

Saint Vincent and the Grenadines



Energy Balances
2010 - 2012



Organización Latinoamericana de Energía
Latin American Energy Organization
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Organização Latino-Americana de Energia



Saint Vincent and the Grenadines Energy Balances (2010 - 2012)

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Saint Vincent and the Grenadines Energy Balances 2010 - 2012
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List of Acronyms

bbl	Barrel
boe	Barrel Oil Equivalent
kboe	Kilo Barrel of Oil Equivalent
tn	Tones
GW	Gigawatt
MW	Megawatt
kW	Kilowatt
kWh	Kilowatt hour
Ha	Hectare
GDP	Gross Domestic Product
USD	United States Dollar
EEZ	Exclusive Economic Zone
GHG	Greenhouse gas emissions
GTZ	German Agency for Technical Cooperation
CAF	Development Bank Of Latin America
CO ₂	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
CHL	CHL Consulting Co LTD
CIPPET	Caribbean Information Platform on Petroleum
CREDP	Caribbean Renewable Energy Development Program
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
HP	Horse Power
JF	Jet Fuel
LA&C	Latin American and the Caribbean
LPG	Liquefied Petroleum Gas
NEP	National Energy Policy
OAS	Organization of American States
OECS	Organization of Eastern Caribbean States
OLADE	Latin American Energy Organization
SOL	SOL Group
USAID	United States Agency for International Development
VINLEC	Saint Vincent Electricity Services Limited

Chapter I. Country Description, Socio-Economic and Energy sector

1. 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; 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 Vincent and the Grenadines 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 eight chapters: The first chapter deals with the country's general information that includes a description on geography, climate, socio-economic characteristics, and the overall of the energy sector. The chapter provides an overview of the concepts defined by the OLADE's Energy Balances Methodology. The third chapter contains the description of the data gathering process. The fourth chapter describes the technical visit to the country and data processing.

The fifth chapter provides the results on the Energy Balances that were elaborated for the periods of 2010, 2011 and 2012. The sixth chapter presents the country's Greenhouse Gases Emission Inventories (2010-2012) by following the technology approach. The seventh chapter shows economic and energy indicators built by using the energy balance results. The last chapter describes the final conclusions and recommendations on the Saint Vincent and the Grenadines Report. By the end of the eight chapters, more additional details can be found in the Annex.

2. 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 La Habana, 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 Vincent and the Grenadines is a multi-island state that receives almost 95% of the overall energy through imported oil products. The main Island Saint Vincent has an important potential of hydropower and some of the islands use small amounts of photovoltaic energy.

For the energy forecast process, Saint Vincent and the Grenadines needs to centralize all the energy information from each subsector. In that sense it is important to gather information and data from industries, residential sector, agriculture, fishing and mining, as well as the commercial and public services.

This accurate information will promote the energy planning process and will help the country to reshape its situation of heavily reliant on foreign oil. Supply, demand and transformation data is required to be gathered. Some other additional information such as socio-economic data, energy infrastructure, vehicle fleet, and census reports, among others, is also required to have a complete overall picture of the energy sector of Saint Vincent and the Grenadines.

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 Vincent and the Grenadines and CELAC's requirements.

3. Country description

3.1. General profile

Country	Saint Vincent and the Grenadines
Capital city	Kingstown
Head of State⁽¹⁾	Queen ELIZABETH II (since 6 February 1952); represented by Governor General Sir Fredrick Nathaniel BALLANTYNE (since 2 September 2002)
Head of Government	Honorable Dr. Ralph Gonsalves (since 2001)
Government Structure⁽¹⁾	The Parliament is a unicameral body with a 15 member elected House of Assembly and six appointed senators. The Governor General appoints senators, four on the advice of the Prime Minister and two on the advice of the Leader of the Opposition. The parliamentary term of office is 5 years, although the Prime Minister may call elections at any time.
Languages⁽¹⁾	English
Currency⁽¹⁾	Eastern Caribbean Dollar (EC\$)
Exchange rate (2014)⁽²⁾	USD 1: EC\$ 2.71
Economy	Tourism, Construction activities and Agriculture
Population (Census 2012)⁽³⁾	109,991
GDP (2013 EC\$M)⁽³⁾	1.673 (2013 est.)

Source: (1) Central Intelligence Agency, visited November 2014, <https://www.cia.gov/library/publications/the-world-factbook/geos/vc.html> (2) Eastern Caribbean Central Bank – ECCB (www.eccb-centralbank.org, web page visited July, 22nd 2014); (3) St Vincent and the Grenadines, POPULATION AND HOUSING CENSUS PRELIMINARY REPORT 2012, the Census Office, Central Planning Division, Ministry of Finance and Economic Planning. (4) GDP Estimates for the ECCU 2000 - 2015 UPDATED 12 February 2014.

The first inhabitants of the islands were the Arawaks and the indigenous people (Caribs). The last ones, constantly prevented European colonization on St. Vincent until the 18th century. Later on, the population included Africans that escaped from Barbados, Saint Lucia and Grenada. Then this ethnically diverse mixture ended with a new race called the Black Caribs.

In the 18th century, French arrived at the island in 1719 and started a lot of economic activities such as the plantation of coffee, tobacco, indigo, cotton, and sugar, which were worked by African slaves. Later on in 1763, St. Vincent was ceded to Britain, however the conflict between the British and the Black Caribs continued until 1796, when General, Sir Ralph Abercromby deported almost 5,000 Black Caribs to an island near Honduras, called Roatán,

One hundred years later, the slavery was abolished in 1834. That situation led to a new immigration process from the Portuguese in 1840 and also from East Indian workers that arrived between 1861 and 1880. Despite that abolition, conditions remained hard for most of the workers, mainly in the agriculture sector.

In 1877 the Crown Colony was installed in the country, followed by a Legislative Council in 1925. The most important accomplish was made in 1951, when the

universal adult suffrage was granted. The British had constantly tried to gain a unified government of most of the islands in the Eastern Caribbean. However that was not possible by that time, due that all the islands gathered together and formed the West Indies Federation that remained until 1962. St. Vincent became an Associate Statehood on October 27, 1969, gaining complete control over its internal affairs. Finally in 1979 the country gained its independence with a Referendum led by the Labour Party Administration headed by Robert Milton Cato (The Commonwealth.org, 2014)¹.

3.2. International profile

Relevant Memberships

Saint Vincent and the Grenadines is a Commonwealth member and a founding member of the Organization of Eastern Caribbean States (OECS). It is also a member of the Caribbean Community (CARICOM), the CARICOM Single Market and PetroCaribe. It is member of the World Trade Organization, the International Bank for Reconstruction and Development (IBRD), the International Monetary Fund (IMF) and the United Nations (UN). The country also has membership in the Association of Caribbean States (ACS) and the Organization of American States (OAS), the Community of States of Latin America and the Caribbean (CELAC), G-77 and the Alianza Bolivariana para los Pueblos de Nuestra América (ALBA).

Sources: St. Vincent and the Grenadines country profile, CIA World Fact book (visited on 28th August 2014)

3.3 Geography

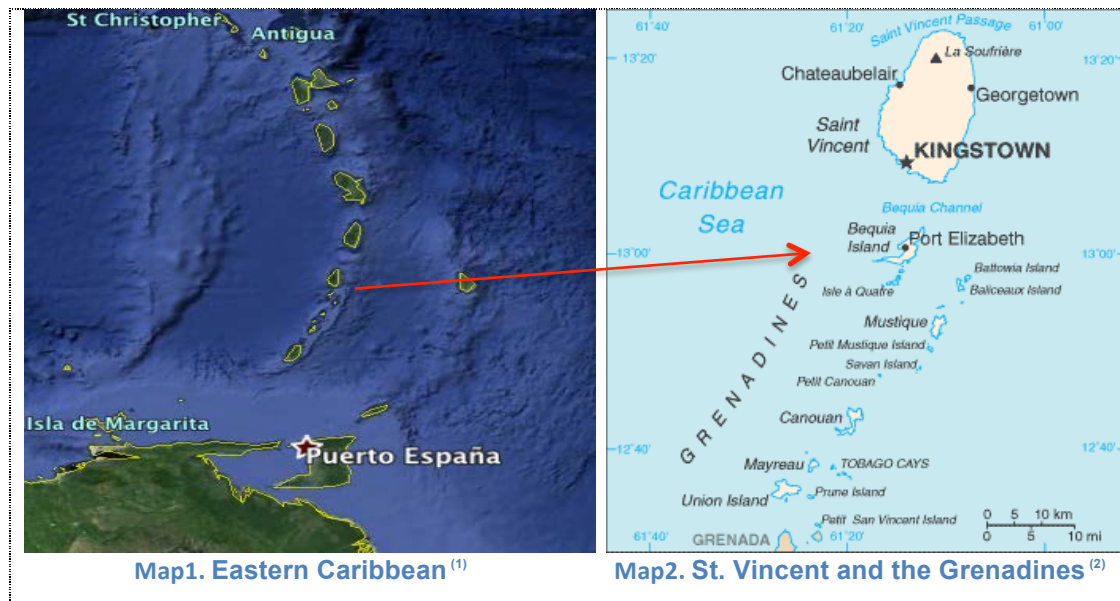
Region	Eastern Caribbean
Location	Caribbean, islands between the Caribbean Sea and North Atlantic Ocean, north of Trinidad and Tobago
Latitude	13° 15" N
Longitude	61° 12" W
Surface area	389 km ² (Saint Vincent 344 km ²)

¹ <http://thecommonwealth.org/our-member-countries/st-vincent-and-grenadines/history>

³ The study was led by several authors: Grímur Björnsson, Hjalmar Eysteinnsson, Haraldur Sigurdsson, Gestur Gíslason, Gunnar Örn Gunnarsson, Trent Philipp and Kenneth Mackeigan. The name of the project was St Vincent Geothermal Surface Exploration Project - Summary Report.

⁴ The construction of The Argyle International Airport was proposed in 2005, but the construction started in 2008. The deadline for the project is the year 2015, <http://www.svgiadc.com/images/ProjectUpdate/08-15-P19.pdf>

⁵ 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)



Sources: (1) Google earth (web page visited January, 2015) and (2) CIA World Fact Book (web page visited July, 22th 2014)

Saint Vincent and the Grenadines has an archipelagic geography formed by a chain of seven smaller island and twenty eight islets. The island of Saint Vincent, in the northern part of the islands, holds the capital city Kingstown. It also has the one of most active volcanoes in the Caribbean, La Soufriere.

The country is located in a hurricane's path that constantly hits the Caribbean islands. These geographical considerations have influenced the sense of living in the country, especially in the northern part of Saint Vincent where it became necessary to relocate an important percentage of population. (St Vincent and the Grenadines country poverty assessment, Living Conditions in St. Vincent and the Grenadines, CEPAL, 2008, pp.16 - 19)

Saint Vincent and the Grenadines marine space is over 70 times the land area. It has a territorial sea of 12 nautical miles and an Exclusive Economic Zone (EEZ) with a continental shelf of 200 nautical miles. The terrain of Saint Vincent and most of the Grenadines is mountainous with forests that cover between 25% and 30% of the country (Economic and Social Development Plan 2013-2025, pp. 22-23).

3.4 Climate

Saint Vincent and the Grenadines holds a tropical climate with little seasonal temperature variation and also a rainy season (May to November). However, in the past years there have been records of climate change, especially related to the rise of the sea level and the intensity of the hurricanes (St Vincent and the Grenadines country poverty assessment, Living Conditions in St. Vincent and the Grenadines, CEPAL, 2008, pp. 16-19)

4. Socio-Economic Characteristics

4.1. General description

According to the 2013 United Nations Human Development Report ranking, St. Vincent and the Grenadines is considered as a country that maintains as High Human Development, placing it in the 91st position. During the last decade, 2001 to 2011, there have been revolutionary changes in areas such as education and health. The expenditure in those areas has consistently been a significant proportion of the national budget (United Nations Human Development Report, Saint Vincent and the Grenadines, 2014, pp.2).

Saint Vincent and the Grenadines' Economy relies mainly on tourism, related services and construction. These are the sectors that have become increasingly important as contributors to the country's Gross Domestic Product. For that reason, agriculture, which was the main activity, has been relegated, although it has not completely disappeared.

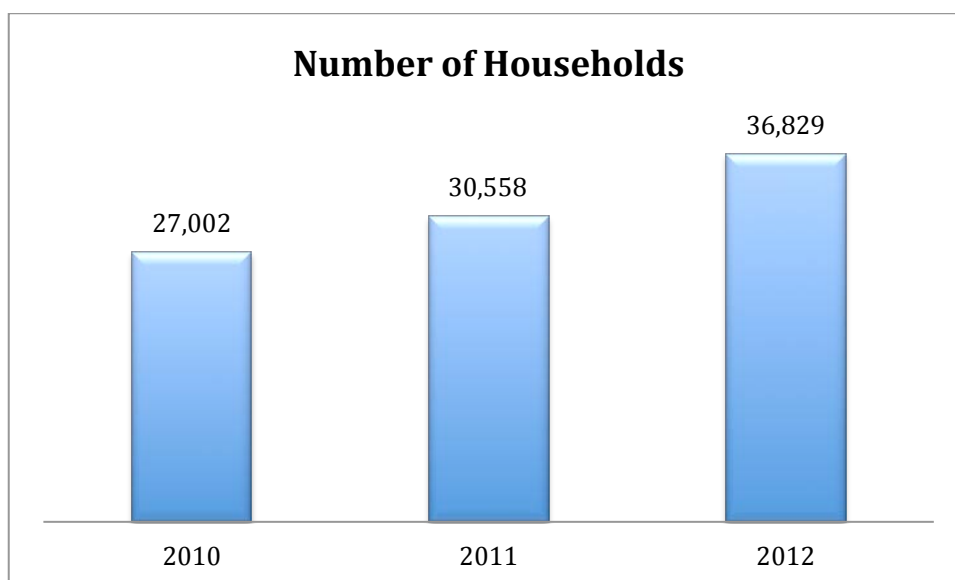
Because of the geographic characteristics of the country, commerce and trade activities take place mainly in Kingstown, the capital city. However, there have been important efforts in decentralize those activities to the rest of the islands. Despite Saint Vincent and the Grenadines has small domestic markets and also faced with the constant oscillation of climate change, the country has manage to constantly attract Foreign Direct Investment (National Report St. Vincent and the Grenadines, Ministry of Health Wellness and the Environment, 2013)

Current Macroeconomic results

From 2001 to 2008, the economy of St. Vincent and the Grenadines registered a real growth of 1.8 percent, with 2005 being the lowest (2.8%) and 2003 being the highest (7.6%). In that period, the positive performance of the telecommunications, construction, Government services, transport, hotels and restaurants influenced several peaks and fuelled the financial activities (Economic and Social Development Plan 2013-2025, pp. 31).

4.2. Residential

In 2012 the total population was 109,991 inhabitants, which is divided in 53,353 females and 55,835 males. The 2012 preliminary Census presents a 0.89% increase in the household population in comparison with the 2001 Housing Census. According to the 2012 Census, the household population reflects an annual increase of 81 persons per year between 2001 and 2012. (2012 Preliminary Population and Housing Census).



Graph 1: Number of Households

Source: 2012 Preliminary Population and Housing Census

In Saint Vincent, the main island, there is a population of 92,000 inhabitants, followed by some islands as Bequia, Union Island and Canouan. According to the Energy Action Plan, in the last decade the electricity consumption in the domestic sector has grown on an average of 5.4% per year.

Currently, the domestic sector pays a different rate: consumers using 50 units or less 42.50 cents/kWh, consumers using more than 50 units pay 50 cents/kWh. The minimum charge per month is \$5.00, comparing with the commercial, industrial and the street lightning (VINLEC web page official rates, 2014).

