		
ATI	SELF PRODUCERS								
₹	GAS TREATM.PLANT								
G	CHARCOAL PLANT	(22,39)						5,60	
N V	COKE/BLAST FURNAC								
TR/	DISTILLERY								
	OTHER CENTERS								
TOTAL	TRANSFORMATION	(22,39)	-	-	-	-	(558,80)	-	-
	OWN CONSUMPTION		18,50						
Z	LOSSES		33,00	0,50	0,80	0,10	0,20		
Ę	ADJUSTMENT	0,01	-	0,80	(1,60)	-	-	-	-
≅	TRANSPORTATION				360,60	13,80	173,90		3,75
nst	INDUSTRY		17,70		0,30		12,80		
Ő	RESIDENTIAL	38,60	112,30	69,80				5,60	
END CONSUMPTION	COMMERC.,SERV.PUB		203,40	18,90					
6	AGRIC.,FISH.MIN.						11,60		
	CONSTRUCTION,OTH.					3,90			
CONSUMPTION	ENERGY SOURCE	38,60	333,40	88,70	360,90	17,70	198,30	5,60	3,75
	NON ENERGY CONSUM								
CONSUMPTION	FINAL	38,60	333,40	88,70	360,90	17,70	198,30	5,60	3,75

Table 15 Saint Lucia Energy Balance 2012 - Physical units

# ii. Calorific units

		PRIM	MARY					SECONDARY				
	ACTIVITY	FIREWOOD	TOTAL PRIMARY	ELECTRICITY	LPG	GASOLINE / ALCOHOL	KEROSENE	DIESEL OIL	CHARCOAL	NON- ENERGY PRODUCTS	TOTAL SECONDARY	TOTAL
	PRODUCTION	158,23	158,23	238,50					27,83		266,33	158,23
≥	IMPORT		-		59,70	318,80	15,20	739,40		3,75	1.136,85	1.136,85
SUPPLY	EXPORT		-								-	-
S	INVENTORIES		-		0,60	2,90	1,80	19,00			24,30	24,30
	UNUSED		-								-	-
TOTAL	SUPPLY	158,23	158,23	238,50	60,30	321,70	17,00	758,40	27,83	3,75	1.427,48	1.319,38
	REFINERY		-								-	-
z	POWER PLANTS		-	238,50				(559,60)			238,50	(321,10)
TRANSFORMATION	SELF PRODUCERS		-								-	-
Ã	GAS TREATM.PLANT		-								-	-
SFO	CHARCOAL PLANT	(58,08)	(58,08)						27,83		27,83	(30,25)
IRA	COKE/BLAST FURNAC		-								-	-
•	DISTILLERY		-								-	-
	OTHER CENTERS		-								-	-
TOTAL	TRANSFORMATION	(58,08)	(58,08)	-	-	-	-	(559,60)	-		-	(351,35)
	OWN CONSUMPTION		-	11,50							11,50	11,50
	LOSSES		-	20,50	0,30	0,70	0,10	0,20			21,80	21,80
EN D CONSU MPTION	ADJUSTMENT	0,03	0,03	(0,10)	0,50	(1,50)	-	-	-		558,50	(1,07)
₹	TRANSPORTATION		-			322,20	13,20	174,20		3,75	513,35	513,35
NSN	INDUSTRY		-	11,00		0,30		12,80			24,10	24,10
000	RESIDENTIAL	100,13	100,13	69,60	46,80				27,83		144,23	244,36
ä	COMMERC.,SERV.PUB		-	126,00	12,70						138,70	138,70
	AGRIC.,FISH.MIN.		-					11,60			11,60	11,60
	CONSTRUCTION,OTH.		-				3,70				3,70	3,70
CONSUMPTION	ENERGY SOURCE	100,13	100,13	206,60	59,50	322,50	16,90	198,60	27,83	3,75	835,68	935,81
	NON ENERGY CONSUM		-								-	-
CONSUMPTION	FINAL	100,13	100,13	206,60	59,50	322,50	16,90	198,60	27,83	3,75	835,68	935,81

Table 16 Saint Lucia Energy Balance 2012 – Calorific units

# VI.2.2. Energy Balance - 2011

i. Physical units

		PRIMARY				SECONDARY			
	ACTIVITY	FIREWOOD	ELECTRICITY	LPG	GASOLINE/ ALCOHOL	KEROSENE	DIESEL OIL	CHARCOAL	NON- ENERGY PRODUCTS
		kt	GWh	kbbl	kbbl	kbbl	kbbl	kt	kBep
	PRODUCTION	62,88	385,30					5,77	
չ	IMPORT			75,90	312,70	9,30	705,80		4,06
SUPPLY	EXPORT								
S	INVENTORIES			0,10	1,10	2,10	6,90		
	UNUSED								
TOTAL	SUPPLY	62,88	385,30	76,00	313,80	11,40	712,70	5,77	4,06
	REFINERY								
N O	POWER PLANTS		385,30				(563,70)		
ATI	SELF PRODUCERS								
RM	GAS TREATM.PLANT								
TRANSFORMATION	CHARCOAL PLANT	(23,08)						5,77	
N/S	COKE/BLAST FURNAC								
TR/	DISTILLERY								
	OTHER CENTERS								
TOTAL	TRANSFORMATION	(23,08)	-	-	-	-	(563,70)	-	-
	OWN CONSUMPTION		18,80						
N <sub>C</sub>	LOSSES		33,00	0,40	0,80		0,10		
EN D CONSU MPTION	ADJUSTMENT	(0,00)	0,10	-	(3,30)	0,30	-	-	-
Σ	TRANSPORTATION				316,00	7,90	127,40		4,06
nsn	INDUSTRY		18,80		0,30		9,40		
ĮO:	RESIDENTIAL	39,80	113,50	59,70				5,77	
QD (	COMMERC.,SERV.PUB		201,10	15,90					
ដែ	AGRIC.,FISH.MIN.						12,10		
	CONSTRUCTION,OTH.					3,20			
CONSUMPTION	ENERGY SOURCE	39,80	333,40	75,60	316,30	11,10	148,90	5,77	4,06
	NON ENERGY CONSUM								
CONSUMPTION	FINAL	39,80	333,40	75,60	316,30	11,10	148,90	5,77	4,06

Table 17 Saint Lucia Energy Balance 2011 – Physical units

# ii. Calorific units

		PRIN	1ARY					SECONDARY				
	ACTIVITY	FIREWOOD	TOTAL PRIMARY	ELECTRICITY	LPG	GASOLINE / ALCOHOL	KEROSENE	DIESEL OIL	CHARCOAL	NON- ENERGY PRODUCTS	TOTAL SECONDARY	TOTAL
	PRODUCTION	163,11	163,11	238,70					28,69		267,39	163,11
≥	IMPORT		-		50,80	279,40	8,90	706,90		4,06	1.050,06	1.050,06
SUPPLY	EXPORT		-								-	-
S	INVENTORIES		-		0,10	1,00	2,00	6,90			10,00	10,00
	UNUSED		-								-	-
TOTAL	SUPPLY	163,11	163,11	238,70	50,90	280,40	10,90	713,80	28,69	4,06	1.327,45	1.223,17
	REFINERY		-								-	-
7	POWER PLANTS		-	238,70				(564,50)			238,70	(325,80)
TRANSFORMATION	SELF PRODUCERS		-								-	-
RMA	GAS TREATM.PLANT		-								-	-
SFO	CHARCOAL PLANT	(59,88)	(59,88)						28,69		28,69	(31,19)
IRAN	COKE/BLAST FURNAC		-								-	-
	DISTILLERY		-								-	-
	OTHER CENTERS		-								-	-
TOTAL	TRANSFORMATION	(59,88)	(59,88)	-	-	-	-	(564,50)	-		-	(356,99)
	OWN CONSUMPTION		-	11,70							11,70	11,70
	LOSSES		-	20,50	0,20	0,70		0,10			21,50	21,50
NOI	ADJUSTMENT	(0,01)	(0,01)	-	-	(2,90)	0,20	-	-		561,80	(2,71)
END CONSUMPTION	TRANSPORTATION		-			282,30	7,60	127,60		4,06	421,56	421,56
NSU	INDUSTRY		-	11,60		0,30		9,40			21,30	21,30
00 0	RESIDENTIAL	103,24	103,24	70,30	40,00				28,69		138,99	242,23
E	COMMERC.,SERV.PUB		-	124,60	10,70						135,30	135,30
	AGRIC.,FISH.MIN.		-					12,20			12,20	12,20
	CONSTRUCTION,OTH.		-				3,10				3,10	3,10
CONSUMPTION	ENERGY SOURCE	103,24	103,24	206,50	50,70	282,60	10,70	149,20	28,69	4,06	732,45	835,69
	NON ENERGY CONSUM		-								-	-
CONSUMPTION	FINAL	103,24	103,24	206,50	50,70	282,60	10,70	149,20	28,69	4,06	732,45	835,69

Table 18 Saint Lucia Energy Balance 2012 – Calorific units

# VI.2.3. Energy Balance – 2010

i. Physical units

	PRIMARY SECONDARY								
		PRIMARY				SECONDARY			
	A CTIVITY	FIREWOOD	ELECTRICITY	LPG	GASOLINE/	KEROSENE	DIESEL OIL	CHARCOAL	NON-
	ACTIVITY				ALCOHOL				ENERGY
									PRODUCTS
		kt	GWh	kbbl	kbbl	kbbl	kbbl	kt	kBep
	PRODUCTION	65,10	380,90					6,00	
<b>\</b>	IMPORT			89,00	366,90	18,30	734,30		4,11
SUPPLY	EXPORT								
SL	INVENTORIES			1,50	3,80	0,60			
	UNUSED								
TOTAL	SUPPLY	65,10	380,90	90,50	370,70	18,90	734,30	6,00	4,11
_	REFINERY								
TRANSFORMATION	POWER PLANTS		380,90				(559,30)		
AT	SELF PRODUCERS								
₹	GAS TREATM.PLANT								
G	CHARCOAL PLANT	(23,90)						5,97	
N.	COKE/BLAST FURNAC								
- 2	DISTILLERY								
·	OTHER CENTERS								
TOTAL	TRANSFORMATION	(23,90)	-	-	-	-	(559,30)	-	-
	OWN CONSUMPTION		17,20						
N O	LOSSES		33,00		0,60	0,10	0,10		
)ILC	ADJUSTMENT	(0,00)	(0,10)	0,10	0,10	0,10	(8,30)	0,03	-
Σ	TRANSPORTATION				369,70	13,60	159,70		4,11
JSL	INDUSTRY		18,40		0,30		11,00		
Į.	RESIDENTIAL	41,20	113,80	72,40				5,97	
END CONSUMPTION	COMMERC.,SERV.PUB		198,60	18,00					
뮵	AGRIC.,FISH.MIN.						12,50		
	CONSTRUCTION,OTH.					5,10			
CONSUMPTION	ENERGY SOURCE	41,20	330,80	90,40	370,00	18,70	183,20	5,97	4,11
	NON ENERGY CONSUM								
CONSUMPTION	FINAL	41,20	330,80	90,40	370,00	18,70	183,20	5,97	4,11

Table 19 Saint Lucia Energy Balance 2010 – Physical units

#### ii. Calorific units

		PRIM	MARY	SECONDARY NON-								
	ACTIVITY	FIREWOOD	TOTAL PRIMARY	ELECTRICITY	LPG	GASOLINE / ALCOHOL	KEROSENE	DIESEL OIL	CHARCOAL	NON- ENERGY PRODUCTS	TOTAL SECONDARY	TOTAL
	PRODUCTION	168,87	168,87	236,00					29,83		265,83	168,87
≥	IMPORT		-		59,60	327,70	17,50	735,40		4,11	1.144,31	1.144,31
SUPPLY	EXPORT		-								-	-
S	INVENTORIES		-		1,00	3,40	0,60	8,30			13,30	13,30
	UNUSED		-								-	-
TOTAL	SUPPLY	168,87	168,87	236,00	60,60	331,10	18,10	743,70	29,83	4,11	1.423,44	1.326,47
	REFINERY		-								-	-
2	POWER PLANTS		-	236,00				(560,20)			236,00	(324,20)
TRANSFORMATION	SELF PRODUCERS		-								-	-
RM,	GAS TREATM.PLANT		-								-	-
SFO	CHARCOAL PLANT	(61,99)	(61,99)						29,70		29,70	(32,29)
₹ E	COKE/BLAST FURNAC		-								-	-
	DISTILLERY		-								-	-
	OTHER CENTERS		-								-	-
TOTAL	TRANSFORMATION	(61,99)	(61,99)	-	-	-	-	(560,20)	-		-	(356,49)
	OWN CONSUMPTION		-	10,70							10,70	10,70
	LOSSES		-	20,50		0,50	0,10	0,10			21,20	21,20
NO	ADJUSTMENT	(0,00)	(0,00)	(0,20)	-	-	-	-	0,13		560,13	(0,20)
MPT	TRANSPORTATION		-			330,30	13,10	159,90		4,11	507,41	507,41
END CONSU MPTION	INDUSTRY		-	11,40		0,30		11,00			22,70	22,70
000	RESIDENTIAL	106,88	106,88	70,50	48,50				29,70		148,70	255,58
Z Z	COMMERC.,SERV.PUB		-	123,10	12,10						135,20	135,20
	AGRIC.,FISH.MIN.		-					12,50			12,50	12,50
	CONSTRUCTION,OTH.		-				4,90				4,90	4,90
CONSUMPTION	ENERGY SOURCE	106,88	106,88	205,00	60,60	330,60	18,00	183,40	29,70	4,11	831,41	938,29
	NON ENERGY CONSUM		-								-	-
CONSUMPTION	FINAL	106,88	106,88	205,00	60,60	330,60	18,00	183,40	29,70	4,11	831,41	938,29

Table 20 Saint Lucia Energy Balance 2010 - Calorific units

#### VII. **Greenhouse Gas Emissions**

The Inventory of Greenhouse Gases is a double entry matrix that provides relevant information on the contribution of Greenhouse Gas Emissions of the Country, by energy sources, activities and/or subsectors.