Number of Households (2011) ⁽¹⁾	36,829
Number of persons per Households (2011) ⁽¹⁾	3.0
Electricity consumption (GWh) (2008) ⁽²⁾	55,305

Table 1. Residential Summary – 2010 - 2011

Source: (1) 2012 Preliminary CENSUS REPORT Saint Vincent and the Grenadines (2) Energy Action Plan for St. Vincent and the Grenadines – First Edition 2010

4.3. Industry and Manufacturing

There is a small manufacturing sector in Saint Vincent and the Grenadines. According to the National Economic and Social Development Plan 2013 – 2015, the manufacturing sector has declined an average of 1.2 % annually, over the period 2001–2010. International competition and high production costs have created barriers for this sector's growth. However in 2012, the manufacturing sector has grown 2.0% (National Economic and Social Development Plan 2013 – 2015).

The constant investments of the Eastern Caribbean Group of Companies, St. Vincent Brewery, and East Caribbean Metals have been central for the growth of the manufacturing sector in Saint Vincent and the Grenadines. The government has

constantly struggled to gain the private sector participation over the manufacturing activities. This sector consists on several small enterprises, which has grown to medium - small enterprises in the last years.

Mainly, regional investors are promoting investments in the wholesale and retail trade and in the provision of services. Basically private investments are centered in the tourism sector and others (hotels, restaurants, construction, furniture-making, agro-processing, retail trade).

According to the Saint Vincent and the Grenadines – European Community Strategic Paper 2008 - 2013, in the country there are 6 licensed offshore banks, also 8,573 registered international business companies, 13 licensed offshore insurance companies and 55 mutual fund companies. (European Community Strategic Paper 2008 – 2013). Currently there is an average of 100 industries in the country (The Chamber of Commerce, interview, 2014)

Added Value (EC\$M) Constant (2012) ⁽¹⁾	79.83
Added Value as % of GDP ⁽¹⁾	5.00
Number of electricity consumers (2012) ⁽²⁾	98
Electricity consumption (GWh) (2012) ⁽³⁾	9.95

Table 2. Industrial Summary – 2012

Source: (1) ECCB, GDP Estimates for the ECCU 2000 - 2015 UPDATED 12 February 2014, (2) The Chamber of Commerce 2014, (3) Energy Balance 2012, OLADE

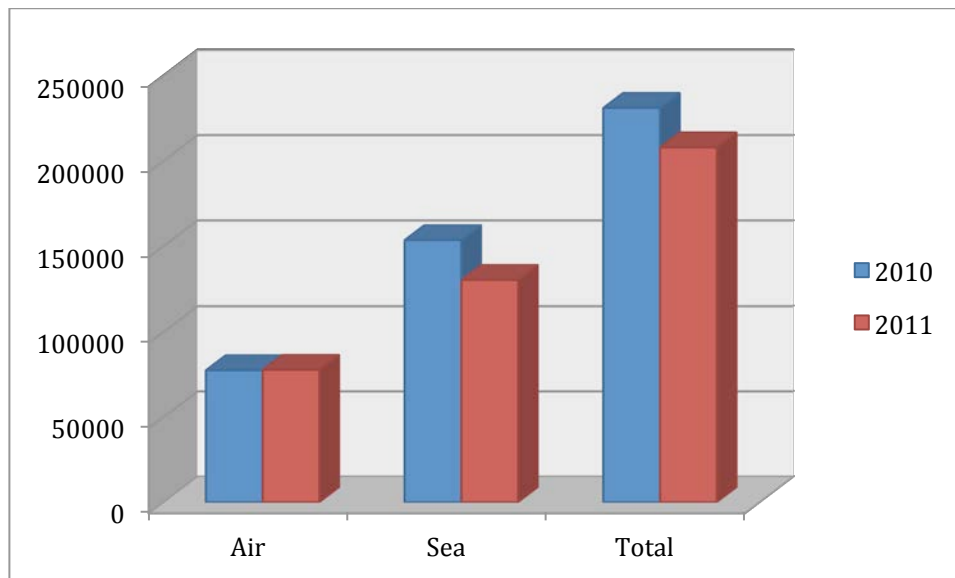
4.4. Tourism

Due to the geographical location of Saint Vincent and the Grenadines, the tourism sector is constantly threatened by global economic crisis and climate change. This sector is divided by the Hotels and Restaurants, which suffer a decline on tourists in 2001 caused by the impacts of the terrorist attacks in the United States. However during the period 2001 – 2010, the subsector grew 2.9%. (National Report St. Vincent and the Grenadines, Ministry of Health Wellness and the Environment, 2013, pp7)

In 2013, the total of visitors increased by 2.5% comparing to the year 2012, a total of 145,703 visitors arrived in Saint Vincent and the Grenadines. According to the Budget Address 2014, sea arrivals increased 7.7% in contrast with the air arrivals, which have declined in 4.9%. The sea arrivals are divided in Yacht visitors (0.5%) and cruise visitors (12.8%). Stay-over visitors account for the majority of visitors to our country (Budget Address 2014).

It is important to notice that, as on the main island, tourism is the main economic entry, in the rest of the islands is the same situation, even more important due to the lack of other activities. Therefore, the access to the energy in those islands, considering their remoteness, is difficult, also in terms of the electricity generation costs, mainly in Bequia, Canouan, Union and Mayreau.

According to the Ministry of Tourism in Saint Vincent and the Grenadines in 2010 there were 45 hotels; however in 2013 this number increased to 133. The number of beds in the total of hotels in 2010 was 1,527 and in 2013 they reached to 2,067 beds (Statistics Department survey, 2014).



Graph 2: Number of visitor by type of arrival

Source: Ministry of Tourism Saint Vincent and the Grenadines 2010-2011

In terms of the number of visitors, there has been a decrease between the years 2010 and 2011. As Graph 2 shows, in 2010 the total visitors that arrived by sea were 153,557 and in 2011 there were 130,190, this could be addressed to the international crises that directly affects tourism on the country.

4.5. Agriculture, Fishing and Mining

Agriculture is practiced mainly in St. Vincent, along with small other small practices for subsistence in the rest of the islands. According to the Caribbean Agricultural Research Institute, in 2009 agriculture contributed 10% of the Gross Domestic Product to the economy of St Vincent and the Grenadines and also, to 26% of the labor force. However In 2012, agriculture represented 6.77% of the Gross Domestic Product (CARDI annual report 2009).

Those changes are due to the loss of the trade preference agreement with the European Union, the damage caused by Hurricane Tomas in 2010 and also because of the growth of tourism chain activities. (Inter-American Development Bank, Private Sector Assessment Report for St. Vincent and the Grenadines, 2013).

Currently the country has become a net exporter of food. However, banana is still the main crop, followed by an increase in the cultivation of root crops such as cassava, eddoe, dasheen yam and sweet potato. (Caribbean Agricultural Research & Development Institute, production estimates for Permanent Crops, 2012).

It is important to highlight that in the past decade the Government of Saint Vincent and the Grenadines has promoted different trade regimes, which have resulted in a dramatic change of the country's land use. Those changes occur along with a firm effort to protect biodiversity, reducing land degradation and greenhouse gas emissions (GHG).

Despite the reduction in agriculture activities, there have been some efforts in investigation about producing Biomass energy. In 2009 the Competence Center for Climate & Energy GFA ENVEST in collaboration with the Caribbean Bioenergy Technology Ltd. and the Government, has done a study on the potential biomass

capacity, using the different biomass residues and also the possibility to build these plants dedicated to electricity generation.

The study concluded that there are some prospects in biogas production, using the banana trunks and also using the rest of the agro and municipal waste. According to the study, Saint Vincent and the Grenadines could have a potential of 3-4 MW using a biogas plant (Energy Action Plan 2010).

As stated in the Economic and Social Development Plan 2013 - 2025, in a short term period the Ministry of Agriculture Forestry and Fishery is actually working in that matter, seeking for independent funding partners for implement a biogas plant (Economic and Social Development Plan 2013-2020, Saint Vincent and the Grenadines)

Added Value Agriculture+Fishing+Mining (EC\$M) Current (2012) ⁽¹⁾	117.25
Added Value as % of GDP Agriculture+Fishing+Mining (2012) ⁽¹⁾	7.34%
Agriculture main products (2013) ⁽²⁾	Bananas, coconuts, sweet potatoes, spices; small numbers of cattle, sheep, pigs, goats; fish
Agricultural area (ha)(2013) ⁽³⁾	1,000

Table 3. Agriculture, Fishing and Mining Summary

Source: (1) ECCB, GDP Estimates for the ECCU 2000 - 2015 UPDATED 12 February 2014; (2) National Economic and Social Development Plan 2013-2025; (3) FAO, Saint Vincent and the Grenadines Country profile, visited on August, 2014, <http://www.fao.org/countryprofiles/index/en/?iso3=VCT>

On the other hand, fisheries are proceeding according to the Food and Agriculture Organization (FAO) code of conduct, to promote responsible fishing so that it can be a sustainable activity; there is a constant effort to meet the International Code of Conduct in terms of Fishing practices. However, illegal fishing is not totally eliminated, it still occurs into international waters, the National Coast Guard constantly acts over these problem.

According to the Country Profile, from the Food and Agricultural Organization of the United Nations, in 2002 the fishing fleet consists of approximately 600 vessels, which are powered by outboard engines of 14 to 200 HP, and exploit both oceanic and inshore areas. The study presents statistics that indicate that 59 of these vessels are less that 12 foot; 274 are between 12 and 20 foot; 175 are between 20 and 30 foot; 10 between 30 and 40 foot; and 8 between 40 and 66 foot. Pirogues, Bow and Stern and Double-Enders, constructed mainly from wood or fiberglass, dominate the fishing fleet (FAO Fisheries country Profile 2002, St. Vincent and the Grenadines).

In 2012 there were 737 registered ships, 30 are powered by a 90 – 190 HP inboard diesel engine, 230 are powered by one or two 15 – 115 HP gasoline engines, 390 are powered by one or two 40 – 85 HP gasoline engine, 69 are powered by one 6 - 48 HP gasoline engine, the other 18 are represented by canoes, rowboats, etc. (FAO Fisheries country Profile 2002, St. Vincent and the Grenadines)

Finally, mining is a small sector of the economy and it basically takes place in two main activities: volcanic deposits of igneous rocks which are used in construction industry, and the mining of beach sand which has lately threatened the coast and makes it vulnerable to storms.

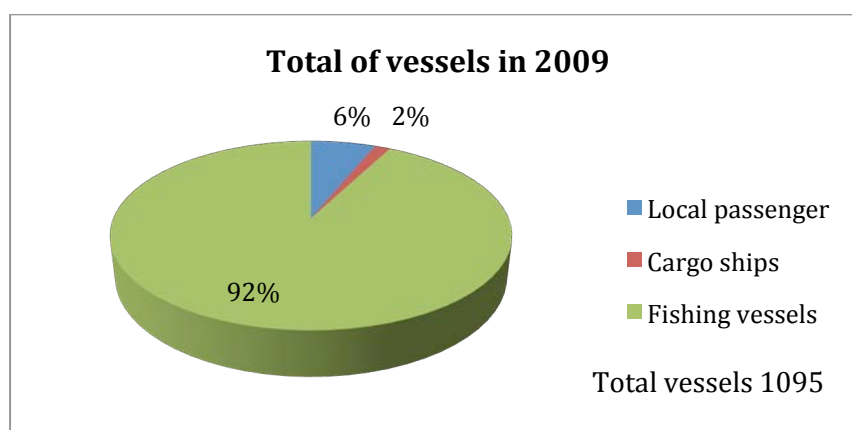
4.6. Transport

In 2009 there were more than 25,382 registered vehicles. The public transport is operated by a significant amount of mini vans, but the largest amount of the vehicles comprises of privately owned sedans and SUVs. In 2013, there were registered 27,331 vehicles; most of the vehicles still are privately owned sedans and SUVs (Inland Revenue, 2014).

According to the National Energy Policy, the age of the vehicle fleet is high; this situation contributes to higher fuel consumption, combined with the amount of emissions and regular engine maintenance needed.

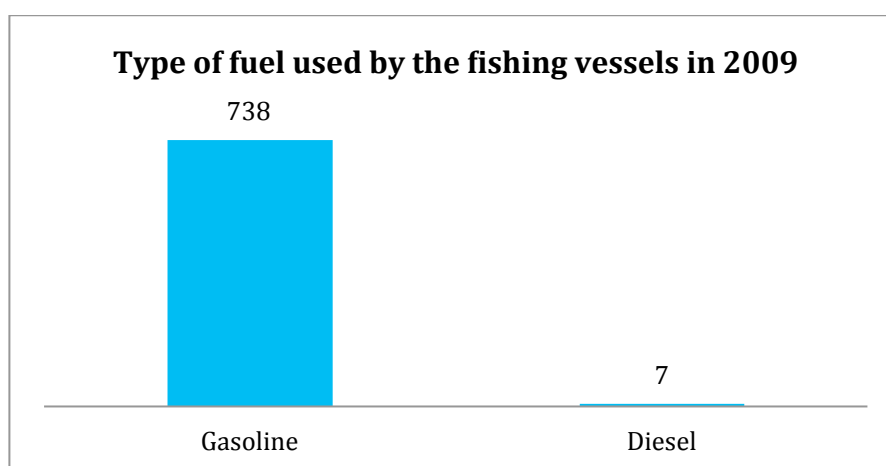
On the other hand, the sea transportation is also a significant consumer sector. In contrast with the 2002 figures presented in the Agriculture and Fishing section, at the end of 2009, there were registered 1,095 vessels: 50 designated to local passenger ships, 12 cargo ships, 745 are fishing vessels (738 with gasoline engines, 7 with diesel engines), there was also 200 private vessels registered (15 with diesel engines) and 100 small commercial yachts (Fisheries Division, Maritime Association 2009).

However, in 2014, according to the Maritime Administration and the Fisheries Division, Saint Vincent and the Grenadines has registered a quantity of 800 vessels approximately² (Fisheries Division, Maritime Association 2009).



Graph 3: Total vessels by type, 2009

Source: Ministry of Agriculture and Fishing, Saint Vincent and the Grenadines, 2009



Graph 4: Total vessels by type, 2009

Source: Ministry of Agriculture and Fishing, Saint Vincent and the Grenadines, 2009

Transportation sector is one of the major consumers of the imported petroleum products. According to the Government's National Energy Policy of March 2009, transport sector consumes mainly gasoline, diesel and kerosene. In 2008, 9.7 million gallons of Diesel oil and 6.4 million gallons of Gasoline were spent in the country (National Energy Policy, 2009).

According to the 2012 figures from the Eastern Caribbean Bank, transportation sector and its participation on the Gross domestic Product in Saint Vincent and the Grenadines is divided as follows.

Transport and Storage (GDP 2012) (EC\$M)	146.78
Road Transport (GDP 2012) (EC\$M)	110.68
Sea Transport (GDP 2012) (EC\$M)	13.61
Air Transport (GDP 2012) (EC\$M)	6.94
Total	293.56

Table 4. 2012 Transport Sector GDP In Current Prices (EC\$M) 2012

Source: ECCB, GDP Estimates for 2000 - 2015 UPDATED September 2014

4.7. Construction

This sector is related with public and private projects, including tourism related constructions as well as highway development, airport and others. In the period 2001-2010, construction sector has growth 4.4%, however, as well as the other sectors; in 2008 it has experienced a decline (10.4%) due to the economic global crisis, which affected the private investments (National Economic and Social Development Plan 2013-2025).

Since 2007, construction activities showed a major positive growth, over 13%, this improvement was related to major public and private projects as the Windward Highway Rehabilitation project, the upgrading of the Arnos Vale Playing Field, Canouan Airport Extension and private tourism-related projects (National Economic and Social Development Plan 2013-2025).

Added Value (EC\$M) Current (2012)	134.59
Added Value as % of GDP(2012)	8.43

Table 5. Constructions and Others Summary – 2012

Source: ECCB, GDP Estimates for the ECCU 2000 - 2015 UPDATED 12 February 2014

5. Energy sector

Since 2006 the Government of Saint Vincent and the Grenadines has pursued strengthening the energy sector. In that year, the Prime Minister took over the energy portfolio. It is important to notice that the Prime Minister is also commanding the Ministry of Finance; therefore the Government has established new linked structures that allow reshaping the energy sector and most importantly, formulating decisions in an effective approach.

A National Energy Committee was also established in 2006, including the main stakeholders from other ministries and state dependent institutions as well. The goal was to advise the Government on energy matters throughout the State. In 2008, an Energy Unit was established into the Prime Minister's Office with a mandate to assist with the formulation and implementation of energy policy issues, particularly in the areas of renewable energy and energy efficiency.

Later on, in February 2009 the Cabinet of Ministers of the Government adopted The National Energy Policy. This document presents the guiding principles upon which the Government has set up to work for the future. Basically, the policy promotes the reduction of the dependence on import of fossil fuels, the stability and possible reduction of the energy consumption per capita in the medium and long term, the reduction of the dependence on import of energy through continued and expanded exploitation of indigenous resources and improvement of energy efficiency along with conservation of energy use (National Energy Policy SVG March 2009).

In the last years the Government in collaboration with the state-owned utility VINLEC and some NGO's has started the process of exploring the development of new sources of energy, including geothermal, wind, solar and additional hydropower resources. There is significant progress in that field, comparing with past years. The most significant achievements in the energy sector in recent years are listed below

- National Energy Policy
- National Energy Action Plan
- Installation of Solar Photovoltaic Systems on Government Buildings
- Geothermal MoU with private developer
- Energy Efficiency Study of Public (Government) Buildings
- Feasibility Study for the Upgrade of Richmond & South Rivers Power Stations

5.1. Institutional Structure

National Level

- ❖ **Ministry of National Security, Air and Sea Port Development:** Is in charge of the energy portfolio, there is no specific ministry in the field. The Ministry, ministered by the Prime Minister, is in charge of establishing certain structures that allow formulating important decisions related to the energy sector and its stakeholders. It is important to state that the Ministry of Finance, Economic Planning, Legal Affairs and Grenadines Affairs are also under the portfolio of

the Prime Minister. This situation allows the government to elaborate a linked public policy that considers both areas.

- ❖ **Saint Vincent Electricity Services Limited (VINLEC):** was established in the country as public electricity utility in 1931 and holds the exclusive license to provide the entire country with electricity until the year 2033. VINLEC only provides power to St. Vincent and four of the Grenadines (Bequia, Canouan, Union Island, and Mayreau). The private islands of Palm Island and Mustique generate their own electricity for exclusive consumption by their resorts. (Energy Action Plan, SVG, 2010)
- ❖ **Independent Producers:** There are some listed in the country, mainly in the Grenadines private islands, they do not require VINLEC approval. The other independent producers such as domestic scale systems and electricity generators at the industry sector must obtain a VINLEC approval license for generate and distribute electricity. The Energy portfolio functions as a de factor regulator but independent producers sometimes operates largely by themselves and they manage their own supply and demand figures.
- ❖ **The Energy Unit:** Currently it is part of the Ministry of National Security, Air and sea Port Development, but it was established to assist with the formulation and implementation of Government's policies related to energy, and to coordinate specific activities related to Government's renewable energy and energy efficiency initiatives. Its main mission is "To contribute to the overall strengthening of the national economy by improving the energy security and affordability in Saint Vincent and the Grenadines." The Unit is currently formed by a Director, two Energy Officers and an Administrative Secretary.
- ❖ **The National Energy Committee:** It was formed in the year 2006, composed of different ministries, national stakeholders, and presided by the Office of the Prime Minister. The Government is constantly undertaking efforts to strengthen the knowledge of its staff on all energy- related issues (Energy Action Plan for Saint Vincent and the Grenadines, pp26, 2010).

Regional Level (Eastern Caribbean)

Electricity Sector

- ❖ **Caribbean Electric Utility Services Corporation –CARILEC–:** CARILEC serves as the focal point for general and technical information. It 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. Actually CARILEC has 88 members. This includes 32 Full Members that are electric utilities and 52 Associate Members that are service companies for the electric utility business and 4 Affiliate Members (CARILEC we page, 2014).
- ❖ **The Caribbean Renewable Energy Development Programme –CREDP–:** The CREDP is a joint project of CARICOM since 1998, integrated by 16 Caribbean countries including Saint Vincent and the Grenadines. The full implementation of the project started in 2004, and its main objectives are to reduce greenhouse gas emissions by removing barriers to renewable energy development, establish the foundation for a sustainable renewable energy industry, and create a framework under which regional and national renewable energy projects are mutually supportive (CREDP web page, 2014).
- ❖ **Eastern Caribbean Energy Regulatory Authority –ECERA–:** ECERA is *expected* to provide regulation and oversight to the electricity utilities to achieve cost efficiency in electricity supply creating lower electricity rates to consumers in the medium to long term. ECERA also advise the OECS countries on renewable energy development, electricity sector plans and cross border interconnection, which is critical for geothermal development within the OECS.

The World Bank is the main founding partner, and it has made available credit facilities from the Adaptable Program Credit (APC) to support the establishment of ECERA (ECERA web page, 2014).

Oil Sector

- ❖ **The Caribbean Information Platform on Petroleum –CIPPET–:** CIPPET was developed by the Scientific Research Council –SRC–, located in Kingston Jamaica, as a regional point for the **Caribbean Energy Information System – 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 (CIPPET web page, 2014, <http://www.ceis-caribenergy.org/>).
- ❖ **Energy Cooperation Agreement PETROCARIBE 2005:** the agreement was established on June 29th, 2005, after the Energy Cooperation Agreement signed by 14 Caribbean nations during the First Energy Meeting of Heads of State / Government of the Caribbean on Petrocaribe. Today, this regional integration initiative has 18 countries grouped by solidarity and inspired by the independence and sovereignty of peoples (Petrocaribe web page, 2014).

5.2. Legal and Policy Framework

- ❖ **National Economic and Social Development Plan 2013-2025:** The Government of St. Vincent and the Grenadines (SVG) has produced a National Economic and Social Development Plan (NESDP) for the period 2013 to 2025 under the theme, “Re-engineering Economic Growth: Improving the Quality of Life for all Vincentians.” The Plan provides the framework for the Government, the Private Sector and Civil Society to embark on a journey of economic transformation in the face of on-going challenges to the people of St. Vincent and the Grenadines.
- ❖ **Electricity Supply Act:** The 1973 Electricity Supply Act (ESA) granted VINLEC a universal license for generating, transmitting and distributing electricity in SVG until 2033. Under the ESA, other companies are also allowed to generate, transmit and distribute electricity, but only with VINLEC’s permission or as VINLEC licensees, and then only with the approval of the relevant minister. . Auto-generation of power also requires VINLEC approval.
- ❖ **The Government’s National Energy Policy:** Published in March 2009, provides the main guiding principles for the National Energy Policy for St. Vincent and the Grenadines. Take advantage of renewable, local energy resources, wherever this is possible from the aspects of availability (potential), energy demand, technical and social implications, economic feasibility, ecological harmony and sustainability.
- ❖ **Energy Action Plan for Saint Vincent and the Grenadines, First edition:** The country has made considerable strides in responding to the environmental issues especially in framework policies and plans. The linkage between development and the environment seems to be well established in the framework agenda for SVG that is why the Government has elaborated this document.

5.3. Electricity

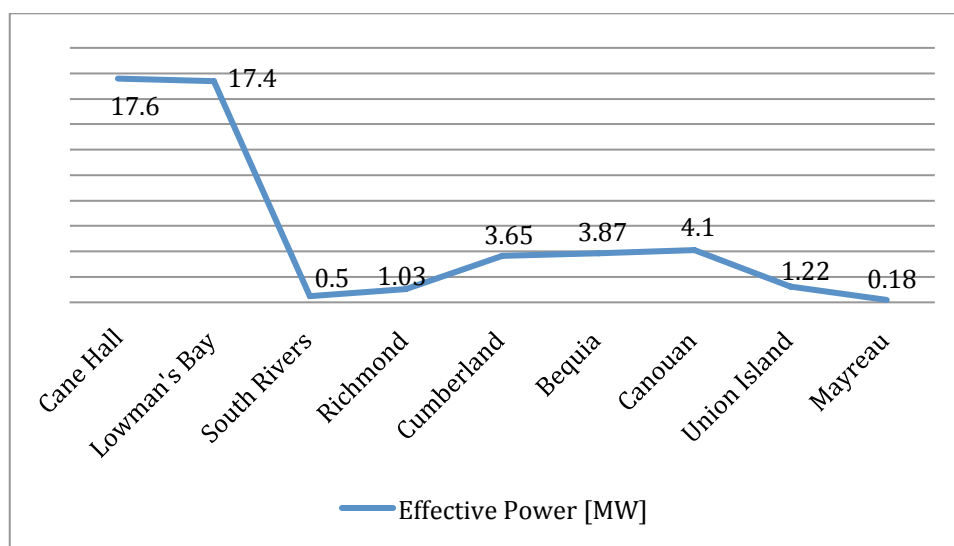
In 2014, the state-owned utility company VINLEC operates mainly with internal combustion diesel engines and has an installed capacity of almost 52.32 MW (11.5% of the installed capacity is hydro), of which 42.41 MW are operated on the main island of St. Vincent with two diesel generating facilities, Cane Hall (19.29 MW) and Lowman's Bay (17.42 MW), and three hydro power stations (Cumberland 3.7 MW, Richmond 1.1 MW, and South Rivers 0.9 MW). The country's electricity is generated by VINLEC, who owns 9 Generation Plants:

Name	Location	Year of Commissioning
Cane Hall Power Plant	Cane Hall	1975
Lowman's Bay Power Plant	Lowman's Bay	2006
South Rivers Hydro Plant	South Rivers	1952
Richmond Hydro plant	Richmond	1962
Cumberland Hydro Plant	Cumberland	1987
Bequia Power Plant	Bequia	1990
Canouan Power Plant	Canouan	1994
Union Island Power Plant	Union Island	1993
Mayreau Power Plant	Mayreau	2003

Table 6. VINLEC Facilities Summary – 2014

Source: St. Vincent Electricity Services / OLADE, 2014

The effective power of each plant varies depending on the year of commissioning and the number of engines that each has (See Graph 5).



Graph 5. Effective power (MW) of the VINLEC Power Plants

Source: VINLEC Survey, 2014

Nowadays, VINLEC also provides some diesel fuelled units for the islands of Bequia (4.9 MW), Union Island (1.3 MW), Canouan (4.4 MW) and Mayreau (0.18 MW). The rest of the Grenadine islands are supplied by Self Producers electricity systems with small diesel plants, to which, VINLEC is not in possession of the generating data, however, there are estimations around 4.3 kWh for each kW installed.

According to VINLEC's 2007 report, St. Vincent has maintained a constant capacity of 5.6 MW of hydro power for the last 10 years. Diesel generation power has evolved from 20.8 MW in 1998 up to 35 MW in 2007, almost a 70% increase (VINLEC's 2007 annual report) and 46.38MW in 2014.

Electricity – Operating Statistics

Number of Customers

Sector	2010	2011	2012
Residential	4,264	4,377	4,395
Commercial, Services & Public	35,571	35,970	36,292
Industrial	24	22	20
Street Lighting	48	48	47
TOTAL	39,907	40,417	40,754
<i>% Growth related to the last period</i>	-	1.27	0.83
Total Sales (GWh)			
Residential	61,379	60,355	60,698
Commercial, Services & Public	54,230	55,459	58,161
Industrial	6,894	6,854	6,541
Street Lighting	2,979	3,089	3,165
TOTAL	125,482	125,757	128,565
<i>% Growth related to the last period</i>	-	0.21	2.2

Table 7. Number of Customers and Consumption Summary 2010 – 2012

Source: St. Vincent Electricity Services / OLADE, 2014

Saint Vincent and the Grenadines also obtains electricity from photovoltaic use. According to VINLEC, in the main island St. Vincent there is an installed capacity of 620 kW, VINLEC owned, Government owned and Privately owned. In Bequia there is a total installed capacity of 160 kW Government owned and privately owned (VINLEC Survey, 2014).

According to VINLEC, works have already started to set up two new generators that will operate on Heavy Fuel Oil (HFO), and according to the Energy Unit, VINLEC has already retrofitted the generators at Lowmans Bay to use Heavy Fuel Oil.

Saint Vincent and the Grenadines has the same problem of other small islands in the Eastern Caribbean, high electricity prices. This situation is caused mainly by high oil import prices, inefficient generation and in some cases inefficient distribution systems. This environment directly affects some economic activities like intensive industries such as food processing, packaging process and also the tourism sector, which is the main activity in the country; making them uncompetitive against other parties in the region with low prices.

However the Government of Saint Vincent and the Grenadines is constantly gathering efforts to stabilize and possibly reduce the energy consumption per capita, in the medium and long term. There was a study concluded in 2007 made by VINLEC that looked into its cost structure and came up with recommendations for a tariff revision that minimizes cross-subsidies. It is clear that increase in generation costs is mainly due to the increase in fuel and also a slight increase in diesel generator's operation and maintenance (Energy Action Plan for SVG, 2010).

The total consumption in the country went from 74.6 GWh in 1998, to 122.9 GWh in 2008, a 70% increase and 142.7 GWh in 2012, a 16% increase. The peak demand in the main island of St. Vincent has risen from less than 14 MW in 1998, to 20 MW in 2008; a 40% increase in 10 years. The Grenadines islands (with the exception of Mayreau) have shown similar increases.

According to the Action Plan for Saint Vincent and the Grenadines, a typical day of energy consumption, in St. Vincent, shows that the peak demand occurs from 10:00 am to 4:00 pm. A smaller peak occurs from 7:00 pm to 8:00 pm on weekdays, whilst weekend peak demand takes place from 6:00 pm to 10:00 pm. These patterns reveal the hours where efficiency measures are mostly needed.

The Electricity sector in Saint Vincent and the Grenadines has a specific tariff charge for the minimal use for households (domestic) and commercial consumers, also a demand charge for industry, and for all cases, a fuel surcharge applied to the amount of kWh consumed every month which depends on international fuel costs. Tariffs are set by the cost of a unit Kwh, as it is shown on table 6.

ELECTRICITY TARIFFS (EC\$)					
Sector	< 50 kWh/month	>50 kWh/month	Minimum Charge	Demand Charge	All Units
Domestic	0.425	0.5	5		
Commercial			15	12	
Industrial				12	0.48
Street lighting					0.44

Table 8. Electricity Tariffs – 2014

Source: Energy Action Plan for Saint Vincent and the Grenadines, First Edition, 2010

The fuel surcharge is variable every month depending on the international fuel prices. In addition, a 15% Value-Added Tax (VAT) is charged on kWh consumption of over 200 units for domestic consumers, and on the total consumption for commercial and industrial consumers (Energy Action Plan for Saint Vincent and the Grenadines, 2010).