# VII.1.Technology approach<sup>24</sup>

This IPCC<sup>25</sup> Methodology is based on the calculation of emissions by pollutants and according to the consultation variables: country, energy source, energy activity carried out in the process and the applicable year. The methodology of technologies uses the values reported by the countries on the fundamental data according to the energy activities developed by energy source, these they are operated with the factors of contamination of this technology and applied according to the pollutant in mention; they are obtained this way the emissions by pollutant.

For the purposes of this chapter, presented results are related to Technology approach.

<sup>&</sup>lt;sup>24</sup>http://siee.olade.org(web page visited on Jan, 17<sup>th</sup> 2014)

<sup>&</sup>lt;sup>25</sup>Intergovernmental Panel On Climate Change (IPCC), is the leading international body for the assessment of climate change. It was established by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) in 1988 to provide the world with a clear scientific view on the current state of knowledge in climate change and its potential environmental and socioeconomic impacts. http://www.ipcc.ch/index.htm#.Utm37DlziqQ (web page visited on Jan, 16<sup>th</sup> 2014).

# **CO<sub>2</sub> Emissions**

ENERGY SOURCE		FIREWOOD	TOTAL PRIMARY	ELECTRICITY	LPG	GASOLINE / ALCOHOL	KEROSENE	DIESEL OIL	CHARCOAL	NON- ENERGY PRODUCTS	SECONDARY	TOTAL
	PRODUCTION		-								-	-
>.	IMPORT		-								-	-
SUPPLY	EXPORT		-								-	-
Ŋ	INVENTORIES											
	UNUSED		-									
TOTAL	SUPPLY	-	-	-	-	-	-	-	-	-	-	-
	REFINERY		-								-	-
	POWER PLANTS		-					227.322,50			227.322,50	227.322,50
ĮOIT.	SELF PRODUCERS		-								-	-
A M	GAS TREATM.PLANT		-								-	-
SFOI	CHARCOAL PLANT		-								-	-
TRANSFORMATION	COKE/BLAST FURNAC		-								-	-
	DISTILLERY		-								-	-
	OTHER CENTERS											•
TOTAL	TRANSFORMATION		-		-	-	-	227.322,50		-	227.322,50	227.322,50
	OWN CONSUMPTION											-
NO NO	TRANSPORTATION		-			136.314,40	5.651,18	74.056,86		790,89	216.813,33	216.813,33
MP.	INDUSTRY		-			74,00		5.207,80			5.281,80	5.281,80
END CONSUMPTION	RESIDENTIAL		-								-	
000	COMMERC.,SERV.PUB		1		4.941,66						4.941,66	
EN	AGRIC.,FISH.MIN.		1					5.170,67			5.170,67	
	CONSTRUCTION,OTH.		1				1.518,53				1.518,53	
CONSUMPTION	FINAL	-	-	-	4.941,66	136.388,40	7.169,71	84.435,33	-	790,89	233.725,99	222.095,13

Table 21 Saint Lucia Greenhouse Gas Inventory – 2012

ENERGY SOURCE		FIREWOOD	TOTAL PRIMARY	ELECTRICITY	LPG	GASOLINE / ALCOHOL	KEROSENE	DIESEL OIL	CHARCOAL	NON- ENERGY PRODUCTS	SECONDARY	TOTAL
	PRODUCTION		-									
≻.	IMPORT		-								-	
SUPPLY	EXPORT		-								-	
Ŋ	INVENTORIES		-								-	
	UNUSED		-								-	-
TOTAL	SUPPLY	-	-	-	-	-	-	-	-	-	-	-
	REFINERY		-								-	-
	POWER PLANTS		-					229.307,80			229.307,80	229.307,80
NOT 10	SELF PRODUCERS		-								-	-
RMA	GAS TREATM.PLANT		-								-	-
TRANSFORMATION	CHARCOAL PLANT		-								-	-
RAN	COKE/BLAST FURNAC		-								-	-
	DISTILLERY		-								-	-
	OTHER CENTERS		-								-	-
TOTAL	TRANSFORMATION	-	-	-	-	-	-	229.307,80	-	-	229.307,80	229.307,80
	OWN CONSUMPTION		-								-	-
N O	TRANSPORTATION		-			119.445,40	3.240,87	56.777,06		855,21	180.318,54	180.318,54
F	INDUSTRY		-			74,00		3.824,48			3.898,48	3.898,48
END CONSUMPTION	RESIDENTIAL		-								-	
Ō CŌ	COMMERC.,SERV.PUB		-		4.161,68						4.161,68	
ENC	AGRIC.,FISH.MIN.		-					5.406,92			5.406,92	
	CONSTRUCTION,OTH.		-				1.245,97				1.245,97	
CONSUMPTION	FINAL	-	-	-	4.161,68	119.519,40	4.486,84	66.008,46	- 1	855,21	195.031,59	184.217,02

Table 22 Saint Lucia Greenhouse Gas Inventory – 2011

ENERGY SOURCE		FIREWOOD	TOTAL PRIMARY	ELECTRICITY	LPG	GASOLINE / ALCOHOL	KEROSENE	DIESEL OIL	CHARCOAL	NON- ENERGY PRODUCTS	SECONDARY	TOTAL
	PRODUCTION		-								-	-
>-	IMPORT		-								-	-
SUPPLY	EXPORT		-								-	-
12	INVENTORIES		-								-	-
	UNUSED		-								-	-
TOTAL	SUPPLY	-	-	-	-	-	-	-	-	-	-	-
	REFINERY		-								-	-
	POWER PLANTS		-					227.550,30			227.550,30	227.550,30
Į.	SELF PRODUCERS		-								-	-
TRANSFORMATION	GAS TREATM.PLANT		-								-	-
ISFOI	CHARCOAL PLANT		-								-	-
RAN	COKE/BLAST FURNAC		-									-
	DISTILLERY		-									-
	OTHER CENTERS		-									-
TOTAL	TRANSFORMATION		-			-	-	227.550,30		-	227.550,30	227.550,30
	OWN CONSUMPTION		-									
N O	TRANSPORTATION					139.754,20	5.591,25	71.172,74		865,76	217.383,95	217.383,95
MP	INDUSTRY					74,00		4.475,45			4.549,45	4.549,45
NSU	RESIDENTIAL										-	-
END CONSUMPTION	COMMERC.,SERV.PUB				4.721,80						4.721,80	4.721,80
EN EN	AGRIC.,FISH.MIN.							5.562,93			5.562,93	5.562,93
	CONSTRUCTION,OTH.						1.985,77				1.985,77	1.985,77
CONSUMPTION	FINAL	-	-	-	4.721,80	139.828,20	7.577,02	81.211,12	-	865,76	234.203,90	234.203,90

Table 23 Saint Lucia Greenhouse Gas Inventory - 2010

# VIII. Economic and Energy Indicators

A set of economic and energy indicators were calculated based on the Energy Balances 2010 – 2012.

The Table 24 below compares Saint Lucia with Latin American and Caribbean Countries (LA&C) annual average energy economic indicators. It's clearly seen that most of the Saint Lucia's indicators are lower than the average for LA&C countries. Those related to electricity consumption are higher than the average.

Saint Lucia's Final Energy Consumption per capita is 4.6 (kboe/ $10^3$  inhab) against 7.4 for LA&C. Similar behavior can be seen for Energy Intensity (SL 0.7 vs LA&C 1.3 bep/ $10^3$ US\$), Industrial Energy Intensity (SL 0.1 vs LA&C 1.3 Gg CO<sub>2</sub> /bep/ $10^3$  inhab) and Total CO<sub>2</sub> Emissions per capita (SL 1.3 vs LA&C 2.7 Gg CO<sub>2</sub> /bep/ $10^3$  inhab).

Regarding electricity sector indicators, it is remarkable that both Total Electricity Consumption per capita ((GWh/ $10^3$  inhab)) and CO<sub>2</sub> intensity for electricity generation ((Gg CO<sub>2</sub>/GWh)) are higher than LA&C values. In the second case, Saint Lucia's emissions are more than twice the emissions of LA&C (SL 0.72 vs LA&C 0.22), which is a result comparable with other Caribbean Countries.

	Final Energy Consumption per capita	Total Electricity Consumption per capita	Total Energy Consumption in Residential Sector per capita	Total Electricity Consumption in Residential Sector per capita	Energy	Industrial Energy Intensity	Total CO2 Emissions per capita	Intensity of CO2 Emissions in Electricity Sector / Generation
Year	(kbep/10(3)inhab) (GWh/10(3)inhab)	(GWh/10(3)inhab)	(kbep/10(3)inhab)	(kWh/inhab)	(bep/10(3) EC\$)	(bep/10(3) EC\$)	(Gg CO2 /bep/10(3)inhab)	(Gg CO2/GWh)
Saint Lucia	ia							
2010	4.82	1.43	0.72	0.43	0.75	0.12	1.41	09'0
2011	4.23	1.44	29.0	0.42	0.65	0.11	1.11	09'0
2012	4.84	1.43	0.70	0.42	0.74	0.13	1.34	0.95
Average	4.63	1.43	0.69	0.42	0.71	0.12	1.29	0.72
Latin Am	Latin America and Caribbean	bean						
2011	7.38	1.21	1.14	0.52	1.29	2.82	2.7	0.22

**Table 24** Energy and Economic Indicators (2010 – 2012)

# IX. Conclusions and recommendations

Saint Lucia's energy matrix is mainly reliant on imported energy products. Even though there was an initial research that mentioned five hydrocarbon providers; the technical visit was carried out just for three companies (Sol, Rubis and Buckeye) because, Buckeye Partners LP bought the storage terminal of Hess and Island Oil Ltd, now-adays, just sells tires for road vehicles.

There is a high percentage of the population have access to the electricity grid and St. Lucia Electricity Services Limited (LUCELEC) is the solely power generation, transmission and distribution company of the country that generates electricity mostly produced through huge diesel engines. This matrix could have a significant shift if the country's renewable energy potential such as solar, wind, geothermal, among others, is being used as an intake for electricity generation by decreasing the quantity of imported diesel oil.

Because most of the information were collected from different sources and there is no institution in the country to compile all of this information on a regular basis, it is suggested that the country take into consideration the improvement on the energy statistical management to keep track the overall energy sector of Saint Lucia and to promote the energy planning of the country. In fact, the sustainability of this mechanism will allow comprehensive energy planning in the medium and long term of Saint Lucia.

The country is based on extensive rain forest, which helps to absorb most of the carbon dioxide and other greenhouse gas emissions that are shown in the GHG Inventories of Saint Lucia so it's important to keep the remaining forests standing. In addition, the share of renewable energy sources could be increased by promoting projects on solar, wind and others.

It was identified that the collection of consumer data was the most complex to obtain due to the few data available in the country. To facilitate this, it is recommended to apply the OLADE's methodology for estimating the energy demand data. Accordingly, it is recommended to conduct surveys to final consumers of energy on a regular basis to validate the estimates made in the different subsectors of demand.

It is important that the government encourages the active participation and collaboration of the energy information providers to facilitate the compilation of energy statistics in a standing order.

It is recommended that the country reuse these survey forms for the collection of energy statistics of the country, as they are useful tools for assessing energy consumption activities, monitor current power projects and identify potential energy programs to be implemented in the future.