As a consequence of the constant variations in international oil prices, electricity tariffs augmented considerably in recent years. However, according to the Energy Action Plan for Saint Vincent and the Grenadines, the rise in the electricity tariff is clearly due to the fuel surcharge, which augmented from an average of EC\$0.09/kWh in 1998, to EC\$0.52/kWh in 2008, an increase of more than 570% in 10 years. In 2014, the fuel surcharge has also experienced an increase staying at EC\$ 0.53/kWh. In 1998, the fuel surcharge was 15% of the full tariff paid by consumers, in 2008 it was 50% and in 2014 it has reached an average of 52%.

In 2007, households paid an average of EC\$0.89/kWh including the fuel surcharge. A year later, in 2008 this increased to nearly EC\$ 1.05/kWh. However in mid-2009, due to lower fuel prices, average consumer costs for electricity dropped to EC\$ 0.85/kWh. In 2014, including the fuel surcharge, households are paying EC\$1.02/kWh (Energy Action Plan, 2010: pp11) and at the end of 2014, due to the fall in oil prices, cost per kWh is around EC\$0.82/kWh (Energy Unit, 2015).

5.4. Renewable Energies

To date, a number of countries in the Caribbean have formulated renewable energy policies; Saint Vincent and the Grenadines is one of them. The country approved a National Energy Policy in February 2009. In recent days, only Hydro and Solar energy are used in the country.

VINLEC has three hydropower generation plants operating in the main island of St. Vincent. One, commissioned in 1952, is located at South Rivers and it has an installed capacity of 0.87 MW with an effective power of 0.5MW. Another is located at Richmond, it was commissioned in 1962 and it has an installed capacity of 1.1MW with an effective power of 1.03MW. The last is located at Cumberland, commissioned in 1987 and it has an installed capacity of 3.67MW with an effective power of 3.65MW. (VINLEC Survey Data, 2014)

There have been some efforts to increase the hydropower participation in the country. A wide number of studies led by international cooperation agencies such as the German Agency for Technical Cooperation (GTZ) identified some of the hydro potential than Saint Vincent and the Grenadines has. Further potential exists through the rehabilitation and expansion of existing plants and development of new sites.

According those studies, unused hydropower potential is in the range of 5 to 10 MW from the rivers of Wallibou and Buccament. There were plans to install river flow gauging equipment at the Wallibou River in 2010 in order to record the long-term flow characteristics of the river.

On the other hand, solar energy use in St. Vincent and the Grenadines is very limited in all sectors. According to VINLEC figures, there are some installed photovoltaic systems in the main island of St. Vincent which are divided as follows:

Photovoltaic Systems in St. Vincent	
VINLEC owned ⁽²⁾	536 kW
Government Owned ⁽¹⁾	13.3 kW
Privately owned ⁽¹⁾	70.8kW
Total	620.1 kW

Table 9. Photovoltaic Systems in St. Vincent – 2014

Source: (1) VINLEC, Dr. Vaughn Lewis, 2014; (2) Energy Unit, 2015

In Bequia, there are some photovoltaic electricity generation systems as well.

Photovoltaic Systems in Bequia	
Government owned	75.9 kW
Privately owned	85.0 kW
Total	160 kW

Table 10. Photovoltaic Systems in Bequia – 2014

Source: VINLEC, Dr. Vaughn Lewis, 2014

There are also some records of private owned small facilities in the rest of the Grenadines, VINLEC is not in possession of all the data, however they estimate that the daily production goes around 4.3kw for each kw installed. (VINLEC, Dr. Vhaugn Lewis interview, 2014)

In terms of the geothermal power, a consortium of Light and Power Holdings (LPH) which is a majority owned subsidiary of Emera and Reykjavik Geothermal from Iceland,

have been granted the development rights for analysis of the geothermal capacity of the main island of St. Vincent. Currently, the consortium is now evaluating the potential associated with the development of a geothermal plant with a capacity in the range of 5 to 15 MW. The study has been carried out on the geothermal power potential of the Soufriere volcanic complex³.

5.5. Hydrocarbons

Saint Vincent and the Grenadines is currently almost completely dependent on imported petroleum products such as gasoline (transport), diesel (transport and electricity generation), LPG (cooking, water heating and industry) and kerosene, lubricants, among others.

Currently, in Saint Vincent and the Grenadines there are three main companies that import all of the oil products: Rubis, Sol and Petrocaribe.

The SOL Group, is an independent petroleum marketing company in the Caribbean, with operations across 23 countries. It was founded in 2005, when the company acquired Shell's assets in the Eastern Caribbean. Mainly supplies diesel, gasoline, lubricants and LPG. *Sol Eastern Caribbean Limited* operates in Saint Vincent and the Grenadines. (Sol web page, visited on 2014)

RUBIS, is a French private limited company established in 1990. Its operations consist of the distribution of diesel, gasoline, LPG and lubricants. It has presence throughout the Eastern Caribbean including Antigua, Barbados, Dominica, Grenada, Guyana, St Lucia as well as the Western and French Caribbean, among other countries and continents (Rubis Web page, visited on 2014).

PetroCaribe, since the initiative was launched in 2005. The supply quota is 1 kbd, and petroleum-based products include Diesel, LPG. The construction of some facilities was part of the cooperation agreement, apart from social plans. Those facilities will also distribute gasoline and jet fuel, the project is scheduled to be completed in 2015. The mixed company founded *PDV SVG Ltd* is in charge of operations in the country (Petrocaribe Web page, visited on 2014).

In the last decade there has been a significant increase in the expenditure for oil derivate imports, mainly due to the increase of the prices per barrel. In 2004 the price of a barrel was US\$32, then in 2006 it reached around US\$70, in 2008 the barrel of oil reached a price of US\$ 147 (Energy Action Plan, 2010: pp8)

Transport Sector

Transport sector is the main consumer of hydrocarbons - the major part is divided between the vehicles for land transportation and the sea transport as well. According to the Inland Revenue Department, in 2012 there were 24,750 registered vehicles. In 2013 there were 27,331 registered vehicles. Most of the vehicles are privately owned sedans and SUVs, but there is also a significant amount of mini-vans, which are used for public transportation.

According to the Maritime Association and the Fisheries Division, Saint Vincent and the Grenadines has registered a quantity of 800 vessels approximately. However,

³The study was led by several authors: Grímur Björnsson, Hjálmar Eysteinnsson, Haraldur Sigurdsson, Gestur Gíslason, Gunnar Örn Gunnarsson, Trent Philipp and Kenneth Mackeigan. The name of the project was St Vincent Geothermal Surface Exploration Project - Summary Report.

according to the Energy Action Plan, in 2010, there were approximately 1,095 vessels operating in the waters of the country. It is important to highlight that some of these vessels trade within other Caribbean countries; that is to say they may purchase fuel outside of Saint Vincent and the Grenadines.

Prices for hydrocarbons

In 2008 the prices of gasoline and diesel reached their highest peak. According to the Energy Action Plan for Saint Vincent and the Grenadines, in July 2008, gasoline was sold for EC\$ 15.33/imperial gallon and diesel at EC\$ 15.50/imperial gallon at any pump station. However, in 2009 the prices decreased to EC\$ 10.6 per imperial gallon of gasoline and approximately EC\$ 9.5 each imperial gallon of diesel. In 2014, gasoline cost EC\$ 13.85 per imperial gallon and EC\$ 13.70 for each imperial gallon of diesel.

In the case of LPG, with the implementation of the Energy cooperation Agreement with Petrocaribe signed in 2005, the prices started to get controlled due to the introduction of cheaper LPG, the 20lb cylinder costs EC\$ 29.00 and the 100lb cylinder EC\$ 155.00. Nevertheless in 2009 a 20lb cylinder cost around EC\$ 35-40 and the 100lb cylinder cost around EC\$ 163-184.

In 2014 the price for the 20lb cylinder goes around EC\$ 31-40 and for the 100lb around EC\$ 185. It is important to mention that the LPG price varies per area due to the transportation charge. According to the Energy Action Plan, for the LPG distribution the country is divided into four areas with the Grenadines having the highest prices for distribution (Energy Action Plan, 2010: pp10).

Chapter II. Definition, Importance and Structure of the Energy Balance

6. Energy Balance Methodology

6.1. Definition and Importance of the Energy Balance

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

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 an established period (usually one year).

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

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

- ❖ To centralize the energy information and figures in order to determine the status of the sector
- ❖ 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

- ❖ 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.

6.2. General structure of the Energy Balance

According the OLADE Methodology for Preparing Energy Balances, 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
 - Supply
 - Transformation
 - 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

Table , 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, prior to some chemical or physical conversion of energy. |

		PRIMARY SOURCES										SECONDARY SOURCES												TOTAL
		NON RENEWABLE SOURCES				RENEWABLE SOURCES				Electricity	L.P.G.	Gasoline / Alcohol	Kerosene	Diesel Oil	Fuel Oil	Coke	Charcoal	Gases	Other Secondary	Non-Energy	Total Secondary			
		Petroleum	Natural Gas	Coal	Fission Fuels	Hydroenergy	Geothermal	Firewood	Sugar Cane Products													Other Primary	Total Primary	
		kBoe	kBoe	kBoe	kBoe	kBoe	kBoe	kBoe	kBoe	kBoe	kBoe	kBoe	kBoe	kBoe	kBoe	kBoe	kBoe	kBoe	kBoe	kBoe	kBoe	kBoe	kBoe	kBoe
SUPPLY	PRODUCTION (PP)																							
	IMPORT (IM)																							
	EXPORT (X)																							
	INVENTORIES (IV)																							
	UNUSED (UN)																							
	TOTAL SUPPLY																							
TRANSFORMATION	REFINERY																							
	POWER PLANTS																							
	SELF PRODUCERS																							
	GAS TREATM.PLANT																							
	CHARCOAL PLANT																							
	COKE/BLAST FURNAC																							
	DISTILLERY																							
	OTHER CENTERS																							
TOTAL TRANSFORMATION																								
FINAL CONSUMPTION	OWN CONSUMPTION																							
	LOSSES																							
	ADJUSTMENT																							
	TRANSPORTATION																							
	INDUSTRY																							
	RESIDENTIAL																							
	COMMERC.,SERV.PUB																							
	AGRIC.,FISH.MIN.																							
	CONSTRUCTION,OTH.																							
	ENERGY CONSUMPTION																							
	NON ENERGY CONSUM																							
FINAL CONSUMPTION																								

Table 11. Structure of an Energy Balance

Source: OLADE (2004)

6.2.1. Sources

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:

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 both.

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 it is 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.

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.

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 below.

- ❖ **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 petro chemistry and the production of fertilizers.

6.2.2. Activities

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

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 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.

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.

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 geo-thermoelectric plants.

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.

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.

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.

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.

Other Centers

These may be the anaerobic digesters and pyrolysis furnaces, etc., which take farm, animal, forest, agroindustrial, 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.

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

6.2.3. Demand

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.

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 are to consider as agricultural all activities carried out within the farm and as industry otherwise.

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.

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).

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.

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.

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.

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:

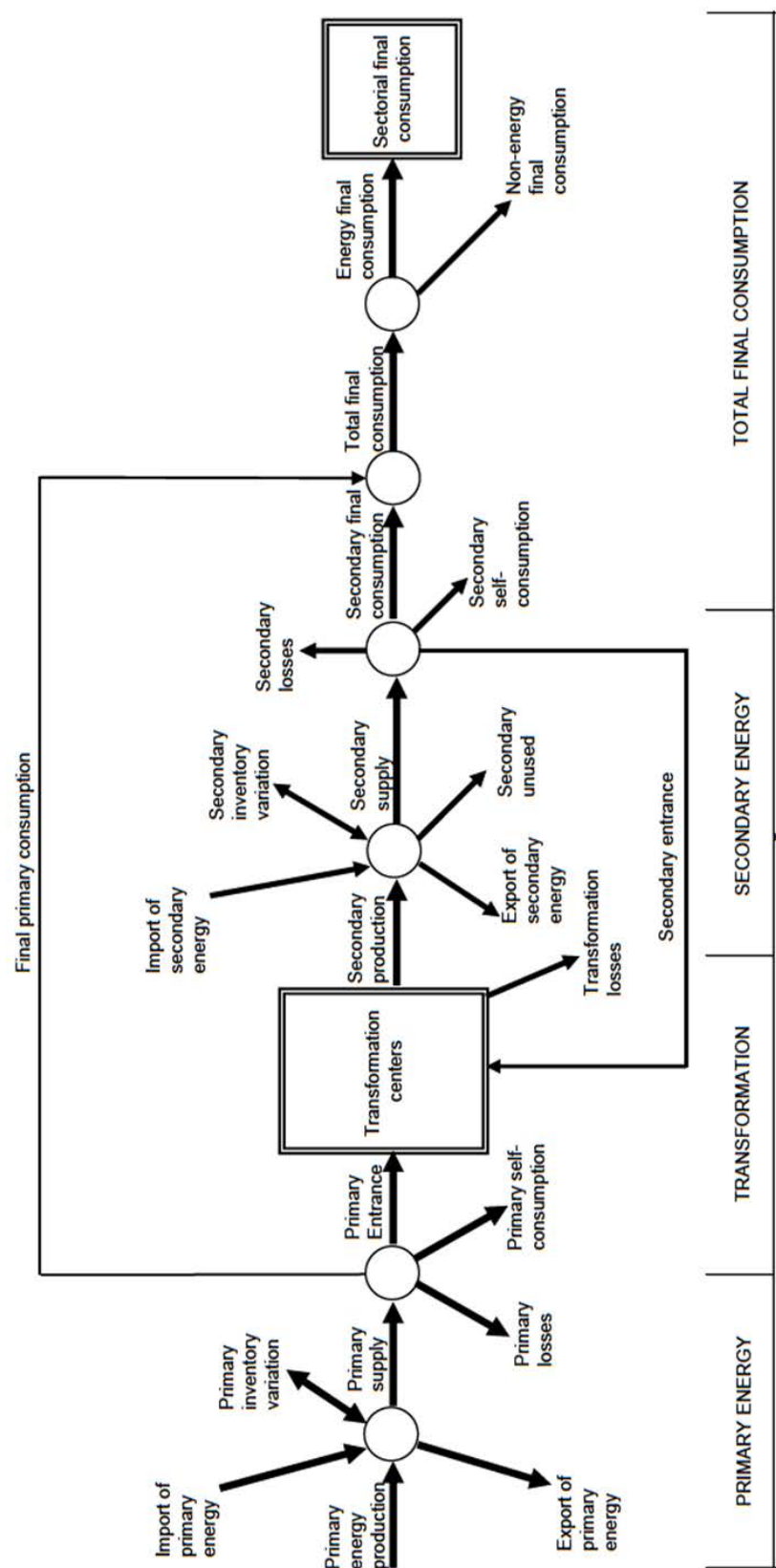
- ❖ Natural gas and petroleum derivatives (naphtha, reformatting, refinery gas, etc.), consumed in petro chemistry to make plastics, solvents, polymers, rubber, etc.
- ❖ Bagasse for making paper or pressed board
- ❖ Animal waste as fertilizers
- ❖ Plant wastes as feed for cattle

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.

6.3. Energy Chain

Figure 1. Energy Chain



Chapter III. Data Gathering Process

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

7. Data collection

The process of data collection consists of:

- a) Characterize the energy sector:
 - Energy sources
 - Energy facilities
 - Energy consumers
 - 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 Vincent and the Grenadines 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.

7.1. Surveys Description

General Energy Variables

Survey 1. Q1_F03_SVG_2014

Oil and Products (Section 1)

This form enables to collect annual *Oil* data by *Activity* and *Energy Source*. Activities are disaggregated in *Production*, *Exports*, *Imports* and *Consumption*, each of which divided into energy sources; *Oil*, *LPG*, *Gasoline*, *Kerosene* and *Jet Fuel*, *Diesel Oil* and *Fuel Oil*. Physical units are expressed in barrels (kbbbl). *Natural Gas* is disaggregated in *Production* (Without reinjection or flaring), *Flaring* (Burned into the atmosphere), *Exports*, *Imports* and *Consumption*. In this last case, classification includes *Power generation*, *Transportation*, *Residential*, *Commercial*, *Industrial*, *Agriculture*, *Fishing and Mining* and *Others*. Physical units are expressed in millions of cubic meters (MMm³).

Other Energy Sources (Section 2)

As in the previous case, *Other Energy Sources* sheet permit to collect data from *Other Energy Sources* and some *relevant activities* as follows: *Coal* (*Production*, *Exports*, *Imports* and *Consumption*), *Alcohol* (*Production* and *Consumption*), *Biodiesel* (*Production*, *Exports*, *Imports* and *Consumption*), *Firewood* (*Consumption*), *Sugar Cane Products* (*Production* and *Consumption*), and *Agricultural Wastes* (*Production* and *Consumption*). Depending on the type of energy source, physical units are expressed in tones (t), barrels (bbl.) and barrels of oil equivalent (boe).

Electricity (Section 3)

Data collection of annual *Electricity* variables is disaggregated in five activities: *Production*, *Exports*, *Imports*, *Consumption* and *Losses*. In the case of *Production*, the information is classified into two categories: *Public Generation* (By technology: *Hydro*, *Thermal*, *Geothermal*, *Wind*, *Photovoltaic* and *Nuclear*) and *Self-Producers' Generation* (By technology: *Hydro* and *Thermal*). *Consumption* is divided in economic sectors such as *Transportation*, *Residential*, *Commercial*, *Industrial*, *Agriculture*, *Fishing and Mining*, and *Others*. Units are expressed in GWh.

Potential and Storage (Section 4)

This sheet is intended to collect data about *Reserves*, –in the case of *Oil*, *Natural Gas* and *Coal*; *Capacity*, –in the case of *Alcohol Distillery* and *Biodiesel Plants*; and *Potential*, –in the case of *Electricity* (*Estimated* and *Installed*).

Survey 2. Q2_HC_SVG_2014

Storage (section 1)

The *Hydrocarbons Survey –HC–* permit to collect information about *Storage Capacity*, *Supply* and *Sales* of each energy source. In the first case, data include the identification of *Facilities* (name and location), and its *Storage Capacity* reported for each of its energy sources (*Oil*, *Gasoline*, *Diesel Oil*, *Fuel Oil*, *Kerosene* and *Jet Fuel*, *LPG*, *Asphalts*, *Lubricants* and *Greases*), expressed in physical units (kbbl).

Supply and Other Variables (section 2)

This section is oriented to determine the amount of *Production*, *Imports*, *Exports*, *Initial/Closing Stocks*, *Unused* and *Losses* of each energy source previously mentioned, expressed in physical units (kbbl).

Hydrocarbons' Total Sales (section 3)

Section 3 enables to identify *Total Sales* of each energy source, previously mentioned, among different economic sectors, expressed in physical units (kbbl).

Survey 3. Q3_EE_SVG_2014

This form is designed to identify the general characteristics of the Electricity Sector, including annual key variables such as *Power Plants General Characteristics* including a range of information from the *Name* and *Location* (**section 1**), to *Technology Type*, *Installed Capacity*, *Plant Factor*, *Electricity Generation*, *Fuel Consumption*, *Own Consumption* and *Losses* (**section 2**). On the other hand, **section 3** refers to *Hydroenergy Technical Specifications* (*Reservoir Name*, *Capacity* and *Flow*, *Average Flow*, *Precipitation Flow*, *Turbine Flow*, among others).

Survey 4. Q4_CTR_SVG_2014

The CTR Survey allows collecting Transportation Sector characteristics both in general terms like *Added Value* and *Total Fleet* by type of each transportation category (*Road*, *Sea* and *Air*). At more detailed level, information includes *Consumption* by relevant energy sources and *Characterization of Vehicle Fleet* in *Public* and *Private* (By fossil fuel used), and *Annual Average of Kilometers Travelled* (km/year).

Survey 5. Q5_CIN_SVG_2014

Characterization of Industrial Sector (section 1)

This Form is oriented to the Industrial Sector and has three sections. This one includes general information such as *Number of Industrial Facilities*, *Added Value*, *Production* and *Number of Employees*.

Consumption by Energy Sources (section 2)

This section provides information on Energy Consumption of each industry category (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).

Great Energy Consumers (section 3)

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

Self-Generators (section 4)

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*.

Survey 6. Q6_CIN2_SVG_2014

The Form 6 was designed with the purpose to be an *Energy Survey of Industry Sector*, which allows to access key information from *Major Energy Consumers*.

Survey 7. Q7_CCO_SVG_2014

General Information of the Commercial Sector (section 1)

This form aims to collect information about *General Characteristics of Commercial Sector*, by providing information on *Number of Beds and Rooms, Occupation Factor of Beds and Rooms* and *Added Value*.

Electricity and Fossil Fuel Purchases (section 2)

In that case, it is needed to report the annual Amount (Physical units) and Sales (Currency), made by overall sector for each single energy source(*Diesel Oil, Fuel Oil, Charcoal, Firewood, LPG, and subtotal on Electricity Purchased, Self-Generated* and *Others*).

Survey 8. Q8_CCOH_SVG_2014

The form correspond to the same structure than the described below, but instead of being addressed to the total Commercial Sector it is oriented to each Hotel Facility, constituting on a particular *Energy Survey of Hotel Industry*.

Survey 9. Q9_CCOR_SVG_2014

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*.

Survey10. Q10_CRW_SVG_2014

General Information of the Agricultural Sector (section 1)

This form 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*.

Survey 11. Q11_NV_SVG_2014

Information from the National Variables

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.

Survey 12. Q701_CCOSC_SVG_2014

General Information for the Shopping Centers

This questionnaire is designed to identify the main characteristics of shopping centers General Characteristics of the Mall by providing information on the name or company, contact details, and size of Shopping centers among others. It gathers data about energy consumption by each Energy Sources (Electricity, LPG, Diesel Oil, Charcoal, Firewood, Fuel Oil and Others).

Survey 13. Q41_CTR2_SKN_2014.xlsx

General information from Individual Drivers

It was designed to collect data from individual drivers within the country. It obtains the total kilometers or miles that a common citizen does per day, also the amount of gallons that are pumped to the vehicle, the age of the vehicle, brand and classification. This survey is delivered to public transportation drivers as well.

Chapter IV. Technical Visit

The main objective of the technical visit to Saint Vincent and the Grenadines 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, tourism and other demand sectors.

However, it was also necessary to collect data from the Ministries related to Finance, Agriculture, Fisheries, Public Works, Statistics, the Inland Revenue, the Maritime Administration, some private non energy products importers and the Chamber of Commerce.

Before the technical visit to the country, it was necessary to investigate and analyze the characteristics and behavior of the institutional structure of the energy sector of Saint Vincent and the Grenadines, in order to quantify and identify the institutions to be visited. Once the institutions were selected, a pre-analysis of the type of information that could be collected was defined and a specific survey to collect the information was prepared.

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 (See Table 12). For each day, four to five appointments are scheduled according to the geographical characteristics of the country.

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 table 12). Saint Vincent and the Grenadines Technical Visit Agenda)

It is important to notice that the Technical visit Agenda is imported from the General main stakeholders list, which also receive a specific survey. That means that OLADE determines the importance of visiting some of the main stakeholders in order to get a consistent perception of their participation in the energy matrix, to visit the facilities and to get additional information for a deeper analysis.

8. Technical Visit Agenda

SAINT VINCENT AND THE GRENADINES TECHNICAL VISIT AGENDA - 2014

N	SUB-SECTOR	INSTITUTION	SURVEY	VISIT DATE
1	Main Energy Supply Demand Variables	Energy Unit	Q1_F03_SVG_2014	Monday 18th
2		Ministry of Finance and Economic Planning	Q1_F03_SVG_2014 Q12_NV_SVG_2014 Q4_CTR_SVG_2014	Monday 18th
3	Hydrocarbons	Petrocaribe	Q2_HC_SVG_2014	Monday 18th
4		Rubis	Q2_HC_SVG_2014	Monday 18th
5		Customs	Q1_F03_SVG_2014	Monday 18th
6	Agriculture and Industry	Ministry of Agriculture, Industry, Forestry, Fisheries and Rural Transformation	Q5_CIN_SVG_2014 Q11_CRW_SVG_2014	Tuesday 19th
7	Electricity	VINLEC	Q3_EE_SVG_2014	Tuesday 19th
8	National Variables	Planning Statistical Office	Q12_NV_SVG_2014	Tuesday 19th
9	Hydrocarbons	Sol	Q2_HC_SVG_2014	Tuesday 19th
10	Industry	The Chamber of Industry and Commerce	Q5_CIN_SVG_2014 Q6_CIN2_SVG_2014	Tuesday 19th
11		St. Vincent Packaging Ltd.	Q6_CIN2_SVG_2014	Wednesday 20th
12	Supermarkets	C. D. Veira Ltd (Singer).	Q10_CCOSC_SVG_2014	Wednesday 20th
13	Industry	East Caribbean Group of Companies.	Q6_CIN2_SVG_2014	Wednesday 20th
14		East Caribbean Metal Industry Ltd.	Q6_CIN2_SVG_2014	Wednesday 20th
15		St. Vincent Brewery Limited.	Q6_CIN2_SVG_2014	Wednesday 20th
16		St. Vincent Distillers Ltd.	Q6_CIN2_SVG_2014	Thursday 21th
17	Tourism	The Grenadine House	Q8_CCOH_SVG_2014	Thursday 21th
18	Industry	St Vincent and the Grenadines Maritime Association	Q4_CTR_SVG_2014	Thursday 21th
19	Tourism	Tourism Administration (Ministry of Tourism, Sports and Culture)	Q7_CCO_SVG_2014	Friday 22th
21	Transport	Ministry of Transport , Works , Urban Development And Local Government	Q4_CTR_SVG_2014	Friday 22th
22		Ministry of National Security, Air and Sea Port Development	Q4_CTR_SVG_2014	Friday 22th
23	Hydrocarbons	Rent and Drive	no survey but visited	Friday 22th

Table 12. Saint Vincent and the Grenadines Technical Visit Agenda

8.1. 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.

Preliminary Energy Flow of Saint Vincent and the Grenadines

Updated: June 30th, 2014

		Renewable Primary Energy Sources				Petroleum and Natural Gas Products					
		Solar	Hydro	Firewood	Electricity	LPG	Gasolines	Kerosene & Jet Fuel	Diesel Oil	Non Energy Products	Charcoal
		Unit:	Unit:	Unit:	Unit:	Unit:	Unit:	Unit:	Unit:	Unit:	Unit:
		GWh	GWh	tons	KWh	Kbbl	Kbbl	Kbbl	Kbbl	Kboe	Tons
Production		=	=	=	=						=
Imports						0	0	0	0	0	
Exports								0			
Unused											
Stock Change						0	0	0	0	0	
Transfers											
Power Plants	Thermal				0				0		
	Photovoltaic	0			0						
	Hydro		0		0						
	Wind				0						
Self-producers					0						
Charcoal Plant				0							0
Gas Plant											
Transport sector							0	0	0	0	
Industrial sector					0				0		
Residential sector		0		0	0	0		0			0
Commercial, Services and Public					0	0	0		0		
Farming, Forestry and Fishing					0		0				
Mining and Quarrying											
Construction sector and Others					0				0	0	
Non Energy Consumption											
Own Consumption					0						
Losses					0	0	0	0	0	0	0

Table 13. Parameterization of the Energy Balance Variables

The second energy flow matrix identifies the information units or data providers' relationship with the energy sources that they are involved with. In page 100 are the specific characteristics of each facility

		STAKEHOLDERS				
	FUELS	RUBIS	SOL	PETROCARIBE	VINLEC	SELF-PRODUCERS
1	CRUDE OIL					
2	LPG	⊕ ⊗		⊕ ⊗		
3	JET FUEL & KERO		⊕ ⊗			
4	GASOLINE	⊗	⊗			
5	NATURAL GAS					
6	DIESEL OIL	⊗	⊗	⊕ ⊗	β	
7	FUEL OIL					
8	NON ENERGY PRODUCTS		⊕ ⊗			
9	ELECTRICITY				β	
11	WIND					
12	SOLAR				β	β
13	HYDROELECTRICITY				β	
14	CHARCOAL					β

Table 14. Energy Sources Vs. Stakeholders Identification

8.2. Additional results of the technical visit:

- Saint Vincent and the Grenadine'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.
- Twenty-three 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 99).
- 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.

8.3 Data processing

During the process of gathering information OLADE had the opportunity to obtain information related to the Supply, Demand and Transformation that is needed to build the Energy Balance. The information available to calculate the EB in Saint Vincent and the Grenadines was the following:

- The major oil companies who filled specific hydrocarbons' questionnaires: RUBIS, Petrocaribe and SOL, who are importers and distributors and store Gasoline, Diesel Oil, LPG, Jet fuel/Kerosene and Non Energy Products. This information is contrasted with the questionnaires from the Ministry of Finance and Customs related to the official import values. Finally, with this information is possible to

determine the final consumption of the several sectors (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 VINLEC and also fulfilled questionnaires related to the electricity information for the years 2010 - 2012;
- Residential consumption of firewood and charcoal was calculated according the information provided by the Statistics Department and also 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 using the number of vehicles and vessels registered in the country within the information provided by the importers in terms of the total sales of the fuel stations and also the storage tanks for filling the sea vessels. OLADE have also provided individual questionnaires' to citizens including taxi drivers. In which it is possible to obtain information related to the vehicle transportation in terms of the type of vehicle and the fuel that it is used.
- To calculate the consumption in the different sectors and economic activities OLADE has also provide specific questionnaires to each sector. The Industry sector, as well as the Commercial & Public services, the Agriculture, Fishing and Mining and the construction were asked about the consumption of energy in terms of electricity consumption, fuels used and size of each location (Hotels, Restaurants, Industries, and Commercial business).

Chapter V. Energy Balance Processing

9. Energy Balance of Saint Vincent and the Grenadines

9.1. Energy Balance sheets

All the data that was gathered during the first technical visit, later on were processed per each Energy Source and located in each one of the following tables that are divided into: Energy Balance Main Sheet, Main Supply Sheet, Main Transformation Sheet, Main Consumption Sheet, and the Auxiliary Sheets.