# X. Annex

# 1. Forms

# 1.1. Agenda for Country Technical Visit

			SAINT LUCIA TECHNICAL VIS March 24 - 28, 2014	ы		40lade	gasinadén Larbouwertoms de Energia n Aerekson Energy Organismus proprietation (Energia (Energia)) gasinagén Larbos-Amerikana de Taergia
	INSTITUTION	CONTACT NAME	EMAIL	PHONE	ADDRESS	TYPE OF INFORMATION	VISIT DATE
1	Ministry of Sustainable Development, Energy, Science and Technology	Ken Aldonza	ken.aldonza@gmail.com	758 716 1383	First Floor, Caribbean Cinemas, Choc, Castries	F03_SurveySaintLucia_2013.xls	Monday, March 24th, 2014
2	LUCELEC	Trevor Louisy	mdudley@lucelec.com	758 457 4400	San Souci, Castries	EE_SaintLucia_2014	Monday, March 24th, 2014
3	SOL EC Ltd.	Thomas Louis	thomas.louis@solpetroleum.com	758 457 4355	Box 140 Cul de Sac, Castries	HC_SurveySaintLucia_2013.xls	Monday, March 24th, 2014
4	Rubis	Gary Gustave	g.gustave@rubis-caribbean.com	758 452 2306	Hess Bldg, Cul de Sac, Castries	HC_SurveySaintLucia_2013.xls	Monday, March 24th, 2014
5	Buckeye Partners LP	Rakhib Mohammed	rmohammed@hess.com	758 456-1603	Cul de Sac, Castries	HC_SurveySaintLucia_2013.xls	Tuesday, March 25th, 201
6	Island Oil Ltd	Thomas Elias	islandoil@hotmail.com	758 451 0322	Bexon, Castries	HC_SurveySaintLucia_2013.xls	Tuesday, March 25th, 201
7	Central Statistics Office - Ministry of Finance, Economic Affairs and Social Security	Tommy Descartes	tdescartes@gosl.gov.lc	758 468 5554	3rd Floor ECFH Building Bridge Street	NV_SurveySaintLucia_2013.xls (Census included)	Tuesday, March 25th, 2014
8	Ministry of Finance and Economic Affairs	Dr. Reginald Darius	reginald.darius@govt.lc	758 468 5503	3rd and 4th floor, Financial Center, Bridge Street, Castries	NV_SaintLucia_2014	Tuesday, March 25th, 201-
9	Ministry of Infrastructure, Port Services and Transport	Ivor Daniel	idaniel@gosl.gov.lc	758 468 4300	Union, Castries	CTR_SurveySaintLucia_2013.xls (Vehicle fleet)	Wednesday, March 26th, 2014
10	Ministry of Agriculture, Food Production, Fisheries, Co-operatives and Rural Development	Dr. Darius Gabriel	pssecretary.agriculture@govt.lc	758 468 4104	5th floor, Stanislaus James Building, Waterfront, Castries	CRW_SurveySaintLucia_2013.xl s	Wednesday, March 26th, 2014
11	Ministry for Commerce, Business Development, Investment and Consumer Affairs	Mr. Leo Titus Preville	mincommerce@govt.lc	758 468 4203	4th floor, Heraldine Rock Building, Waterfront, Castries	CIN_SaintLucia_2014, CCO_SaintLucia_2014	Wednesday, March 26th, 2014
12	Saint Lu Metal and Plastic Manufacturers Ltd	Neil Beepat	neilbeepat@saintlu.co	758 454 6538	Vieux Fort Ind'l Est Box 243	CIN2_SaintLucia_2014	Wednesday, March 26th, 2014
13	Saint Lucia Distillers Ltd	Wilson Sifflet	w.sifflet@saintluciarums.com	758 456 3100	Roseau Box 823, Castries	CIN2_SaintLucia_2014	Thursday, March 27th, 201
14	Chemical Manufacturing and Investment Co Ltd, Chemico	Thomas Roserie	info@chemicoslu.com	758 454 6133	Vieux-Fort Industrial Estate, Box 317	CIN2_SaintLucia_2014	Thursday, March 27th, 201
15	Wilrock Ltd	Norbert Wilson	wilrock@candw.lc	758 455 9999	Saphyr Estate Laborie	CIN2_SaintLucia_2014	Thursday, March 27th, 201
16	SMJ (St. Lucia) Ltd	Dave JnPierre	dpierre@chubbysd.com	758 454 7765	Vieux Fort Ind'l Estate, Box 1906 Castries	CIN2_SaintLucia_2014	Thursday, March 27th, 201

# 1.2. Main Energy Variables

# Questionnaire 1 F03 SURVEYSAINTLUCIA 2013.xls



# Q1\_F03\_SAINTLUCIA\_2014

# Energy Supply, Consumption and Potential

#### Description

This questionnaire collects data about Supply, Consumption and Potential by each of the primary and secondary energy sources. Data is compiled annually and expressed in physical units. It is divided into two sections and four sheets as follows:

#### Addressed to

**Energy Ministries or similar** 

# Section 1 – Energy Supply and Consumption

It is oriented to gather information about Production, Exports, Imports and Consumption for each energy source; Oil, Natural Gas, Coal, Alcohol, Biodiesel Firewood, Sugar Cane Products, Agricultural Wastes and Electricity.

#### **File Structure**

Sheet name	Sections included
	General information of the reporting unit
F03A	Section 1. Energy Supply and Consumption 2010 – 2012 of Oil and Natural Gas
F03B	Section 1. Energy Supply and Consumption 2010 – 2012 of Coal, Alcohol Biodiesel, Firewood and Agricultural Wastes.
F03C	Section 1. Energy Supply and Consumption 2010 – 2012 of Electricity.

#### **SAINT LUCIA ENERGY BALANCE**



#### MAIN ENERGY VARIABLES FORM

MINISTRY NAME:	
ADDRESS:	
CITY:	
CONTACT NAME:	
EMAIL:	
DATE:	

Please fill in this survey as fully as you can. Your completed survey will be treated in confidence. Once completed please return the survey to SIEE@olade.org

# SECTION 1. ENERGY SUPPLY AND CONSUMPTION

VARIABLES	UNIT	2010	2011	2012
1. OIL AND PRODUCTS				
1.1 PRODUCTION				
- Oil	10(3) bbl			
- LPG	10(3) bbl			
- Gasoline	10(3) bbl			
- Kerosene & Jet fuel	10(3) bbl			
- Diesel Oil	10(3) bbl			
- Fuel Oil	10(3) bbl			
1.2 EXPORTS				
- Oil	10(3) bbl			
- LPG	10(3) bbl			
- Gasoline	10(3) bbl			
- Kerosene & Jet fuel	10(3) bbl			
- Diesel Oil	10(3) bbl			
- Fuel Oil	10(3) bbl			
1.3 IMPORTS				
- Oil	10(3) bbl			
- LPG	10(3) bbl			
- Gasoline	10(3) bbl			
- Kerosene & Jet fuel	10(3) bbl			
- Diesel Oil	10(3) bbl			
- Fuel Oil	10(3) bbl			
1.4 CONSUMPTION				
- Oil	10(3) bbl			
- LPG	10(3) bbl			
- Gasoline	10(3) bbl			
- Kerosene & Jet fuel	10(3) bbl			
- Diesel Oil	10(3) bbl			
Power generation	10(3) bbl			
- Fuel Oil	10(3) bbl			
Power generation	10(3) bbl			
2. NATURAL GAS				
2.1 PRODUCTION(Without reinjection or flaring)	10(6) m(3)			
2.2 FLARING (Burned into the atmosphere)	10(6) m(3)			
2.3 EXPORTS	10(6) m(3)			
2.4 IMPORTS	10(6) m(3)			
2.5 CONSUMPTION				
- Power generation	10(6) m(3)			
- Transportation	10(6) m(3)			
- Residential	10(6) m(3)			
- Commercial	10(6) m(3)			
- Industrial	10(6) m(3)			
- Agriculture, Fishing and Mining	10(6) m(3)			
- Other	10(6) m(3)			

Page 1

# SECTION 2. ENERGY SUPPLY AND CONSUMPTION

VARIABLES	UNIT	2010	2011	2012
3. COAL				
3.1 PRODUCTION	10(6) t			
3.2 EXPORTS	10(6) t			
- Volume(**)	10(6) t			
- Value	10(3)US\$			
3.3 IMPORTS				
- Volume(**)	10(6) t			
- Value	10(3)US\$			
3.4 CONSUMPTION				
- Iron & steal	10(3) t			
- Industrial	10(3) t			
- Power generation	10(3) t			
- Other	10(3) t			
4. ALCOHOL (Energy use)				
4.1 PRODUCTION	10(3) bbl			
4.2 CONSUMPTION	10(3) bbl			
5. BIODIESEL				
5.1 PRODUCTION	10(3) bbl			
5.2 IMPORTS	10(3) bbl			
5.3 EXPORTS	10(3) bbl			
5.4 CONSUMPTION	10(3) bbl			
6. FIREWOOD				
6.1 CONSUMPTION	10(3) t			
7. SUGAR CANE PRODUCTS				
7.1 PRODUCTION	10(3) boe			
7.2 CONSUMPTION	10(3) boe			
- Power generation	10(3) boe			
8. AGRICULTURAL WASTES				
8.1 PRODUCTION	10(3) boe	·		
8.2 CONSUMPTION	10(3) boe			

<sup>(\*\*)</sup> Specify calorific value

Page 2

#### SECTION 3. ENERGY SUPPLY AND CONSUMPTION

VARIABLES	UNIT	2010	2011	2012
9. ELECTRICITY				
9.1 TOTAL GENERATION	GWh			
9.1.1 PUBLIC GENERATION				
- Hydro	GWh			
- Thermal	GWh			
- Geothermal	GWh			
- Wind	GWh			
- Photovoltaic	GWh			
- Nuclear	GWh			
9.1.2 SELF- PRODUCERS' GENERATION				
- Hydro	GWh			
- Thermal	GWh			
9.2 CONSUMPTION				
- Transportation	GWh			
- Residential	GWh			
- Commercial	GWh			
- Industrial	GWh			
<ul> <li>Agriculture, Fishing and Mining</li> </ul>	GWh			
- Other	GWh			
9.3 LOSSES	GWh			
9.4 EXPORTS				
- Volume	GWh			
9.5 IMPORTS				
- Volume	GWh			

Page 3

# 1.3. Hydrocarbons

# Questionnaire 2 HC\_SAINTLUCIA\_2014



# Q2\_HC\_SAINTLUCIA\_2014

# Storage, Supply and Distribution of Hydrocarbons

#### Description

The *Hydrocarbons Questionnaire* collects data about Storage, Supply and Sales of Hydrocarbons. Data is compiled annually and expressed in physical units. It is divided into three sections and four sheets as follows:

#### Addressed to

Energy Ministries and oil utilities

#### Section 1 - Storage

This section is oriented to gather information about the storage capacity of every reported facility

# Section 2 – Hydrocarbons' Supply Side and Other Variables

This section includes data of Production, Import, Export, Initial and Closing Stocks, Unused and Losses for every type of energy source (Petroleum, Gasoline, Diesel, and Fuel Oil, among others).

#### Section 3 - Hydrocarbons' Total Sales

The section enables to identify total sales of each energy source distributed by economic activity (Transport, Industrial, Residential, Service Stations and others).

#### File Structure

Sheet name	Sections included		
HC Conoral	General information of the reporting unit		
HC_General	Section 1. Storage capacity by facility reported		
110, 2010	Section 2. Hydrocarbons' Supply of year 2010		
HC_2010	Section 3. Hydrocarbons' Total Sales of year 2010		
HC 2011	Section 2. Hydrocarbons' Supply of year 2011		
HC_2011	Section 3. Hydrocarbons' Total Sales of year 2011		
HC_2012	Section 2. Hydrocarbons' Supply of year 2012		
	Section 3. Hydrocarbons' Total Sales of year 2012		

#### Q2\_HC\_SAINTLUCIA\_2014

#### SAINT LUCIA ENERGY BALANCE



#### HYDROCARBONS SURVEY

COMPANY NAME:	
ADDRESS:	
CITY:	
CONTACT NAME:	
EMAIL:	
TELEPHONE:	
DATE:	

Please fill in this survey as fully as you can. It should only take around 30 minutes. Your completed survey will be treated in confidence. Once completed please return the survey to siee@olade.org

#### SECTION 1: STORAGE GENERAL CHARACTERISTICS

	Storage Capacity											
N	Facility Name	Location	Petroleum (kbbl)	Gasoline (kbbl)	Diesel Oil (kbbl)	Fuel Oil (kbbl)	Kerosene (kbbl)	Jet Fuel (kbbl)	LPG (kbbl)	Asphalts (kbbl)	Lubricants (kbbl)	Greases (kbbl)
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												

Page 1

YEAR: 2010

SECTION 2: HYDROCARBONS' SUPPLY SIDE AND OTHER VARIABLES

	Petroleum (kbbl)	Gasoline (kbbl)	Diesel (kbbl)	Fuel Oil (kbbl)	Kerosene (kbbl)	Jet Fuel (kbbl)	LPG (kbbl)	Lubricants (kbbl)	Asphalts (kbbl)	Greases (kbbl)
Production										
Import										
Exports										
Initial Stock										
Closing Stock										
Unused										
Losses										

SECTION 3: HYDROCARBONS' TOTAL SALES

	Petroleum (kbbl)	Gasoline (kbbl)	Diesel (kbbl)	Fuel Oil (kbbl)	Kerosene (kbbl)	Jet Fuel (kbbl)	LPG (kbbl)	Lubricants (kbbl)	Asphalts (kbbl)	Greases (kbbl)
Transport sector										
Industrial sector										
Residential sector										
Commercial, Services & Public										
Agriculture, Forestry and Fishing										
Mining and Quarring										
Construction sector & Others										
Service Stations										
Total										

Page 2

# 1.1. Electricity

# Questionnaire 1 EE\_SAINTLUCIA\_2014



#### Q3\_EE\_SAINTLUCIA\_2014

# **Electricity Sector**

#### Description

This questionnaire is designed to identify the main characteristics of the Electricity Sector and Industry. Data is compiled annually and expressed in physical units. It is divided in four sections and fours sheets as follows:

#### Addressed to

**Electricity Utilities** 

#### Section 1 - Power plant description

This section is oriented to power plants general description in terms of location, type of service, year of Commissioning, Ownership type, Number of Units, Nominal [MW] and Effective Capacity [MW].