Main 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 15. Main Energy Balance Sheet

Main Supply Sheet

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



MAIN FORM: SUPPLY						
SOURCE	LPG	UNIT	kbbl	COUNTRY	SAINT VINCENT AND THE GRENADINES	
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 16. Main Supply Sheet

Main 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, cookeries 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										
2012										
2013										

Table 17. Main Transformation Sheet

Main 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 FARMING, FISHING AND MINING	6 CONSTRUCTION OTHERS	7 NON ENERGY CONSUMPTION	1+2+3+4+5+6+7 FINAL CONSUMPTION
2005								-
2006								-
2007								-
2008								-
2009								-
2010								-
2011								-
2012								-
2013								-

Table 18. 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 19. Main Auxiliary Sheets

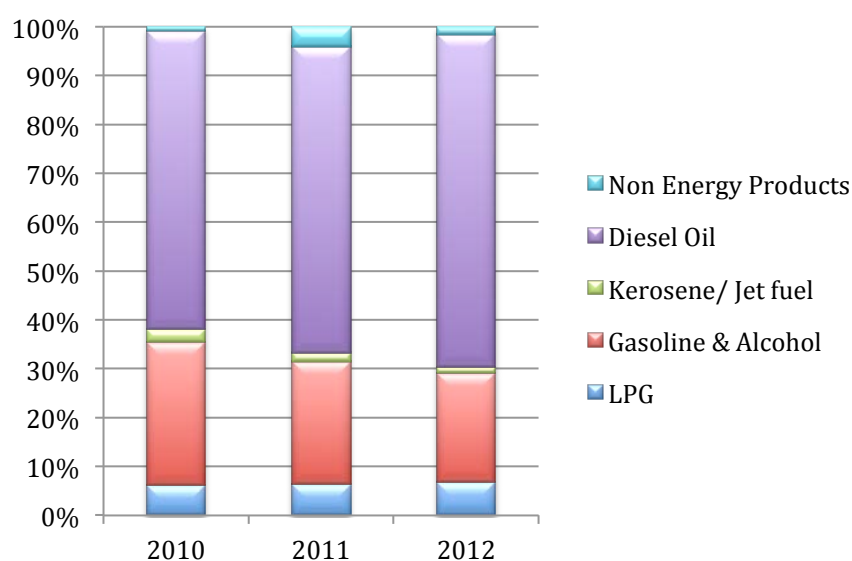
9.2. Results of the Saint Vincent and the Grenadines Energy Balances (2010-2012)

The Energy Balances of Saint Vincent and the Grenadines allow to determine a wide range of analysis, graphs and tables in which it is possible to appreciate the key inputs for energy policy evaluation, designing and decision making processes in this specific sector.

As seen in the Energy Balance 2010 – 2012 (from page. 60-64), the Country is a Net Importer of Energy. Total Energy Supply was based on Imports of Oil Products, especially Diesel Oil and Gasoline / Alcohol.

Energy Imports and total supply

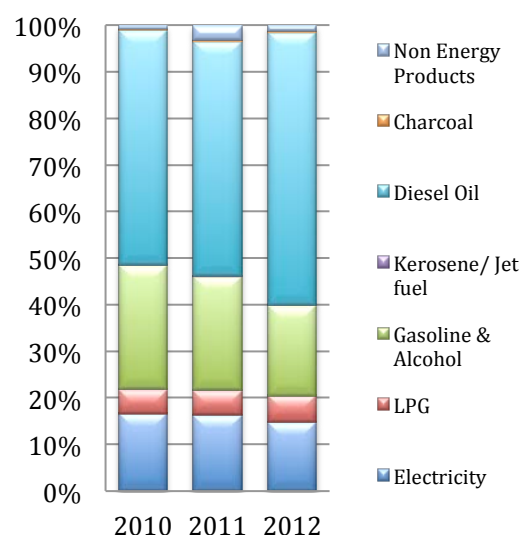
A general view on the obtained results highlight, that Saint Vincent and the Grenadines Energy Supply Matrix depends on the imports of secondary sources, which in 2012 were Diesel Oil (359.99 kBoe), Gasoline (118.54 kBoe), LPG (36.07 kBoe) and Kerosene & Jet Fuel (0.35 kBoe), (See Graph6). It is important to notice the increase in the Diesel oil importation compared with the year 2011 (272.43 kBoe), this situation is explained in the Final consumption part in the next page.



Graph 6. Imports by Energy sources

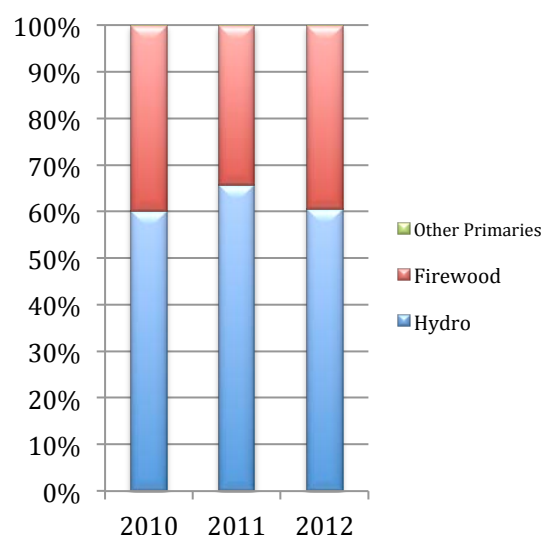
Source: Energy Saint Vincent and the Grenadines Energy Balances 2010 – 2012

However it is important to notice that the country also relies on other secondary energy sources such as Electricity, which in 2012 had supplied 90.5kBoe, and Charcoal with 1.7kBoe in the same year. In terms of the primary energy sources the country relies on Hydropower, Firewood and Photovoltaic solar panels (classified for this report in Other Primaries) as well (see Graph 7, Graph 8).



Graph 7. Secondary sources Energy Matrix

Source: Energy Saint Vincent and the Grenadines
Energy Balances 2010 – 2012



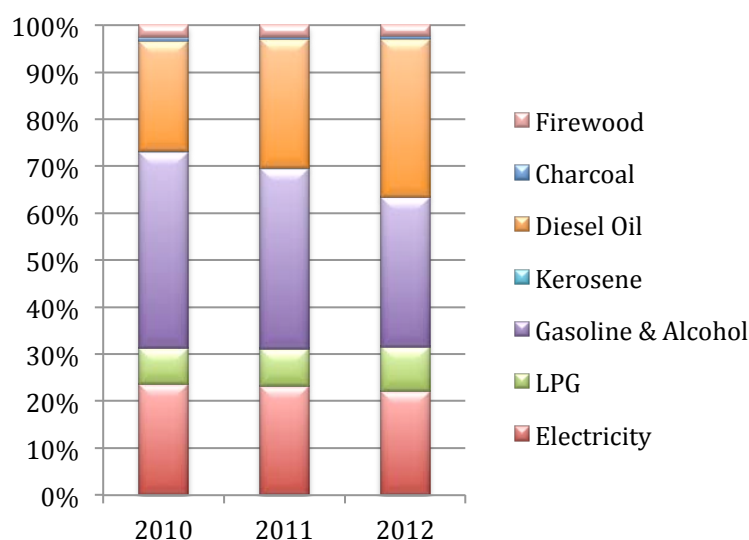
Graph 8. Primary sources Energy Matrix

Source: Energy Saint Vincent and the Grenadines
Energy Balances 2010 – 2012

The total supply of energy in terms of calorific results of Saint Vincent and the Grenadines was 559.9kBoe in 2010, 577.8kBoe in 2011 and 646.9kBoe in 2012. It has been an increase of 15% comparing the years 2010 and 2012.

Final Consumption

The energy consumption in Saint Vincent and the Grenadines varies depending on the energy source and the activity. As shown on the Graph 9, there are a variety of seven energy sources that are been consumed.



Graph 9. Final Consumption of energy by Source

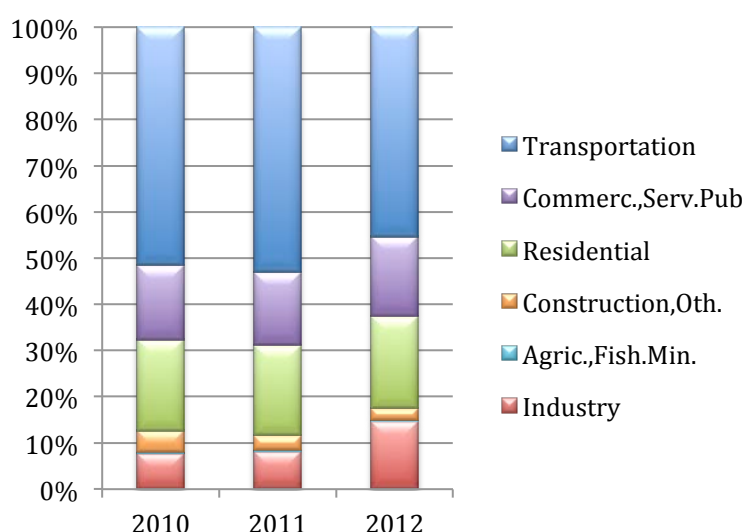
Source: Energy Saint Vincent and the Grenadines Energy Balances 2010 – 2012

According to the Graph 9, in 2012, Diesel oil had the major share with 33.6 % of the consumption matrix followed very close by Gasoline with 31,8% of the total

consumption. The Electricity consumption appears with 22% of the total followed by LPG with 9.5%, Firewood with 2.3%, Charcoal with 0.4% and Kerosene with 0.1% of the total. In 2012, Diesel oil consumption has experienced an increase of 57.5% comparing with 2010, while the gasoline consumption has decrease of 15.9% comparing with the same year.

This situation is due to the increase in Diesel oil consumption in the industry sector, which has augmented from 22.18kBoe in 2011 to 57.67kBoe in 2012. This increase is caused by the use of self-generation power plants for electricity generation and also caused by an increase in the production of some industries that uses Diesel oil for their machinery. The increase in Diesel oil consumption in other sectors such as Transport 55.29kBoe in 2011 and 57.67kBoe in 2012 and Commercial and Public services 6.20kBoe in 2011 and 9.11kBoe in 2012, are important to consider as well.

The Gasoline supply has decrease with 136.6kBoe in 2010 to 118.5kBoe in 2012. In terms of the consumption of the fuel, the transport sector, the major consumer, consumed 128.5kBoe in 2011 and 111.1kBoe in 2012. This decrease is due because of the gasoline prices for transportation.



Graph 10. Final Consumption of Energy by Sector

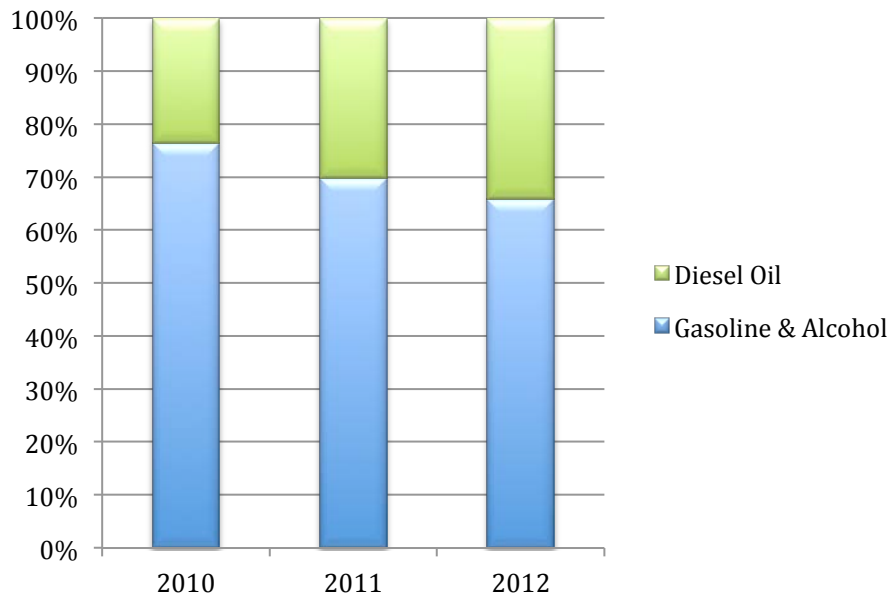
Source: Energy Saint Vincent and the Grenadines Energy Balances 2010 – 2012

Transport sector

In Graph 10, we can appreciate the Final energy consumption by each economic activity, being the transport sector the major consumer with a participation of 45% in 2012. However, in this sector there has been a decrease of 3% comparing with the figures from 2010. According to the Inland Revenue Department, in 2012 there were 24.750 registered vehicles.

Most of the vehicles are privately owned sedans, but there is also a significant amount of mini-vans, which are used for public transportation. In terms of the sea transport, according the Maritime Administration and the Fisheries Division, Saint Vincent and the Grenadines has registered a quantity of 800 vessels approximately. From the total of vessels, 738 uses Gasoline, while a minimum amount of 7 uses Diesel oil.

As shown on Graph 11, 65% of the fuels used for transportation are gasoline and 34% is related to the Diesel oil use.

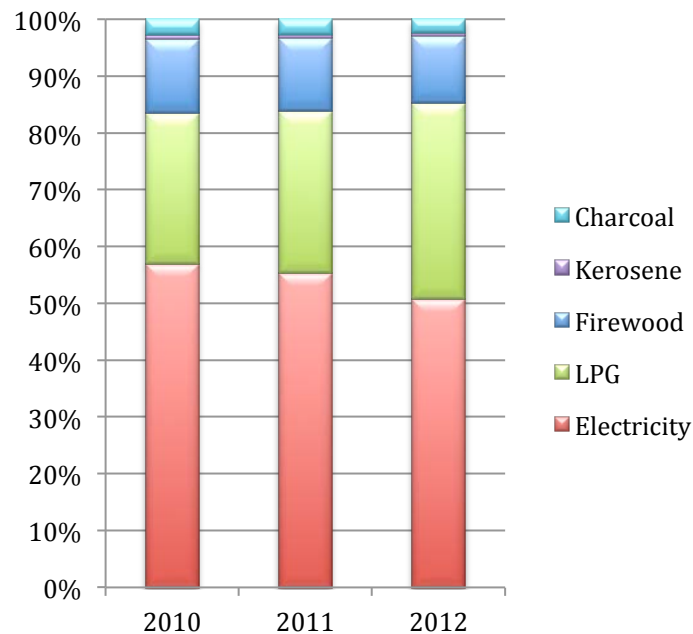


Graph 11. Fuels used in the Transport sector

Source: Energy Saint Vincent and the Grenadines Energy Balances 2010 – 2012

Residential Consumption

As it is shown on Graph12, this sector consumes a variety of 5 energy sources. The major consumption goes to electricity with 37.6 kBoe in 2012; it represents 50.7% of the total consumption matrix in this sector. Other major consumes goes to LPG with 25.61 kBoe, which represents 34.5% of the total.



Graph 12. Energy sources consumption in the Residential sector

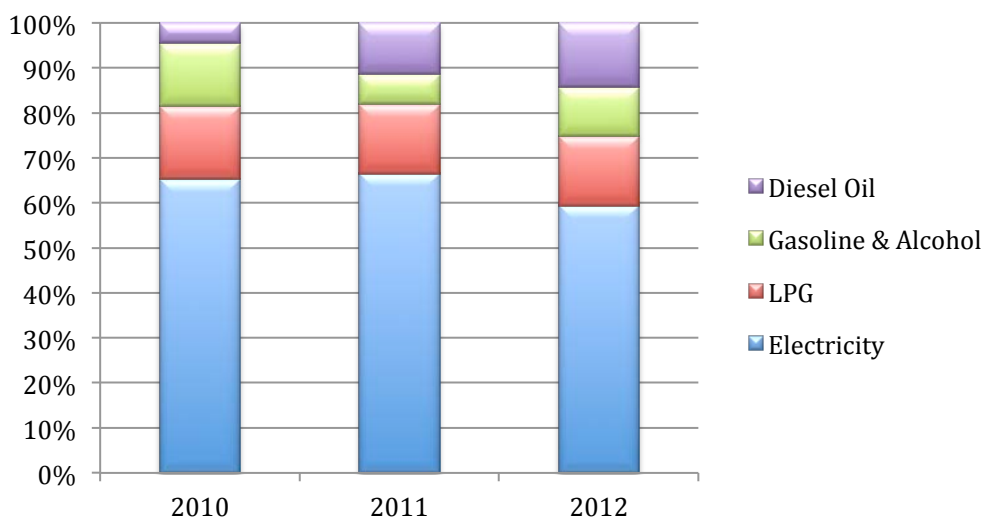
Source: Energy Saint Vincent and the Grenadines Energy Balances 2010 – 2012

For the same year, Firewood (11.8%), Charcoal (2.39%) and Kerosene (0.48%) are the other energy sources that - are consumed in the country by the residential sector. It is important to highlight the growth in the use of LPG, mainly for cooking purposes. In 2012, the consumption has increase in 44.9% comparing with the year 2010. On the other side, due to the increase in LPG use, the charcoal consumption has decrease in 4% in 2012 comparing with 2010, while the firewood consumption remains steady for the 3 years.

As the international oil prices had increase between 2010 and 2012, the prices for electricity have also increased. That is why there has been a reduction in the consumption of electricity in the residential sector. On the other side the LPG consumption has increase due to the reduction in the use of electricity and charcoal for cooking purposes.

Commercial and Public Services

This sector is the third major consumer in the general matrix. It includes Hotels, Restaurant, small business and the consumption related to the public services. The Graph 13 shows all the sources consumed.



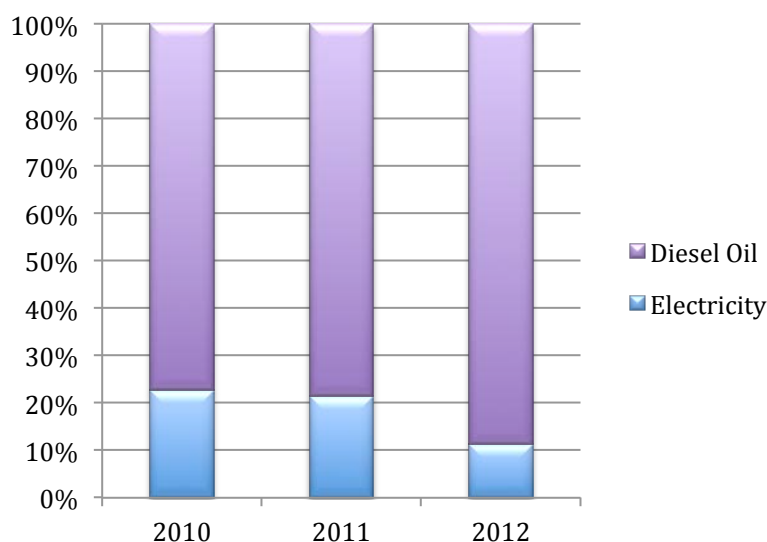
Graph 13. Energy sources consumption in the Commercial & Public Serv. sector

Source: Energy Saint Vincent and the Grenadines Energy Balances 2010 – 2012

As it is shown on Graph 13, Electricity is the most consumed energy source representing 59.3% of the total. We can see that LPG is consumed in a proportion of 15.6% of the total matrix. Besides those two energy sources, this sector also consumes Diesel oil (14.25%) and Gasoline (10.7%).

Industry

The industry sector has shown an increase in the energy consumption comparing with the figures from 2010. Basically, industry consumes Electricity and Diesel oil. As it is shown in Graph 14, in 2012 there was an increase in the use of Diesel oil of 141% comparing with the year 2010. The use of Electricity has also increased by 4%.



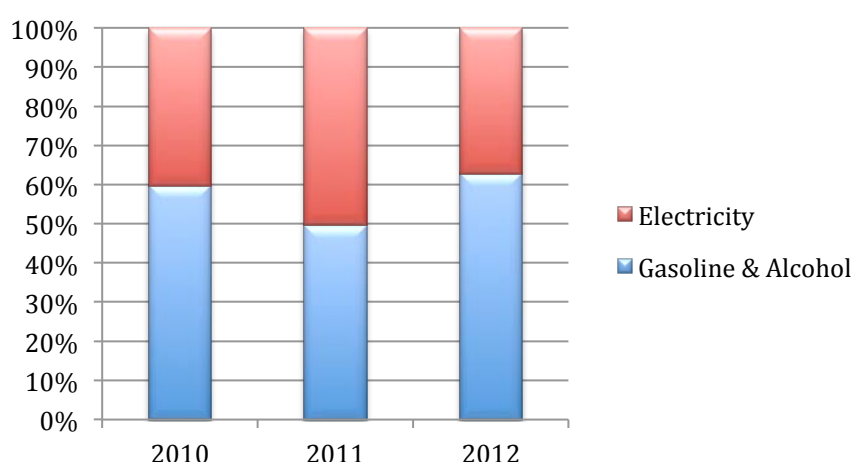
Graph 14. Energy sources consumption in the Industry sector

Source: Energy Saint Vincent and the Grenadines Energy Balances 2010 – 2012

It is important to highlight that most of the Diesel oil that has been bought by the industry sector is used mainly in machinery, transportation vehicles and in electricity self-generation Power Plants. According to the information that OLADE accessed through the questionnaires, the industry production has augmented from the years 2010 to 2012, therefore the need of electricity and the rounds of operational activities in the sector should have increased as well.

Construction & others and Agriculture, Fishing and Mining

Both sectors are minor consumers of energy. The Agriculture, Fishing and Mining sector (Graph 15) consumes basically two sources of energy, Gasoline and Electricity. The first one represents 62% of the energy consumption while Electricity represents 37.1% of the total.

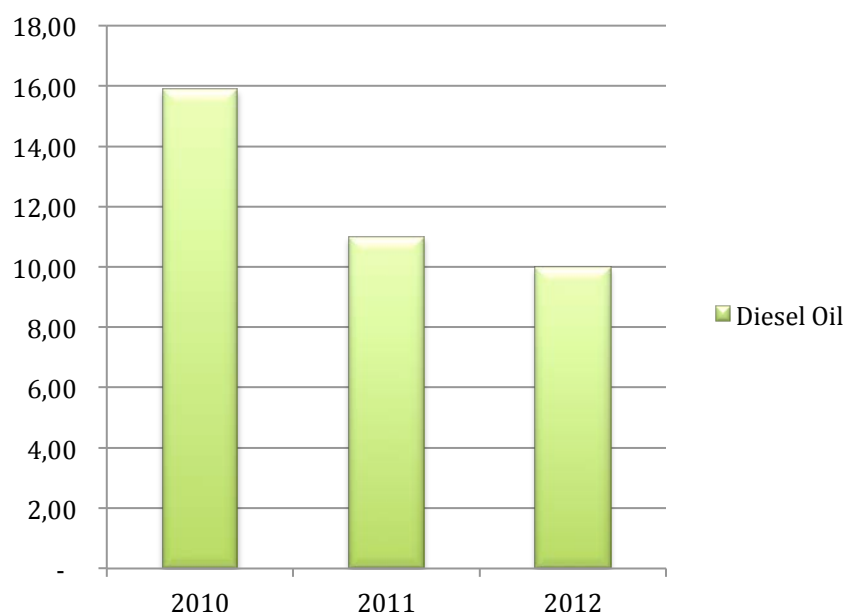


Graph 15. Energy sources consumption in the Agriculture, Fishing and Mining sector

Source: Energy Saint Vincent and the Grenadines Energy Balances 2010 – 2012

Construction sector mainly consumes Diesel oil. As it is shown on Graph 16 there has been a reduction in the use of this fuel. Between the years 2010 and 2012 there has

been a reduction of 37%. It is important to notice that this sector uses asphalts for the construction, but for the purposes of this report those values are considered as Non Energy Products along with lubricants (see Graph 19).



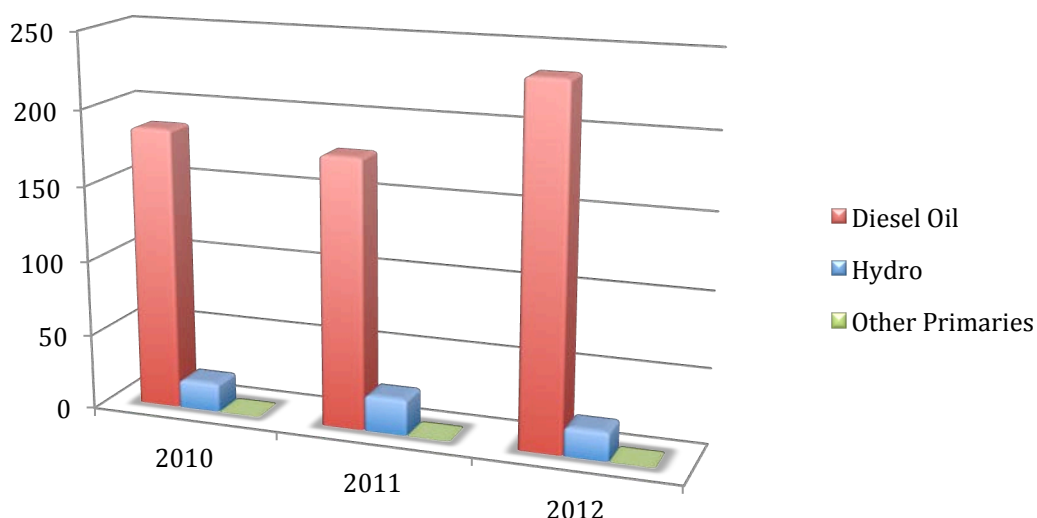
Graph 16. Energy sources consumption in the Construction and others sector

Source: Energy Saint Vincent and the Grenadines Energy Balances 2010 – 2012

Electricity Generation

As shown in Graph 17, for the Electricity generation, the Transformation sector is supplied with Diesel oil for the power plants with internal combustion engines, for VINLEC and for the Self Producers. There is also the use of hydropower and photovoltaic panels. Diesel oil is the main used fuel represented.

In terms of the percentage of the sources used in 2010, Diesel oil represents 90.7%, while the Hydro represents 9.2% and the photovoltaic use less than 0.5%. In 2011, Diesel oil represents 88.1%, while the hydro represents 11.8% and the photovoltaic less than 0.5%. In 2012, Diesel oil represents 92.4%, while the hydro represents 7.5% and the photovoltaic less than 0.5%.



Graph 17. Energy sources for electricity generation

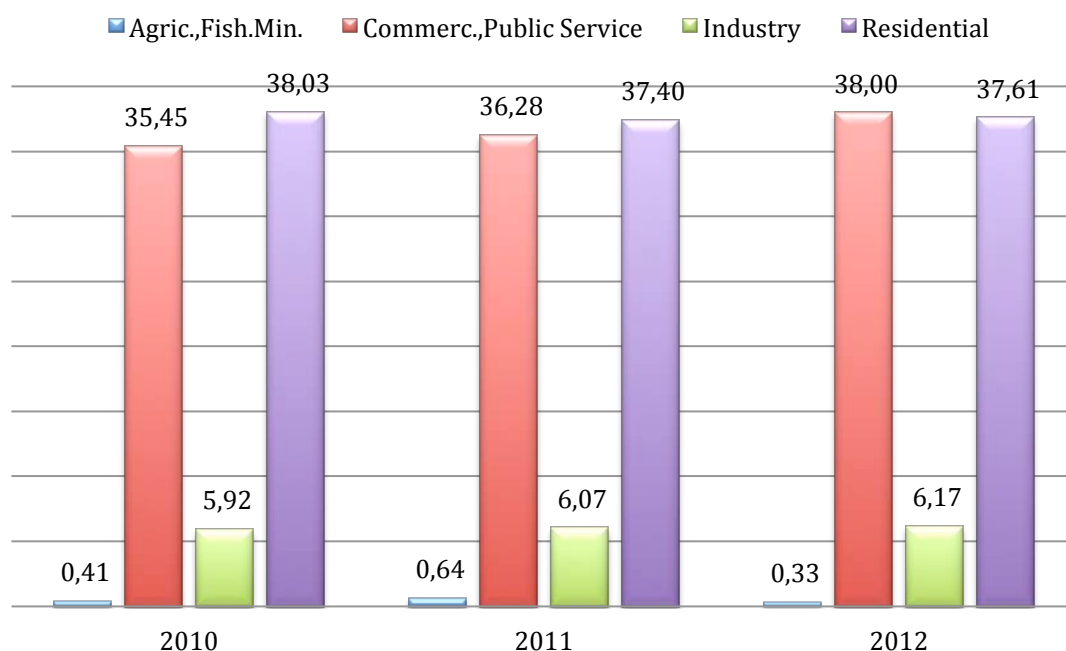
Source: Energy Saint Vincent and the Grenadines Energy Balances 2010 – 2012

Electricity consumption

In 2012, a total of 528.6 kBoe was imported, from which 359.9 kBoe was Diesel Oil (68.1%), mainly used for Electricity Generation (92.4%) (See Graph 17).

As shown on the Graph 18, from total *Electricity Consumption* in 2012 (91 kBoe), Commercial and Public Services sector represents around 41.9%. Within this economic sector, Residential sector has an annual contribution of 41.5%, while Industry, Agriculture, Fishing and Mining and Construction have the rest.

Until 2011 the Residential sector has been the major consumer of electricity with 37.4 kBoe, however, in 2012 the Commercial and the public services has become the mayor consumer with 38 kBoe. It is important to notice that hotels and restaurants are included in this sector.

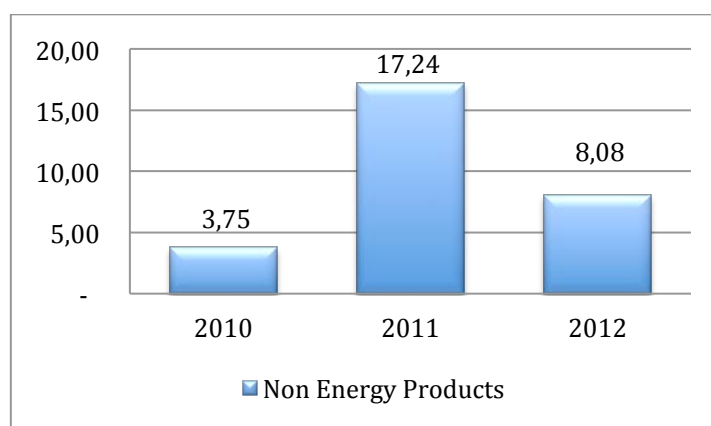


Graph 18. Electricity consumption by sector

Source: Energy Saint Vincent and the Grenadines Energy Balances 2010 – 2012

Non Energy Product consumption

The supply of these products includes lubricants, greases and asphalts. It is shown in Graph 19 that there has been a decrease of 53% in the supply of these products comparing the years 2011 and 2012. However, due to the new airport construction between the years 2010 and 2011 there has been an increase of almost 360% in the supply, mainly of asphalts⁴.