#### Section 2 - Power plant annual variables

It is referred to Technology Type, Plant Factor, Electricity Generation, Fuel Consumption, Own Consumption and Losses.

#### Section 3 – Total customers and sales

It gathers data of total customers and sales (GWh) divided for each economic activity.

#### File Structure

Sheet name	Sections included		
EE General	General information of the reporting unit		
LL_General	Section 1. Power plant description		
EE 2010	Section 2. Power plant annual variables of year 2010		
EE_2010	Section 3. Total customers and sales for year 2010		
EE 2011	Section 2. Power plant annual variables of year 2011		
EE_2011	Section 3. Total customers and sales for year 2011		
FF 2042	Section 2. Power plant annual variables of year 2012		
EE_2012	Section 3. Total customers and sales for year 2012		

Q3	EE	SAIN	TLU	CIA	2014

#### **SAINT LUCIA ENERGY BALANCE**



#### **ELECTRICITY SURVEY**

COMPANY NAME:	
ADDRESS:	
CITY:	
CONTACT NAME:	
EMAIL:	
DATE:	

Please fill in this survey as fully as you can. It should only take around 30 minutes. Your completed survey will be treated in confidence. Once completed please return the survey to SIEE@olade.org

#### SECTION 1: POWER PLANT GENERAL CHARACTERISTICS

N	Name	Location	Service P=Public S=Self-producer	Year of Commissioning	Ownership type P=Public R=Private	Number of Units	Installed capacity [MW]	Effective Power [MW]
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								

YEAR: 2010

#### SECTION 2: POWER PLANT DESCRIPTION

N	Technology Type *	Plant Factor (%)	Electricity Generation (GWh)	Name of Fuel Consumed for Electricity Generation	Quantity of Fuel Used (kbbl)	Own Consumption (GWh)	Losses (GWh)
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

<sup>\*</sup> CC: Combined Cycle GT: Gas Turbine HY: Hydro ICE: Internal Combustion Engine PH: Photovoltaic ST: Steam Turbine WD: Wind

#### SECTION 3: TOTAL CUSTOMERS AND SALES

Economic Activity	TOTAL CUSTOMERS	TOTAL SALES (GWh)
Transport sector		
Industrial sector		
Residential sector		
Commercial, Services & Public		
Farming, Forestry and Fishing		
Mining and Quarring		
Construction sector & Others		
Total		

# 1.2. Transport Sector

# Questionnaire 2 CTR\_SAINTLUCIA\_2014



# Q4\_CTR\_SAINTLUCIA\_2014

# Transport characteristics

#### Description

This questionnaire is designed to identify the main characteristics of the Transport Sector in general and specific terms. Data is collected annually and expressed in physical units. It is divided in three sections and fours sheets as follows:

#### Addressed to

Transport Ministry or Authorities in charge of Transport Administration

#### Section 1 – General Characteristics of Transport Sector

Considering the desegregation of country GDP, the section is oriented to identify the Added Value and Total Fleet for each of transport categories: Road, Sea and Air Transport.

#### Section 2 - Consumption of Energy Sources

In accordance to transport categories, the section compiles data by energy source: Electricity, Crude Oil, LPG, Kerosene, Gasoline, Diesel Oil, Fuel Oil, Coke, Charcoal and Firewood.

### Section 3 – Transport Fleet by Category

The Information of this section includes the Characterization of Vehicle Fleet by type of Fuel and the Annual Average of Kilometers Travelled (km/year).

#### **File Structure**

Sheet name	Sections included
CTR_General	General information of the reporting unit
	Section 1. General Characteristics of transport sector for year 2010
CTR_2010	Section 2. Consumption of energy sources of year 2010
	Section 3. Transport Fleet by Category for year 2010
	Section 1. General Characteristics of transport sector for year 2011
CTR_2011	Section 2. Consumption of energy sources of year 2011
	Section 3. Transport Fleet by Category for year 2011
	Section 1. General Characteristics of transport sector for year 2012
CTR_2012	Section 2. Consumption of energy sources of year 2012
	Section 3. Transport Fleet by Category for year 2012

# CTR\_SURVEY\_SAINTLUCIA\_2014.xls

TRANSPORT SECTOR				ade	Latin American Energy Organizacion Organisation Latino-americaine d'Ene Organização Latino-Americana de Ene
Date: (yyyy/mm/dd)		afoe-ye	ars - enos - ens		
1. GENERAL INFORMATION	•				
name of the institution:					
contact person:			e-mail:		
position:			area:		
telephone office:			fax:		
movil number:					
2. LOCATION					
country:			parish:		
Please fill in this survey a	as fully information as you can	It should only take around 3	0 minutes \	Your completed surv	ev will be treated in
	eted please return the survey		o minutoo.	roar completed carv	oy wiii bo troatoa iii

67

# SAINT LUCIA ENERGY BALANCE TRANSPORT SECTOR



Date:	0		also year and an
name of the institution:	0		
country:	0	parish:	0

Please fill in this survey as fully information as you can. It should only take around 30 minutes. Your completed survey will be treated in confidence. Once completed please return the survey to SIEE@olade.org

2010

# SECTION 1. GENERAL CHARACTERISTICS OF TRANSPORT SECTOR

Subsector	Added Value	Total Fleet		
	EC\$	Units		
ISIC Category				
Transport and Storage				
Ground transportation				
Road Transport				
Railway				
Sea Transport				
Cruises				
Yacht				
Fishing boats				
Air Transport				

#### SECTION 2. CONSUMPTION BY ENERGY SOURCES

Subsector	Electricity	Crude Oil	LPG	Kerosene	Gasoline	Diesel Oil	Fuel Oil	Coke	Charcoal	Firewood
ISIC Categories	(kWh)	(kbbl)	(MM3)	(kbbl)	(kbbl)	(kbbl)	(kbbl)	(KT)	(KT)	(KT)
Transport and Storage										
Ground transportation										
Road Transport										
Railway										
Sea Transport										
Cruises										
Yacht										
Fishing boats										
Air Transport										

#### SECTION 3. TRANSPORT FLEET BY CATEGORY

Category	Priv	ate	Pub	olic	Average Annual
	Un	its	Un	Mileage	
	Gasoline	Diesel	Gasoline	Diesel	Km/year
Subtotal light vehicles					
Automobil					
4x4					
Pick-up					
Others					
Subtotal buses					
Small bus					
Big bus					
Subtotal heavy cargo					
Heavy cargo					
2 axes					
4 axes					
6 axes					
>6 axes					

#### 1.6. Industrial Sector

### Questionnaire 5 CIN SAINTLUCIA 2014



#### Q5\_CIN\_SAINTLUCIA\_2014

# **Characteristics of Industry Sector**

#### Description

This questionnaire is designed to identify the main characteristics of the Industrial Sector in general and specific terms. Data is collected annually and expressed in physical units. It is divided in four sections and four sheets as follows:

#### Addressed to

Industry Ministry, Industry Association or Authority in charge of Industry Sector

#### Section 1 - General Characteristics of Industry Sector

Considering the desegregation of country GDP, the section is oriented to identify general characteristics such as Number of Industrial Facilities, Added Value, Production and Number of Employees.

#### Section 2 - Consumption by Energy Sources

This section identify information of Energy Consumption on every category of the industry sector, by energy source.

#### Section 3 - Great Energy Consumers

In order to establish a detailed level of data collecting, information requested is based on a List of Great Industries, which includes Facility Name and Category of Industrial Subsector, Location, Added Value, Production and Number of Employees.

#### Section 4 - Self-Generators

The Characterization of Self–Generators is based on the Inputs used for self – generation: Hydro, Diesel Oil, Fuel Oil, Photovoltaic, Bagasse and Others, and a final column for Self–Generated Electricity

#### **File Structure**

Sheet name	Sections included				
CIN_General	General information of the reporting unit				
	Section 1. General Characteristics of Industrial Sector of year 2010				
CIN 2010	Section 2. Consumption by energy sources of year 2010				
CIIV_2010	Section 3. Great Energy Consumers of year 2010				
	Section 4 – Self–Generators of year 2010				
	Section 1. General Characteristics of Industrial Sector of year 2011				
CIN_2011	Section 2. Consumption by energy sources of year 2011				
CIIV_2011	Section 3. Great Energy Consumers of year 2011				
	Section 4 – Self–Generators of year 2011				
	Section 1. General Characteristics of Industrial Sector of year 2012				
CIN_2012	Section 2. Consumption by energy sources of year 2012				
0111_2012	Section 3. Great Energy Consumers of year 2012				
	Section 4 – Self–Generators of year 2012				

# Q5\_CIN\_SAINTLUCIA\_2014.xls

SAINT LUCIA ENERGY BALANCE INDUSTRY SECTOR  Date:	Organisación Latinoamericana de Latin American Enego (Ogunisas Gin American Degrado (Organisación Latino-Americana de Organisación Latino-Americana de
(yyyy/mm/dd)  1. GENERAL INFORMATION  name of the institution:  contact person:	
1. GENERAL INFORMATION         name of the institution:         contact person:       e-mail:         position:       area:         telephone office:       fax:         movil number:       2. LOCATION	
name of the institution:  contact person:	
contact person:     position:     area: telephone office:     fax: movil number:  2. LOCATION	
position: area: telephone office: fax: movil number:   2. LOCATION	
telephone office: fax: movil number: 2. LOCATION	
movil number: 2. LOCATION	
2. LOCATION	
country: parish:	
E	
Please fill in this survey as fully information as you can. It should only take around 30 minutes. Your completed survey will be treate completed please return the survey to SIEE@olade.org	in confidence. Once
completed please forum and survey to one excellent	
OBJECTIVE OF THIS SURVEY: TO ESTABLISH THE INDUSTRY SECTOR ENERGY SOURCES AND CONSUMPTIONS FOR YEARS 2010	

SAINT LUCIA ENERGY BALA	INCE							10	ad	Organ Latin a	ización Latinoamericana Imerican Energy Organi isation Latino-americain ização Latino-Americana	de Energia zation e d'Energia
									uu	Organ	ização Latino-Americana	de Energia
Date:	0			-				IIII afos years aros and				
name of the institution:	0											
ountry:	country:				parish:	0						
					= ·					<del>-</del>	_	
Please fill in this survey as fully infor eturn the survey to SIEE@olade.or	9		take around 30	) minutes. You	ur completed su	rvey will be tre	ated in confider	nce. Once com	pleted please		-	
ION 1. CHARACTERISTICS OF I	IDUSTRIAL SEC	TOR										
Subsector	Number of Industrial Facilities	Added Value	Produ	uction	Number of Employees							
	N°	EC\$	Amount	Units	N°							
ndustry												
Food products, beverages and tobacco												
Textiles and clothing												
Footwear & leather												
Wood and furniture												
Pulp, paper and printing												
Chemical												
Glass and ceramics												
Cement												
Iron and steel												
Metal industries												
Other industries												
					ļ	]						
fining & Quarrying												
	GY SOURCES											
ION 2. CONSUMPTION BY ENER	GY SOURCES	ricity	Crude Oil	LPG	Kerosene	Gasoline	Diesel Oil	Fuel Oil	Coke	Charcoal	Firewood	Oth
ION 2. CONSUMPTION BY ENER		ricity Self-Generation	Crude Oil	LPG	Kerosene	Gasoline	Diesel Oil	Fuel Oil	Coke	Charcoal	Firewood	Oth
ION 2. CONSUMPTION BY ENER	Elect		Crude Oil	LPG (MM3)	Kerosene (kbbl)	Gasoline (kbbl)	Diesel Oil (kbbl)	Fuel Oil	Coke (KT)	Charcoal (KT)	Firewood (KT)	Oth
ION 2. CONSUMPTION BY ENER	Elect Purchase	Self-Generation										Oth 
ION 2. CONSUMPTION BY ENER	Elect Purchase	Self-Generation										Oth 
ION 2. CONSUMPTION BY ENER subsector	Elect Purchase	Self-Generation										Oth (_
ION 2. CONSUMPTION BY ENER subsector adustry Food products, beverages and tobacco	Elect Purchase	Self-Generation										Oth (
TION 2. CONSUMPTION BY ENER subsector  adustry  Food products, beverages and tobaccor Teelles and clothing	Elect Purchase	Self-Generation										Ott-
TION 2. CONSUMPTION BY ENER subsector  Industry  Food products, beverages and tobacconductives and clothing  Footnear & leather	Elect Purchase	Self-Generation										Oth
TION 2. CONSUMPTION BY ENER Subsector	Elect Purchase	Self-Generation										Oth
CONSUMPTION BY ENER subsector  Industry  Food products, beverages and tobacco Teellies and clothing  Footwear & leather  Wood and furniture  Pulp, paper and printing	Elect Purchase	Self-Generation										(
TON 2. CONSUMPTION BY ENER  subsector  housiny  Food products, beverages and tobacco Tedities and clothing  Footweer & leather  Wood and furniture  Pulp, paper and printing  Chemical	Elect Purchase	Self-Generation										Oth
Textiles and clothing Footwear & leather Wood and furniture Pulp, paper and printing Chemical Glass and ceramics	Elect Purchase	Self-Generation										(
Adustry  Food products, beverages and tobacco  Food products, beverages and tobacco  Foothear & leather  Wood and furniture  Pulp, paper and printing  Chemical  Glass and ceramics  Cement	Elect Purchase	Self-Generation										(
Floor 2. CONSUMPTION BY ENER Subsector  Food products, beverages and tobacco Tredities and citothing Footwer & Isather Wood and furniture Pulp, paper and printing Chemical Class and ceramics Cement Iron and steel	Elect Purchase	Self-Generation										Oth (
ITION 2. CONSUMPTION BY ENER Subsector  Industry Food products, beverages and tobacco Teetiles and clothing Footwar & leather Wood and furniture Pulp, paper and printing Chemical Glass and ceramics Cement Iron and steel Metal inclustries	Elect Purchase	Self-Generation										(

Facility name	Industrial Subsector	Location	Added Value EC\$	Production		Number of Employees	
				Amount	Units	Number	
			1			ļ	

#### SECTION 4. SELF GENERATORS

Facility name	Inputs for self generation						
	Hydro	Diesel Oil	Fuel Oil	Photovoltaic	Bagasse	Others	generated Electricity
	kWh	kbbl	kbbl	kWh	kT	()	kWh

## Questionnaire 6 CIN2\_SAINTLUCIA\_2014



### Q6\_CIN2\_SAINTLUCIA\_2014

### **Industry Survey**

#### Description

It is an Energy Survey for the Industrial Sector, which allows to access key information from Major Energy Consumers. It is divided in two sections and two sheets as follows:

#### Addressed to

Industry Ministry, Industry Association or Authority in charge of Industry Sector

### Section 1 - General description of the Facility

The section compiles information about the size of the facility (Number of Employees, Total Production Value, etc.).

### Section 2 - Consumption by Energy Sources

Gathers data about consumption by energy source and by each year under study.

Sheet name	Sections included
CIN2_GENERAL	Section 1 – Facility General Information
CIN2_PURCHASES	Section 2 – Consumption by Energy Sources of years 2010 - 2012

### SAINT LUCIA ENERGY BALANCE



#### INDUSTRIAL SURVEY

COMPANY NAME:	
ADDRESS:	
CITY:	
CONTACT NAME:	
EMAIL:	
TELEPHONE:	
WEBSITE:	
DATE:	

Please fill in this survey as fully as you can. It should only take around 30 minutes. Your completed survey will be treated in confidence. Once completed please return the survey to SIEE@olade.org.

#### SECTION 1: GENERAL INFORMATION AT PRESENT TIME

Subsector and Activity	Number of Employees	Total Production Value	Total Added Value	Shifts Worked	Weeks Worked per Year	Worked Days per Week	Hours Worked per Year	Schedule	Collective Vacations

Manufactu	red Products	Product 1	Product 2	Product 3	Product 4	Product 5	Product 6	Product 7	Product 8	Product 9	Product 10
Product C		1 Toduct 1	1 Toduct 2	1 Toduct 0	1 Toduct 4	1 Todact o	1 Toduct 0	1 Todact 7	1 Toduct o	1 Todact 5	1 Todact 10
Production											
	Production Capacity										
2010	Production										
	Value										
	Production Capacity										
2011	Production										
	Value										
	Production Capacity										
2012	Production										
	Value										

Page 1

#### SECTION 2: PURCHASES AND SALES OF ENERGY

F	1114	20	10	20	11	2012		
Energy Sources	Unit	Amount	\$ Per Year	Amount	\$ Per Year	Amount	\$ Per Year	
Natural Gas								
Coal								
Crude Oil								
Firewood								
Vegetal waste								
LPG								
Gasoline								
Kerosene								
Diesel oil								
Fuel oil								
Coke								
Charcoal								
Electricity purchased								
Self-generated Electricity								
Electricity sold								

Page 2

### 1.7. Commercial Sector Survey

### Questionnaire 7 CCO\_SAINTLUCIA\_2014



### Q7\_CCO\_SAINTLUCIA\_2014

### **Characteristics of Commercial Sector**

#### Description

This questionnaire is designed to identify the main characteristics of the Commercial Sector. It is divided in three sections and fours sheets as follows:

#### Addressed to

Commerce Ministry, Commerce Associations or Authority in charge of Commercial Sector

#### Section 1 - General description of Commercial Sector

It compiles Number of Facilities, Employees, Capacity and Added Value.

#### Section 2 – Consumption by Energy Sources

It gathers data about energy consumption by each hotel category and by restaurants. Energy sources are Electricity, LPG, Diesel Oil, Charcoal, Firewood, Fuel Oil and Others.

### Section 3 – Major Consumers

Collects data about energy consumption by major hotels and restaurants. Data consist in Location, Capacity (rooms and beds), Occupation Factor and Added Value.

Sheet name	Sections included
CCO_General	General information of the reporting unit
	Section 1. Characteristics of commercial sector by year 2010
CCO_2010	Section 2. Consumption by energy sources by year 2010
	Section 3. Majors consumers by year 2010
	Section 1. Characteristics of commercial sector by year 2011
CCO_2011	Section 2. Consumption by energy sources by year 2011
	Section 3. Majors consumers by year 2011
	Section 1. Characteristics of commercial sector by year 2012
CCO_2012	Section 2. Consumption by energy sources by year 2012
	Section 3. Majors consumers by year 2012

### Q7\_CCO\_SAINTLUCIA\_2014.xls

### Organización Latinoamericana de Energía Latinoamericana de Energía Latino American Energy Organización Organización Carlon-americana de Energia Organização Latino-Americana de Energia SAINT LUCIA ENERGY BALANCE COMMERCIAL - HOTELS AND RESTAURANTS (yyyy/mm/dd) 1. GENERAL INFORMATION contact person: e-mail: position: area: telephone office: fax: movil number: 2. LOCATION parish: country: Please fill in this survey as fully information as you can. It should only take around 30 minutes. Your completed survey will be treated in confidence. Once completed please return the survey to SIEE@olade.org OBJECTIVE OF THIS SURVEY: TO STABLISH THE SERVICES SECTOR ENERGY SOURCES AND CONSUMPTIONS FOR YEARS 2010, 2011 AND 2012

SAINT LUCIA ENERGY BALANCE COMMERCIAL - HOTELS AND RESTAURANTS							40	olac	e Organical Congression	unización Latinoar a American Energ unisation Latino-a unização Latino-A
Date:	0						IIII afos yes	rs aros ans		
Name of the Institution				-						
Name of the institution										_
Country					Parish					_
Please fill in this survey as fully in please return the survey to SIEE		can. It should	only take around	d 30 minutes. Y	our completed	survey will be t	reated in confi	dence. Once c	ompleted	
2010										
TION 1. CHARACTERISTICS OF		L SECTOR								
TABLE 1.2 CHARACTERIZATION O					TABLE 1.2 CHA	HACTERIZATIO				_
Subsector	Number of Facilities	Number of Employees	Added Value		Subsector		Facilities	Capacity	Added Value	`
	(Number)	(Number)	(EC\$)	]			(Number)	(persons)	(EC\$)	
Hotels					Restaurants					
Small (25 rooms or less)				]						_
Average (26-99 rooms)										
Above average (100-299 rooms)										
Large (more than 300 rooms)  TION 2. CONSUMPTION BY EN			LPG	Diesel Oil	Charcoal	Firewood	Fuel Oil	Others	1	
Large (more than 300 rooms)  TION 2. CONSUMPTION BY EN		ricity Self - Generated	LPG	Diesel Oil	Charcoal	Firewood	Fuel Oil	Others	]	
Large (more than 300 rooms)  TION 2. CONSUMPTION BY EN	Elec	ricity Self -	LPG (MM3)	Diesel Oil (kbbl)	Charcoal KT	Firewood	Fuel Oil	Others (kbbl)		
Large (more than 300 rooms)  PETION 2. CONSUMPTION BY EN  Subsector  Hotels	Elect Purchase	Self - Generated								
Large (more than 300 rooms)  TION 2. CONSUMPTION BY EN  Subsector	Elect Purchase	Self - Generated								
Large (more than 300 rooms)  TION 2. CONSUMPTION BY EN  Subsector  Hotels  Small (25 rooms or less)  Average (26-99 rooms)	Elect Purchase	Self - Generated								
Large (more than 300 rooms)  ETION 2. CONSUMPTION BY EN  Subsector  Hotels  Small (25 rooms or less)  Average (26-99 rooms)  Above average (100-299 rooms)	Elect Purchase	Self - Generated								
Large (more than 300 rooms)  PTION 2. CONSUMPTION BY EN  Subsector  Hotels  Small (25 rooms or less)  Average (26-99 rooms)  Above average (100-299 rooms)  Large (more than 300 rooms)	Elect Purchase	Self - Generated								
Large (more than 300 rooms)  ETION 2. CONSUMPTION BY EN  Subsector  Hotels  Small (25 rooms or less)  Average (26-99 rooms)  Above average (100-299 rooms)	Elect Purchase	Self - Generated								
Large (more than 300 rooms)  PTION 2. CONSUMPTION BY EN  Subsector  Hotels  Small (25 rooms or less)  Average (26-99 rooms)  Above average (100-299 rooms)  Large (more than 300 rooms)  Restaurants	Elect Purchase	Self - Generated								
Large (more than 300 rooms)  TION 2. CONSUMPTION BY EN  Subsector  Hotels  Small (25 rooms or less)  Average (26-99 rooms)  Above average (100-299 rooms)  Large (more than 300 rooms)  Restaurants	Purchase (kWh)	Self - Generated								
Large (more than 300 rooms)  PTION 2. CONSUMPTION BY EN  Subsector  Hotels  Small (25 rooms or less)  Average (26-99 rooms)  Above average (100-299 rooms)  Large (more than 300 rooms)  Restaurants	Purchase (kWh)	Self - Generated (kWh)	(MM3)	(kbbl)						
Large (more than 300 rooms)  ETION 2. CONSUMPTION BY EN  Subsector  Hotels  Small (25 rooms or less)  Average (26-99 rooms)  Above average (100-299 rooms)  Large (more than 300 rooms)  Restaurants  ETION 3. MAJOR CONSUMERS  TABLE 3.1 ENERGY CONSUMPTION B'	Purchase (kWh)	Self - Generated (kWh)	(MM3)	(kbbl)  Occupation factor	KT Added Value					
Large (more than 300 rooms)  ETION 2. CONSUMPTION BY EN  Subsector  Hotels  Small (25 rooms or less)  Average (26-99 rooms)  Above average (100-299 rooms)  Large (more than 300 rooms)  Restaurants  ETION 3. MAJOR CONSUMERS  TABLE 3.1 ENERGY CONSUMPTION B'	Purchase (kWh)	Self - Generated (kWh)	(MM3)	(kbbl)	KT					
Large (more than 300 rooms)  ETION 2. CONSUMPTION BY EN  Subsector  Hotels  Small (25 rooms or less)  Average (26-99 rooms)  Above average (100-299 rooms)  Large (more than 300 rooms)  Restaurants  ETION 3. MAJOR CONSUMERS  TABLE 3.1 ENERGY CONSUMPTION B'	Purchase (kWh)	Self - Generated (kWh)	(MM3)	(kbbl)  Occupation factor	KT Added Value					
Large (more than 300 rooms)  ETION 2. CONSUMPTION BY EN  Subsector  Hotels  Small (25 rooms or less)  Average (26-99 rooms)  Above average (100-299 rooms)  Large (more than 300 rooms)  Restaurants  ETION 3. MAJOR CONSUMERS  TABLE 3.1 ENERGY CONSUMPTION B'	Purchase (kWh)	Self - Generated (kWh)	(MM3)	(kbbl)  Occupation factor	KT Added Value					
Large (more than 300 rooms)  ETION 2. CONSUMPTION BY EN  Subsector  Hotels  Small (25 rooms or less)  Average (26-99 rooms)  Above average (100-299 rooms)  Large (more than 300 rooms)  Restaurants  ETION 3. MAJOR CONSUMERS  TABLE 3.1 ENERGY CONSUMPTION B'	Purchase (kWh)	Self - Generated (kWh)	(MM3)	(kbbl)  Occupation factor	KT Added Value					
Large (more than 300 rooms)  ETION 2. CONSUMPTION BY EN  Subsector  Hotels  Small (25 rooms or less)  Average (26-99 rooms)  Above average (100-299 rooms)  Large (more than 300 rooms)  Restaurants  ETION 3. MAJOR CONSUMERS  TABLE 3.1 ENERGY CONSUMPTION B'	Purchase (kWh)	Self - Generated (kWh)	(MM3)	(kbbl)  Occupation factor	KT Added Value					
Large (more than 300 rooms)  ETION 2. CONSUMPTION BY EN  Subsector  Hotels  Small (25 rooms or less)  Average (26-99 rooms)  Above average (100-299 rooms)  Large (more than 300 rooms)  Restaurants  ETION 3. MAJOR CONSUMERS  TABLE 3.1 ENERGY CONSUMPTION B'	Purchase (kWh)	Self - Generated (kWh)	(MM3)	(kbbl)  Occupation factor	KT Added Value					
Large (more than 300 rooms)  ETION 2. CONSUMPTION BY EN  Subsector  Hotels  Small (25 rooms or less)  Average (26-99 rooms)  Above average (100-299 rooms)  Large (more than 300 rooms)  Restaurants  ETION 3. MAJOR CONSUMERS  TABLE 3.1 ENERGY CONSUMPTION B'	Purchase (kWh)	Self - Generated (kWh)	(MM3)	(kbbl)  Occupation factor	KT Added Value					
Large (more than 300 rooms)  ETION 2. CONSUMPTION BY EN  Subsector  Hotels  Small (25 rooms or less)  Average (26-99 rooms)  Above average (100-299 rooms)  Large (more than 300 rooms)  Restaurants  ETION 3. MAJOR CONSUMERS  TABLE 3.1 ENERGY CONSUMPTION B'	Purchase (kWh)	Self - Generated (kWh)	(MM3)	(kbbl)  Occupation factor	KT Added Value					
Large (more than 300 rooms)  ETION 2. CONSUMPTION BY EN  Subsector  Hotels  Small (25 rooms or less)  Average (26-99 rooms)  Above average (100-299 rooms)  Large (more than 300 rooms)  Restaurants  ETION 3. MAJOR CONSUMERS  TABLE 3.1 ENERGY CONSUMPTION B'	Purchase (kWh)	Self - Generated (kWh)	(MM3)	(kbbl)  Occupation factor	KT Added Value					
Large (more than 300 rooms)  THON 2. CONSUMPTION BY EN  Subsector  Hotels  Small (25 rooms or less)  Average (26-99 rooms)  Above average (100-299 rooms)  Large (more than 300 rooms)  Restaurants  THON 3. MAJOR CONSUMERS  TABLE 3.1 ENERGY CONSUMPTION B  HOTEL NAME	Purchase (kWh)  Y HOTEL Location	Self - Generated (kWh)	(MM3)	(kbbl)  Occupation factor	KT Added Value					
Large (more than 300 rooms)  ETION 2. CONSUMPTION BY EN  Subsector  Hotels  Small (25 rooms or less)  Average (26-99 rooms)  Above average (100-299 rooms)  Large (more than 300 rooms)  Restaurants  ETION 3. MAJOR CONSUMERS  TABLE 3.1 ENERGY CONSUMPTION B'	Purchase (kWh)  Y HOTEL Location	Self - Generated (kWh)	acity  Beds Units  Occupation	(kbbl)  Occupation factor	KT Added Value					
Large (more than 300 rooms)  PTION 2. CONSUMPTION BY EN  Subsector  Hotels  Small (25 rooms or less)  Average (26-99 rooms)  Above average (100-299 rooms)  Large (more than 300 rooms)  Restaurants  PTION 3. MAJOR CONSUMERS  TABLE 3.1 ENERGY CONSUMPTION B  HOTEL NAME	Purchase (kWh)  Y HOTEL Location	Self - Generated (kWh)  Cap Rooms Units	acity Beds Units	Occupation factor	KT Added Value					

RESTAURANT NAME	Location	Capacity	Occupation factor	Added Value
		Persons	%	EC\$
		-	-	



### Q8\_CCOH\_SAINTLUCIA\_2014

### **Hotels Survey**

#### Description

This questionnaire is designed to identify the main characteristics of the hotel major consumers. It is divided in two sections and one sheet as follows:

#### Addressed to

Hotels Major Consumers

#### Section 1 - General description of Hotel

Collect information about General Characteristics of the Hotel, by providing information on Number of Beds and Rooms, Occupation Factor of Beds and Rooms and Occupation Factor (annual % of bed, annual % of rooms) and Added Value.

### Section 2 - Energy Purchases

It gathers data about energy consumption by each Energy Sources (Electricity, LPG, Diesel Oil, Charcoal, Firewood, Fuel Oil and Others).

Sheet name	Sections included
CCO Hotels	Section 1 – General description of Hotel for years 2010, 2011 and 2012
CCO_Floters	Section 2 – Energy Purchases for years 2010, 2011 and 2012

### **SAINT LUCIA ENERGY BALANCE**



#### HOTELS SURVEY

HOTEL NAME:	
ADDRESS:	
CITY:	
CONTACT NAME:	
EMAIL:	
TELEPHONE:	
WEBSITE:	
DATE:	

Please fill in this survey as fully as you can. It should only take around 30 minutes. Your completed survey will be treated in confidence. Once completed please return the survey to siee@olade.org

#### SECTION 1: GENERAL INFORMATION

Year	Number of Beds	Number of Rooms	Occupation factor - beds	Occupation factor - rooms	Added Value
	Number	Number	%	%	EC\$
2010					
2011					
2012					

#### SECTION 2: ELECTRICITY AND FOSIL FUEL PURCHASES

F 8	Hali	2	010	201	11	20	112
Energy Sources	Unit	Amount	\$ Per Year	Amount	\$ Per Year	Amount	\$ Per Year
Firewood	KT						
LPG	(MM3)						
Diesel oil	(kbbl)						
Fuel oil	(kbbl)						
Charcoal	KT						
Electricity purchased	(kWh)						
Self-generated Electricity	(kWh)						
Others	( )						



### Q9\_CCOR\_SAINTLUCIA\_2014

### **Restaurants Survey**

#### Description

This questionnaire is designed to identify the main characteristics of the restaurants major consumers. It is divided in two sections and one sheet as follows:

#### Addressed to

Restaurants Major Consumers

#### Section 1 - General description of Restaurant

Collect information about General Characteristics of the establishment by providing information on Number of Invoices, Occupation Factor and Occupation Factor and Sales Value.

### Section 2 - Energy Purchases

It gathers data about energy consumption by each Energy Sources (Electricity, LPG, Diesel Oil, Charcoal, Firewood, Fuel Oil and Others).

Sheet name	Sections included
CCO_Restaurants	Section 1 – General description of Restaurant for years 2010 - 2012
CCO_Nestaurants	Section 2 – Energy Purchases for years 2010 - 2012

### **SAINT LUCIA ENERGY BALANCE**



#### RESTAURANT SURVEY

RESTAURANT NAME:	
ADDRESS:	
CITY:	
CONTACT NAME:	
EMAIL:	
TELEPHONE:	
WEBSITE:	
DATE:	

Please fill in this survey as fully as you can. It should only take around 30 minutes. Your completed survey will be treated in confidence. Once completed please return the survey to SIEE@olade.org

#### SECTION 1: GENERAL INFORMATION

Year	Number of invoices	Occupation factor	Sales value
	N°	Capacity used / Capacity installed (%)	\$
2010			
2011			
2012			

Capacity is the number of persons that can be simultaneously served

Occupation Factor is the anual average of the number of persons served divided by the Capacity Added Value is related to the annual sales value

#### SECTION 2: PURCHASES

F C	11-4	20	010	20	11	2012		
Energy Sources	Unit	Amount	\$ Per Year	Amount	\$ Per Year	Amount	\$ Per Year	
Firewood	kt							
LPG	(MM3)							
Diesel oil	(kbbl)							
Fuel oil	(kbbl)							
Charcoal	kt							
Electricity purchased	(kWh)							
Self-generated Electricity	(kWh)							
Others	()							

### 1.8. Agricultural Sector Survey

### Questionnaire 10 CCOR\_SAINTLUCIA\_2014



### Q10\_CRW\_SAINTLUCIA\_2014

### **Characteristics of Agricultural Sector**

#### Description

The questionnaire is designed to identify the general characteristics of the Agricultural Sector. Data is collected annualy and expressed in physical units. It is divided in three sections and four sheets as follows:

#### Addressed to

Ministry of Agriculture, Fishing, Forestry and/or Environment or similar institutions

#### Section 1-

Collected Annual key variables include Added Value, Production, Number of Agricultural Production Facilities, Area Harvested and Level of Mechanization.

#### Section 2 - Consumption by Energy Sources

In accordance to agriculture categories (crops, livestocks, etc), the section compiles data by energy source: Electricity, Crude Oil, LPG, Kerosene, Gasoline, Diesel Oil, Fuel Oil, Coke, Charcoal and Firewood.

#### Section 3 - Characterization of the Level of Mechanization

The Information of this section includes the Characterization of Level of Mechanization

Sheet name	Sections included
CRW_General	General information of the reporting unit
	Section 1. General Characteristics of Agricultural Sector of year 2010
CRW_2010	Section 2. Consumption by Energy Sources of year 2010
	Section 3. Characterization of the Level of Mechanization of year 2010
	Section 1. General Characteristics of Agricultural Sector of year 2011
CRW_2011	Section 2. Consumption by energy sources of year 2011
	Section 3. Characterization of the Level of Mechanization of year 2011
	Section 1. General Characteristics of Agricultural Sector of year 2012
CRW_2012	Section 2. Consumption by energy sources of year 2012
	Section 3. Characterization of the Level of Mechanization of year 2012

### CRW\_SURVEYSAINTLUCIA\_2014.xls

### SAINT LUCIA ENERGY BALANCE Organización Latinoamericana de Energía Larin American Latinoamericana de Energía Organización Latino-americani de Energía Organización Latino-Americana de Energía Organización Latino-Americana de Energía AGRICULTURE, FORESTRY AND FISHING SECTOR Date: (yyyy/mm/dd) 1. GENERAL INFORMATION name of the institution: contact person: e-mail: position: area: telephone office: fax: movil number: 2. LOCATION Please fill in this survey as fully information as you can. It should only take around 30 minutes. Your completed survey will be treated in confidence. Once completed please return the survey to SIEE@olade.org OBJECTIVE OF THIS SURVEY: TO ESTABLISH THE AGRICULTURE, FORESTRY AND FISHING SECTOR ENERGY USES AND CONSUMPTIONS FOR YEARS 2010,

ILTURE, FORESTRY AND FIS	LANCE HING SECTOR								40	olac	de	nganiración Latinoamerica nin American Energy Orga ganisation Latino-america nganização Latino-America	ria de Energia anizazion alne d'Energie una de Energia
0													
the institution: 0													
trie institution.									-				
0				parish	0								
fill in this survey as fully in return the survey to SIEE		It should only ta	ake around 30 r	ninutes. Your cor	mpleted survey	will be treated	in confidence. Or	nce completed	]				
O ON 1. GENERAL CHARA	CTERISTICS OF AGE	RICULTURAL SI	ECTOR										
									T.D. E		05 5101 1110		
Subsector	Added Value	Produ	uction	Agricultural Production Facilities	Waste to Energy	Area Harvested	Level of Mechanization		TABLE 1.2 CHAI Subsector	RACTERIZATION	Added Value	Processed Fish	
	EC\$	Amount	Units	Number	Tons	Km2	%				EC\$	Tons	1
Agriculture									Fishing				1
Crops													_
Bananas													
Other Crops													
Crop 1													
Crop 2 Crop 3													
Crop 4		ļ			1								
Livestock			-										
TABLE 2.1 CHARACTER Subsector	IZATION OF ENERGY CO	NSUMPTION IN AG	RICULTURE SEC	TOR BY ENERGY S									
				Ciude Oil	LPG	Kerosene	Gasoline	Diesel Oil	Fuel Oil	Coke	Charcoal	Firewood	Othe
1		Purchase	Self-Generation	Cidde Oil	LPG	Kerosene	Gasoline	Diesel Oil	Fuel Oil	Coke	Charcoal	Firewood	Othe
		Purchase (MWh)	Self-Generation (MWh)	(kbbl)	(MM3)	Kerosene (kbbl)	Gasoline (kbbl)	Diesel Oil (kbbl)	Fuel Oil (kbbl)	Coke (KT)	Charcoal (KT)	Firewood (KT)	Othe
Agriculture													Othe
Crops													Othe
Crops Bananas													Othe
Crops Bananas Other Crops													Othe
Crops Bananas Other Crops Crop 1													Othe (
Crops Bananas Other Crops Crop 1 Crop 2													Othe
Crops Bananas Other Crops Crop 1 Crop 2 Crop 3													Othe
Crops  Bananas  Other Crops  Crop 1  Crop 2  Crop 3  Crop 4													Othe (
Crops Bananas Other Crops Crop 1 Crop 2 Crop 3													Othe
Crops Bananas Other Crops Crop 1 Crop 2 Crop 3 Crop 4 Livestock	IZATION OF ENERGY CO	(MWh)	(MWh)	(kbbl)	(MM3)								Othe
Crops Bananas Other Crops Crop 1 Crop 2 Crop 3 Crop 4 Livestock	IZATION OF ENERGY CO	(MWh)	(MWh)	(kbbl)	(MM3)								Othe
Crops Bananas Other Crops Crop 1 Crop 2 Crop 3 Crop 4 Livestock  TABLE 2.2 CHARACTER	IZATION OF ENERGY CO	(MWh)	(MWh)	(kbbl)  Y ENERGY SOURCE  Diesel Oil	(MM3)	(kbbl)  Others							Othe
Crops Bananas Other Crops Crop 1 Crop 2 Crop 3 Crop 3 Crop 4 Livestock  TABLE 2.2 CHARACTER Subsector	IZATION OF ENERGY COL	(MWh)	(MWh)	(kbbl)  (kbbl)	(MM3)	(kbbl)							(
Crops Bananas Other Crops Crop 1 Crop 2 Crop 3 Crop 4 Livestock  TABLE 2.2 CHARACTER	IZATION OF ENERGY CO	(MWh)	(MWh)	(kbbl)  Y ENERGY SOURCE  Diesel Oil	(MM3)	(kbbl)  Others							Othi
Crops Bananas Other Crops Crop 1 Crop 2 Crop 2 Crop 3 Crop 4 Livestock TABLE 22 CHARACTER Subsector		(MWh)	(MWh)  SHING SECTOR B  Gasoline  (kbbl)	(kbbl)  Y ENERGY SOURCE  Diesel Oil	(MM3)	(kbbl)  Others							Othe
Crops Bananas Other Crops Crop 1 Crop 2 Crop 3 Crop 3 Crop 4 Livestock  TABLE 2.2 CHARACTER Subsector		(MWh)	(MWh)  SHING SECTOR B  Gasoline  (kbbl)	(kbbl)  Y ENERGY SOURCE  Diesel Oil	(MM3)	(kbbl)  Others							Othe
Crops Bananas Other Crops Crop 1 Crop 2 Crop 3 Crop 4 Livestock TABLE 22 CHARACTER Subsector Fishing ON 3. CHARACTERIZATI TABLE 3.1 CHARACTERIZATI TABLE 3.1 CHARACTERIZATI		(MWh)  NSLMPTICN IN FIST Total  F MECHANIZA	(MWh)  BHING SECTOR B  Gasoline (kbbl)	(kbbi)  y ENERGY SOURCE  Diesel Oil (kbbi)	(MM3)	(kbbl)  Others	(Abbi)	(kbbl)	(kbbi)				Othe
Crops Bananas Other Crops Crop 1 Crop 2 Crop 3 Crop 4 Livestock  TABLE 2.2 CHAPACTER Subsector  Fishing ON 3. CHARACTERIZATI	ON OF THE LEVEL C	(MWh)  SSUMPTION IN FIS  TOTAL	(MWh)  CHAIN SECTOR B  Gasoline  (kbbl)  TTON	(KBbI)  Y ENERGY SOURCE  Diesel Oil (KBbI)	(MM3)  Electricity  kWh	(kbbl)  Others  ()	(kbb)	(kbbi)	(kbbi)				
Crops Bananas Other Crops Crop 1 Crop 2 Crop 3 Crop 4 Livestock TABLE 22 CHARACTER Subsector Fishing ON 3. CHARACTERIZATI TABLE 3.1 CHARACTERIZATI TABLE 3.1 CHARACTERIZATI	ON OF THE LEVEL C	(MWh)  SSLMPTRON IN FIS  Total  F MECHANIZATIO  General	(MWh)  (MWh)  HNG SECTOR 8  Gasoline (kbbl)  TION  N  Irric Electricity	(kbbi)  Y ENERGY SOURCE OII  (kbbi)  Quality (kbbi)	(MM3)  E Electricity  kWh  Trai	(kbbl)  Others  Curry  Diesel Oil	(kbb)  (kbb)  Harvester Diesel Oil	(kbbl)  Fumly Acrial	(kbbl)				Othe
Crops Bananas Other Crops Crop 1 Crop 2 Crop 2 Crop 3 Crop 4 Livestock TABLE 2.2 CHARACTER Subsector Fishing ON 3. CHARACTERIZATI TABLE 3.1 CHARACTER Subsector	ON OF THE LEVEL C	(MWh)  NSLMPTICN IN FIST Total  F MECHANIZA	(MWh)  CHAIN SECTOR B  Gasoline  (kbbl)  TTON	(KBbI)  Y ENERGY SOURCE  Diesel Oil (KBbI)	(MM3)  Electricity  kWh	(kbbl)  Others  ()	(kbb)	(kbbi)	(kbbi)				Othe
Crops Bananas Other Crops Crop 1 Crop 2 Crop 3 Crop 4 Livestock TABLE 2.2 CHAPACTER Subsector Fishing ON 3. CHARACTERIZATII TABLE 3.1 CHAPACTER Subsector Agriculture	ON OF THE LEVEL C	(MWh)  SSLMPTRON IN FIS  Total  F MECHANIZATIO  General	(MWh)  (MWh)  HNG SECTOR 8  Gasoline (kbbl)  TION  N  Irric Electricity	(kbbi)  Y ENERGY SOURCE OII  (kbbi)  Quality (kbbi)	(MM3)  E Electricity  kWh  Trai	(kbbl)  Others  Curry  Diesel Oil	(kbb)  (kbb)  Harvester Diesel Oil	(kbbl)  Fumly Acrial	(kbbl)				Othe
Crops Bananas Other Crops Crop 1 Crop 2 Crop 2 Crop 3 Crop 4 Livestock TABLE 22 CHARACTER Subsector Fishing TABLE 3.1 CHARACTER Subsector  TABLE 3.1 CHARACTER Subsector  Agriculture Crops	ON OF THE LEVEL C	(MWh)  SSLMPTRON IN FIS  Total  F MECHANIZATIO  General	(MWh)  (MWh)  HNG SECTOR 8  Gasoline (kbbl)  TION  N  Irri Electricity	(kbbi)  Y ENERGY SOURCE OII  (kbbi)  Quality (kbbi)	(MM3)  E Electricity  kWh  Trai	(kbbl)  Others  Curry  Diesel Oil	(kbb)  (kbb)  Harvester Diesel Oil	(kbbl)  Fumly Acrial	(kbbl)				Othe
Crops Bananas Other Crops Crop 1 Crop 2 Crop 2 Crop 3 Crop 4 Livestock  TABLE 2.2 CHAPACTER Subsector  Fishing ON 3. CHARACTERIZATI TABLE 3.1 CHAPACTER Subsector  Agriculture Crops Bananas	ON OF THE LEVEL C	(MWh)  SSLMPTRON IN FIS  Total  F MECHANIZATIO  General	(MWh)  (MWh)  HNG SECTOR 8  Gasoline (kbbl)  TION  N  Irri Electricity	(kbbi)  Y ENERGY SOURCE OII  (kbbi)  Quality (kbbi)	(MM3)  E Electricity  kWh  Trai	(kbbl)  Others  Curry  Diesel Oil	(kbb)  (kbb)  Harvester Diesel Oil	(kbbl)  Fumly Acrial	(kbbl)				Other
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Crops Bannas Other Crops Crop 1 Crop 2 Crop 2 Crop 3 Crop 4 Livestock TABLE 2.2 CHAPACTER Subsector Fishing ON 3. CHARACTERIZATI TABLE 3.1 CHAPACTER Subsector Agriculture Crops Bannasa Other Crops Crop 1	ON OF THE LEVEL C	(MWh)  SSLMPTRON IN FIS  Total  F MECHANIZATIO  General	(MWh)  (MWh)  HNG SECTOR 8  Gasoline (kbbl)  TION  N  Irri Electricity	(kbbi)  Y ENERGY SOURCE OII  (kbbi)  Quality (kbbi)	(MM3)  E Electricity  kWh  Trai	(kbbl)  Others  Curry  Diesel Oil	(kbb)  (kbb)  Harvester Diesel Oil	(kbbl)  Fumly Acrial	(kbbl)				Other
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Crops Bananas Other Crops Crop 1 Crop 2 Crop 2 Crop 3 Crop 4 Livestock TABLE 2.2 CHARACTER Subsector Fishing ON 3. CHARACTERIZATI TABLE 3.1 CHARACTER Subsector  Agriculture Crops Bananas Other Crops Crop 1 Crop 2	ON OF THE LEVEL C	(MWh)  SSLMPTRON IN FIS  Total  F MECHANIZATIO  General	(MWh)  (MWh)  HNG SECTOR 8  Gasoline (kbbl)  TION  N  Irri Electricity	(kbbi)  Y ENERGY SOURCE OII  (kbbi)  gation  Diesel Oil	(MM3)  E Electricity  kWh  Trai	(kbbl)  Others  Curry  Diesel Oil	(kbb)  (kbb)  Harvester Diesel Oil	(kbbl)  Fumly Acrial	(kbbl)				Othe
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### 1.9. National Variables Survey

## Questionnaire 11 NV\_SAINTLUCIA\_2014



### Q11\_NV\_SAINTLUCIA\_2014

### **National Variables**

#### Description

The questionnaire is designed to identify Socio - Economic and Demographic conditions. Data is collected annualy. It is divided in five sheets as follows:

#### Addressed to

Ministry of Financie, Central Bank, National estatistical office or similar.

#### Sheet 1. GENERAL

Collect general characteristics of the institution in charge of providing the information.

#### **Sheet 2. DEMOGRAPHIC**

Collect data from the last two censuses, about: Population and Households.

#### Sheet 3. ECONOMY

Gathered information correspond to macroeconomic variables.

### Sheet 4. TRANSPORT

Data collection is about main transport variables: fleet by year 2010, 2011 and 2012.

#### **Sheet 5. COMMERCIAL**

Compile data about commercial sector including number of establishements and employees of hotels, restaurants, among others.

Sheet name	Sections included
GENERAL	General information
	Section 1. Characteristics of Population and Information Unit
DEMOGRAPHIC	Section 2. Consumption of Energy Sources (Cooking and Lighting)
	Section 3. Equipements
ECONOMY	Section 1. National Macroeconomic Variables
TRANSPORT	Section 1. General Charcateristics
COMMERCIAL	Section 1. General Information of Commercial Sector
COMMERCIAL	Section 2. Consumption of Energy Sources

IONAL VARIAB	LANCE BLES			40	lac		Organización Latinoamericana d Latin American Energy Organiza Organisation Latino-americaine Organização Latino-Americana o
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EE@olade.org	vey as fully information as		,	nutes. Your completed surve	y will be treated in co	nfidence. Once co	ompleted please return the s
711014 1. 0116	aracteristics of Fop	alation and im	ormation orm				
TABLE 1. POP		11-1	D	TABLE 3. INFOR			North and
Census	Total population	Urban population	Rural population		Households	Household size	Number of electrified
Year				Year			households
Last				Last			
					ļ.		
TION 2. Cor	nsumption of Energ	y Sources					
2.1 COOKIN	NG .						
Year				Last			
TABLE 4.1 HO Energy	USING DISTRIBUTION B	Y COOKING ENER Rural area	RGY SOURCE	TABLE 4.2 HOUS Energy	Urban area	BY COOKING EN Rural area	NERGY SOURCE
Source	Olbali alea	nuiai aiea		Source	Olbali alea	nuiaiaica	
	%	%			%	%	1
LPG				LPG			
Kerosene				Kerosene			
Charcoal				Charcoal			
Electricity				Electricity			1
Firewood				Firewood			-
Others				Others			
Total	-	_		Total	_	_	†
			l				1
	NG						
2.2 LIGHTIN				Last			
	housing						
Year	housing	Y LIGHTING ENER	3GY SOURCE		SING DISTRIBUTION	BY LIGHTING EN	JERGY SOURCE
Year	housing NUSING DISTRIBUTION B Urban area	Y LIGHTING ENER	RGY SOURCE		SING DISTRIBUTION Urban area	BY LIGHTING EN Rural area	IERGY SOURCE
Year TABLE 5.1 HO	USING DISTRIBUTION B		RGY SOURCE	TABLE 5.2 HOUS			IERGY SOURCE
Year TABLE 5.1 HO	USING DISTRIBUTION B Urban area	Rural area	RGY SOURCE	TABLE 5.2 HOUS	Urban area	Rural area	IERGY SOURCE
Year TABLE 5.1 HO Energy Source	USING DISTRIBUTION B Urban area	Rural area	RGY SOURCE	TABLE 5.2 HOUS Energy Source	Urban area	Rural area	ERGY SOURCE
YearTABLE 5.1 HO Energy Source Electricity	USING DISTRIBUTION B Urban area	Rural area	RGY SOURCE	TABLE 5.2 HOUSE Energy Source	Urban area	Rural area	IERGY SOURCE
YearTABLE 5.1 HO Energy Source Electricity Kerosene	USING DISTRIBUTION B Urban area	Rural area	RGY SOURCE	Energy Source Electricity Kerosene	Urban area	Rural area	ERGY SOURCE
YearTABLE 5.1 HO Energy Source Electricity Kerosene Candles	USING DISTRIBUTION B Urban area	Rural area	RGY SOURCE	Energy Source  Electricity Kerosene Candles	Urban area	Rural area	ERGY SOURCE
Year	USING DISTRIBUTION B Urban area	Rural area	RGY SOURCE	Energy Source Electricity Kerosene Candles Firewood	Urban area	Rural area	ERGY SOURCE
Year	USING DISTRIBUTION B Urban area	Rural area	RGY SOURCE	Energy Source  Electricity Kerosene Candles Firewood Charcoal	Urban area	Rural area	ERGY SOURCE
Year	USING DISTRIBUTION B Urban area %	Rural area	RGY SOURCE	Energy Source  Electricity Kerosene Candles Firewood Charcoal Others	Wrban area	Rural area	ERGY SOURCE
YearTABLE 5.1 HO Energy Source Electricity Kerosene Candles Firewood Charcoal Others Total	SUSING DISTRIBUTION B Urban area %	Rural area	RGY SOURCE	Energy Source  Electricity Kerosene Candles Firewood Charcoal Others	Wrban area	Rural area	ERGY SOURCE
Year	SUSING DISTRIBUTION B Urban area %	Rural area	RIGY SOURCE	Energy Source  Electricity Kerosene Candles Firewood Charcoal Others	Wrban area	Rural area	ERGY SOURCE
Year	SUSING DISTRIBUTION B Urban area %	Rural area	RGY SOURCE	Energy Source  Electricity Kerosene Candles Firewood Charcoal Others Total	Wrban area	Rural area	ERGY SOURCE
Year	WSING DISTRIBUTION B Urban area %	Rural area		Electricity Kerosene Candles Firewood Charcoal Others Total	Wrban area	Rural area	
YearTABLE 5.1 HO Energy Source Electricity Kerosene Candles Firewood Charcoal Others Total  CTION 3. EQ YearTABLE 6.1 HO	WSING DISTRIBUTION B Urban area %  %  UIPMENTS	Rural area %	DUIPMENTS	Energy Source  Electricity Kerosene Candles Firewood Charcoal Others Total  Last	Urban area %	Rural area %	EQUIPMENTS
YearTABLE 5.1 HO Energy Source Electricity Kerosene Candles Firewood Charcoal Others Total  CTION 3. EQ YearTABLE 6.1 HO	WSING DISTRIBUTION B Urban area %	Rural area		Energy Source  Electricity Kerosene Candles Firewood Charcoal Others Total  Last	Wrban area	Rural area	
YearTABLE 5.1 HO Energy Source Electricity Kerosene Candles Firewood Charcoal Others Total  TOTAL  TABLE 6.1 HO	WSING DISTRIBUTION B Urban area %  %  UIPMENTS	Y ACCESS TO EC	OUIPMENTS Rural	Energy Source  Electricity Kerosene Candles Firewood Charcoal Others Total  Last	Urban area %	Rural area %	EQUIPMENTS Rural
YearTABLE 5.1 HO Energy Source Electricity Kerosene Candles Firewood Charcoal Others Total  CTION 3. EQ YearTABLE 6.1 HO	WSING DISTRIBUTION B Urban area %  %  UIPMENTS	Y ACCESS TO EC Urban population	QUIPMENTS Rural population	Energy Source  Electricity Kerosene Candles Firewood Charcoal Others Total  Last	Urban area %	Rural area %  BY ACCESS TO Urban population	EQUIPMENTS Rural population
Year TABLE 5.1 HO Energy Source Electricity Kerosene Candles Firewood Charcoal Others Total  TOTAL  Year TABLE 6.1 HO E	WSING DISTRIBUTION B Urban area %  %  UIPMENTS	Y ACCESS TO EC Urban population	QUIPMENTS Rural population	TABLE 6.2 HOUSE	Urban area %	Rural area %  BY ACCESS TO Urban population	EQUIPMENTS Rural population
Year TABLE 5.1 HO Energy Source Electricity Kerosene Candles Firewood Charcoal Others Total  TOtal  Year TABLE 6.1 HO E	WSING DISTRIBUTION B Wrban area %  WIPMENTS  WUSING DISTRIBUTION B Equipment	Y ACCESS TO EC Urban population	QUIPMENTS Rural population	TABLE 5.2 HOUSE Energy Source  Electricity Kerosene Candles Firewood Charcoal Others Total  Last TABLE 6.2 HOUSE Equi	Urban area %	Rural area %  BY ACCESS TO Urban population	EQUIPMENTS Rural population
YearTABLE 5.1 HO Energy Source Electricity Kerosene Candles Firewood Charcoal Others Total  TOtal  Year TABLE 6.1 HO E	WSING DISTRIBUTION B Wrban area %  WIPMENTS  WUSING DISTRIBUTION B Equipment	Y ACCESS TO EC Urban population	QUIPMENTS Rural population	Energy Source  Electricity Kerosene Candles Firewood Charcoal Others Total  Last TABLE 6.2 HOUE Equ	Urban area %	Rural area %  BY ACCESS TO Urban population	EQUIPMENTS Rural population
YearTABLE 5.1 HO Energy Source Electricity Kerosene Candles Firewood Charcoal Others Total  CTION 3. EQ  Year TABLE 6.1 HO E  Fridge Refrigerated Air conditionir	WSING DISTRIBUTION B Wrban area %  WIPMENTS  WUSING DISTRIBUTION B Equipment	Y ACCESS TO EC Urban population	QUIPMENTS Rural population	Energy Source  Electricity Kerosene Candles Firewood Charcoal Others Total  Last  TABLE 6.2 HOUR  Fridge Refrigerated Air conditioning	Urban area %	Rural area %  BY ACCESS TO Urban population	EQUIPMENTS Rural population

TABLE 6.1 HOUSING DISTRIBUTION E Equipment	Urban	Rural
Equipment	population	population
	%	%
Fridge		
Refrigerated		
Air conditioning		
Fan		
Ovens		
Stove		
Water heaters		
Light bulb		
Iron		
Television		
Computer		
Vacuum cleaner		
Washing Machine		
Dryer		
Microwave		
Other electromechanical devices		
Total	-	-

Equipment	Urban	Rural
	population	population
	%	%
Fridge		
Refrigerated		
Air conditioning		
Fan		
Ovens		
Stove		
Water heaters		
Light bulb		
Iron		
Television		
Computer		
Vacuum cleaner		
Washing Machine		
Dryer		
Microwave		
Other electromechanical devices		
Total	_	_

# 

ABLA 1.2 HOTELS
-----------------

Description	2010	2011	2012	2010	2011	2012
		Number of room	3	Nu	mber of employe	es
Hotels						
Hotels						
Guest Houses						
Apartment/Cottages						

#### TABLA 1.2 RESTAURANTS

IABLA 1.2 RESTAURANTS							
Description		2010	2011	2012	2010	2011	2012
		Number of stablishments			Capacity (number of persons)		
Restaurants	Total						
Category 1							
Category 2							
Category 3							

TABLA 1.3 PUBLIC ADMIN AND SERVICES

Description	2010	2011	2012	2010	2011	2012
	Nu	Number of stablishments		Number of employees		
Public Admin, Defense & Compulsory SocSec						
Buildings						
Wholesale & Retail Trade						
Shopping centers						
Others						
Financial Intermediation						
Banks						
Insurance agency						
Real Estate, Renting and Business Activities						
Real Estate						
Business Services						
Education						
Schools						
Others						
Health and Social Work						
Hospitals						
Others						
Other Community, Social & Personal Services						
Buildings						

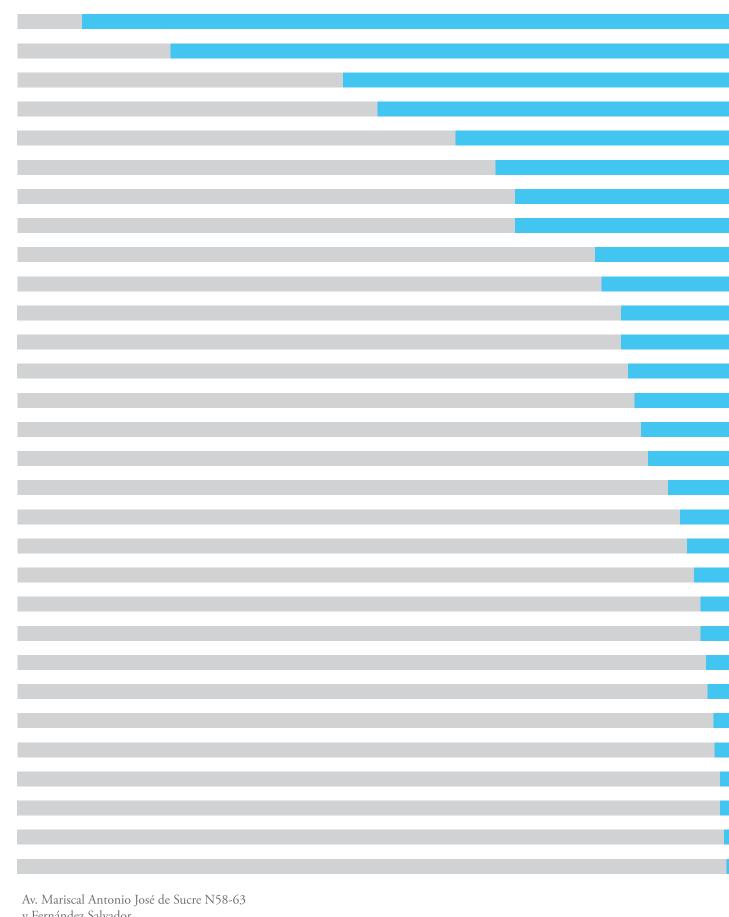
#### SECTION 2. CONSUMPTIONS OF ENERGY SOURCES

Subsector	Electricity	LPG	Kerosene	Gasoline	Diesel Oil	Fuel Oil	Charcoal	Firewood
	(kWh)	(MM3)	(kbbl)	(kbbl)	(kbbl)	(kbbl)	KT	KT
Hotels								
Hotels								
Guest Houses								
Apartment/Cottages								
Restaurants								
Category 1								
Category 2								
Category 3								
Public Admin, Defense & Compulsory SocSec								
Buildings								
Wholesale & Retail Trade								
Shopping centers								
Others								
Financial Intermediation								
Banks								
Insurance agency								
Real Estate, Renting and Business Activities								
Real Estate								
Business Services								
Education								
Schools								
Others								
Health and Social Work								
Hospitals								
Others								
Other Community, Social & Personal Services								
Buildings								

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