Graph 19. Supply of Non energy products

Source: Energy Saint Vincent and the Grenadines Energy Balances 2010 – 2012

⁴ The construction of The Argyle International Airport was proposed in 2005, but the construction started in 2008. The deadline for the project is the year 2015, <http://www.svgiadc.com/images/ProjectUpdate/08-15-P19.pdf>

Energy Balance 2012

Physical units

	ACTIVITY	PRIMARY			SECONDARY						
		Hydropower	FIREWOOD	Others Prim	ELECTRICITY	LPG	GASOLINE/ ALCOHOL	KEROSENE	DIESEL OIL	CHARCOAL	NON- ENERGY PRODUCTS
		GWh	kt	Kboe	GWh	kbbbl	kbbbl	kbbbl	kbbbl	kt	kBep
SUPPLY	PRODUCTION	30,86	4,8	0,001	146,21					0,36	
	IMPORT					53,83	131,87	6,94	359,45		8,08
	EXPORT							6,57			
	INVENTORIES						0,82				
	UNUSED										
TOTAL	SUPPLY	30,86	4,8	0,001	146,21	53,83	132,69	0,37	359,45	0,36	8,08
TRANSFORMATION	REFINERY										
	POWER PLANTS	-30,86		0,	142,8				-232,7		
	SELF PRODUCERS			-0,001	3,41				-1,64		
	GAS TREATM.PLANT										
	CHARCOAL PLANT		-1,42							0,36	
	COKE/BLAST FURNAC										
	DISTILLERY										
	OTHER CENTERS										
TOTAL	TRANSFORMATION	-30,86	-1,42	-0,001					-234,34		
END CONSUMPTION	OWN CONSUMPTION				4,43						
	LOSSES				9,27	0,7			0,15		
	ADJUSTMENT	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
	TRANSPORTATION						124,37		57,59		
	INDUSTRY				9,95				48,29		
	RESIDENTIAL		3,37		60,7	38,22		0,37		0,36	
	COMMERC.,SERV.PUB				61,33	14,91	7,7		9,1		
	AGRIC.,FISH.MIN.				0,54		0,63				
	CONSTRUCTION,OTH.								9,98		
	CONSUMPTION		3,37		132,52	53,13	132,7	0,37	124,96	0,36	
CONSUMPTION	NON ENERGY CONSUM										8,08
CONSUMPTION	FINAL		3,37		132,52	53,13	132,7	0,37	124,96	0,36	8,08

Table 20. Saint Vincent and the Grenadines Energy Balance 2012 (Physical units)

Calorific units (kboe)

ACTIVITY	PRIMARY				SECONDARY							TOTAL SECONDARY	TOTAL
	Hydropower	FIREWOOD	Others Prim	TOTAL PRIMARY	ELECTRICITY	LPG	GASOLINE / ALCOHOL	KEROSENE	DIESEL OIL	CHARCOAL	NON- ENERGY PRODUCTS		
PRODUCTION	19,12	12,44	0,001	31,57	90,59					1,77		92,36	31,57
IMPORT						36,07	117,82	6,65	359,99		8,08	528,61	528,61
EXPORT								6,29				6,29	6,29
INVENTORIES							0,73					0,73	0,73
UNUSED													
SUPPLY	19,12	12,44	0,	31,57	90,59	36,07	118,55	0,35	359,99	1,77	8,08	615,41	554,61
REFINERY													
POWER PLANTS	-19,12		-0,00003	-19,12	88,48				-233,05			88,48	-163,7
SELF PRODUCERS			-0,001	-0,001	2,12				-1,64			2,12	0,47
GAS TREATM.PLANT													
CHARCOAL PLANT		-3,69		-3,69						1,77		1,77	-1,92
COKE/BLAST FURNAC													
DISTILLERY													
OTHER CENTERS													
TRANSFORMATION	-19,12	-3,69	-0,001	-22,82					-234,69			-234,69	-165,62
OWN CONSUMPTION					2,74							2,74	2,74
LOSSES					5,74	0,47			0,15			6,36	6,36
ADJUSTMENT	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	-0,01	-0,48
TRANSPORTATION							111,11		57,67			168,78	168,78
INDUSTRY					6,17				48,37			54,53	54,53
RESIDENTIAL		8,75		8,75	37,61	25,61		0,35		1,77		65,35	74,1
COMMERC.,SERV.PUB					38,	9,99	6,88		9,12			63,99	63,99
AGRIC.,FISH.MIN.					0,33		0,56					0,9	0,9
CONSTRUCTION,OTH.									9,99			9,99	9,99
ENERGY SOURCE		8,75		8,75	82,11	35,6	118,55	0,35	125,15	1,77		363,54	372,29
NON ENERGY CONSUM											8,08	8,08	8,08
FINAL		8,75		8,75	82,11	35,6	118,55	0,35	125,15	1,77	8,08	371,62	380,37

Table 21. Saint Vincent and the Grenadines Energy Balance 2012 (Calorific units)

Energy Balance – 2011

Physical units

	ACTIVITY	PRIMARY			SECONDARY						
		Hydropower	FIREWOOD	Others Prim	ELECTRICITY	LPG	GASOLINE/ ALCOHOL	KEROSENE	DIESEL OIL	CHARCOAL	NON- ENERGY PRODUCTS
		GWh	kt	Kboe	GWh	kbl	kbl	kbl	kbl	kt	kBep
SUPPLY	PRODUCTION	38,64	4,81	0,001	143,62					0,36	
	IMPORT					41,56	120,91	8,31	270,72		17,24
	EXPORT							7,87			
	STOCK CHANGE						27,61		1,31		
	UNUSED										
TOTAL	SUPPLY	38,64	4,81	0,001	143,62	41,56	148,52	0,44	272,03	0,36	17,24
TRANSFORMATION	REFINERY										
	POWER PLANTS	-38,64		0,	140,67				-176,34		
	SELF PRODUCERS			-0,001	2,94				-1,14		
	GAS TREATM.PLANT										
	CHARCOAL PLANT		-1,45							0,36	
	COKE/BLAST FURNAC										
	DISTILLERY										
	OTHER CENTERS										
TOTAL	TRANSFORMATION	-38,64	-1,45	-0,001					-177,49		
CONSUMPTION	OWN CONSUMPTION				4,28						
	LOSSES				9,61	0,2					
	ADJUSTMENT	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
	TRANSPORTATION						143,85		55,21		
	INDUSTRY				9,79				22,15		
	RESIDENTIAL		3,36		60,36	28,74		0,44		0,36	
	COMMERC.,SERV.PUB				58,55	12,62	3,97		6,19		
	AGRIC.,FISH.MIN.				1,03		0,7				
	CONSTRUCTION,OTH.								10,98		
	ENERGY SOURCE		3,36		129,73	41,36	148,51	0,44	94,54	0,36	
CONSUMPTION	NON ENERGY CONSUM										17,24
CONSUMPTION	FINAL		3,36		129,73	41,36	148,51	0,44	94,54	0,36	17,24

Table 22. Saint Vincent and the Grenadines Energy Balance 2011 (Physical units)

Calorific units (kboe)

ACTIVITY	PRIMARY				SECONDARY							TOTAL SECONDARY	TOTAL
	Hydropower	FIREWOOD	Others Prim	TOTAL PRIMARY	ELECTRICITY	LPG	GASOLINE / ALCOHOL	KEROSENE	DIESEL OIL	CHARCOAL	NON- ENERGY PRODUCTS		
PRODUCTION	23,94	12,49	0,	36,43	88,98					1,81		90,79	36,43
IMPORT						27,85	108,02	7,96	271,12		17,24	432,19	432,19
EXPORT								7,54				7,54	7,54
INVENTORIES							24,67		1,31			25,98	25,98
UNUSED													
SUPPLY	23,94	12,49	0,	36,43	88,98	27,85	132,69	0,42	272,43	1,81	17,24	541,42	487,06
REFINERY													
POWER PLANTS	-23,94		0,	-23,94	87,16				-176,61			87,16	-113,39
SELF PRODUCERS			0,	0,	1,82				-1,14			1,82	0,68
GAS TREATM.PLANT													
CHARCOAL PLANT		-3,77		-3,77						1,81		1,81	-1,96
COKE/BLAST FURNAC													
DISTILLERY													
OTHER CENTERS													
TRANSFORMATION	-23,94	-3,77	0,	-27,71					-177,75			-177,75	-115,35
OWN CONSUMPTION					2,65							2,65	2,65
LOSSES					5,96	0,13						6,09	6,09
ADJUSTMENT	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,01	-0,67
TRANSPORTATION							128,51		55,3			183,81	183,81
INDUSTRY					6,07				22,18			28,25	28,25
RESIDENTIAL		8,71		8,71	37,4	19,26		0,42		1,81		58,88	67,59
COMMERC.,SERV.PUB					36,28	8,46	3,55		6,2			54,48	54,48
AGRIC.,FISH.MIN.					0,64		0,63					1,26	1,26
CONSTRUCTION,OTH.									11,			11,	11,
ENERGY SOURCE		8,71		8,71	80,38	27,71	132,68	0,42	94,68	1,81		337,68	346,39
NON ENERGY CONSUM											17,24	17,24	17,24
FINAL		8,71		8,71	80,38	27,71	132,68	0,42	94,68	1,81	17,24	354,92	363,64

Table 23. Saint Vincent and the Grenadines Energy Balance 2011 (Calorific units)

Energy Balance – 2010

Physical units

	ACTIVITY	PRIMARY			SECONDARY						
		HYDRO	FIREWOOD	OTHER PRIMARIES	ELECTRICITY	LPG	GASOLINE/ ALCOHOL	KEROSENE	DIESEL OIL	CHARCOAL	NON-ENERGY PRODUCTS
		GWh	kt	Kboe	GWh	kbbl	kbbl	kbbl	kbbl	kt	kBep
SUPPLY	PRODUCTION	30,63	4,86	0,001	142,64					0,37	
	IMPORT					40,31	143,49	11,81	265,46		3,75
	EXPORT							11,32			
	INVENTORIES						14,37				
	UNUSED										
TOTAL	SUPPLY	30,63	4,86	0,001	142,64	40,31	157,86	0,49	265,46	0,37	3,75
TRANSFORMATION	REFINERY										
	POWER PLANTS	-30,63		0,000	139,98				-185,06		
	SELF PRODUCERS			-0,001	2,66				-1,07		
	GAS TREATM.PLANT										
	CHARCOAL PLANT		-1,49							0,37	
	COKE/BLAST FURNAC										
	DISTILLERY										
	OTHER CENTERS										
TOTAL	TRANSFORMATION	-30,63	-1,49	-0,001	0,00	0,00	0,00	0,00	-186,12	0,00	0,00
END CONSUMPTION	OWN CONSUMPTION				4,04						
	LOSSES				9,80	0,62					
	ADJUSTMENT	0,00	0,00	0,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00
	TRANSPORTATION						148,76		41,06		
	INDUSTRY				9,55				20,00		
	RESIDENTIAL		3,37		61,38	26,38		0,49		0,37	
	COMMERC.,SERV.PUB				57,21	13,31	8,43		2,41		
	AGRIC.,FISH.MIN.				0,66		0,68				
	CONSTRUCTION,OTH.								15,87		
CONSUMPTION	ENERGY SOURCE		3,37		128,80	39,69	157,87	0,49	79,34	0,37	
	NON ENERGY CONSUM										3,75
CONSUMPTION	FINAL		3,37		128,80	39,69	157,87	0,49	79,34	0,37	3,75

Table 24. Saint Vincent and the Grenadines Energy Balance 2010 (Physical units)

Calorific units (kboe)

	ACTIVITY	Hydropower	FIREWOOD	Others Prim	TOTAL PRIMARY	ELECTRICITY	LPG	GASOLINE / ALCOHOL	KEROSENE	DIESEL OIL	CHARCOAL	NON- ENERGY PRODUCTS	TOTAL SECONDARY	TOTAL
SUPPLY	PRODUCTION	18,98	12,6	0,001	31,57	88,38					1,85		90,23	31,57
	IMPORT						27,01	128,2	11,32	265,86		3,75	436,14	436,14
	EXPORT								10,85				10,85	10,85
	INVENTORIES							12,84					12,84	12,84
	UNUSED													
TOTAL	SUPPLY	18,98	12,6	0,	31,57	88,38	27,01	141,03	0,47	265,86	1,85	3,75	528,35	469,7
TRANSFORMATION	REFINERY													
	POWER PLANTS	-18,98		-0,00003	-18,98	86,73				-185,33			86,73	-117,58
	SELF PRODUCERS			-0,001	0,	1,65				-1,07			1,65	0,58
	GAS TREATM.PLANT													
	CHARCOAL PLANT		-3,85		-3,85						1,85		1,85	-2,01
	COKE/BLAST FURNAC													
	DISTILLERY													
OTHER CENTERS														
TOTAL	TRANSFORMATION	-18,98	-3,85	-0,001	-22,83					-186,4			-186,4	-119,58
END CONSUMPTION	OWN CONSUMPTION					2,5							2,5	2,5
	LOSSES					6,07	0,42						6,48	6,48
	ADJUSTMENT	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	-0,01	-0,59
	TRANSPORTATION							132,9		41,12			174,02	174,02
	INDUSTRY					5,92				20,03			25,95	25,95
	RESIDENTIAL		8,74		8,74	38,03	17,67		0,47		1,85		58,02	66,77
	COMMERC.,SERV.PUB					35,45	8,92	7,53		2,41			54,31	54,31
	AGRIC.,FISH.MIN.					0,41		0,61					1,02	1,02
	CONSTRUCTION,OTH.									15,89			15,89	15,89
CONSUMPTION	ENERGY SOURCE		8,74		8,74	79,81	26,6	141,04	0,47	79,46	1,85		329,22	337,96
	NON ENERGY CONSUM											3,75	3,75	3,75
CONSUMPTION	FINAL		8,74		8,74	79,81	26,6	141,04	0,47	79,46	1,85	3,75	332,97	341,71

Table 25. Saint Vincent and the Grenadines Energy Balance 2010 (Calorific units)

Chapter VI. Greenhouse Emissions Methodology

10. 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.

Two methodologies could be applied to obtain Greenhouse Gas Emissions: Technology approach and Reference approach.

10.1. Technology approach

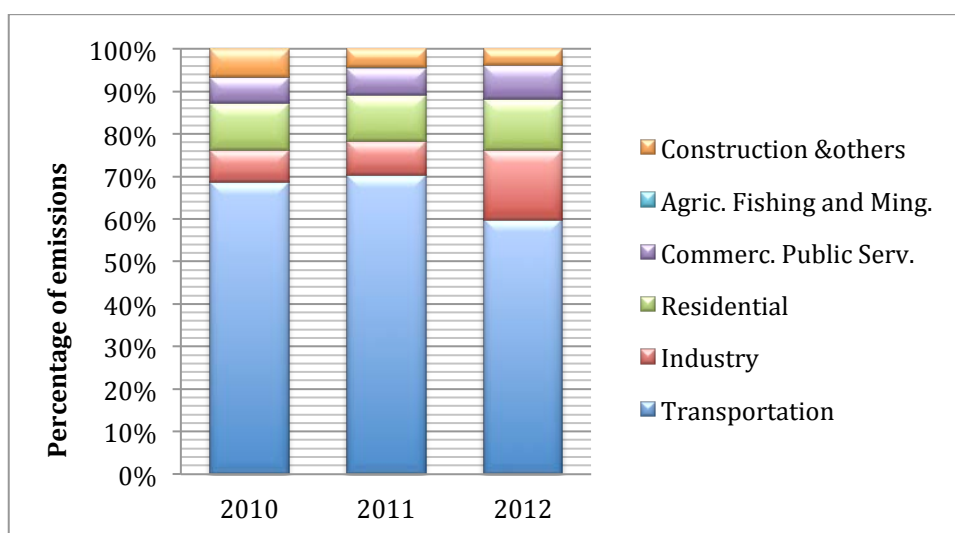
This IPCC⁵ Methodology is based on the calculation of emissions by pollutants and according to the consultation variables: country, energy source, energy activity carried out in the process and the applicable year.

The methodology of technologies uses the values reported by the countries on the fundamental data according to the energy activities developed by energy source, those are operated with the factors of contamination of this technology and applied according to the pollutant in mention, this way we can get the emissions by source (See Graph 21).

In terms of the Activities on Graph 20 we can see that the Transport sector is the most pollutant activity with 59.9 % of the total of sources. However, it is important to notice that it has been a 7% decrease in terms of the emissions caused by Transportation oil comparing with the year 2011.

Other important activity is Industry, which has a 16,2% of participation in this matrix. In this case it is important to notice that there has been an increase of 119% in the emissions caused by the industry sector compared with the year 2011.

⁵Intergovernmental 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 socio-economic impacts. <http://www.ipcc.ch/index.htm#Utm37DlziqQ> (web page visited on Jan, 16th 2014).

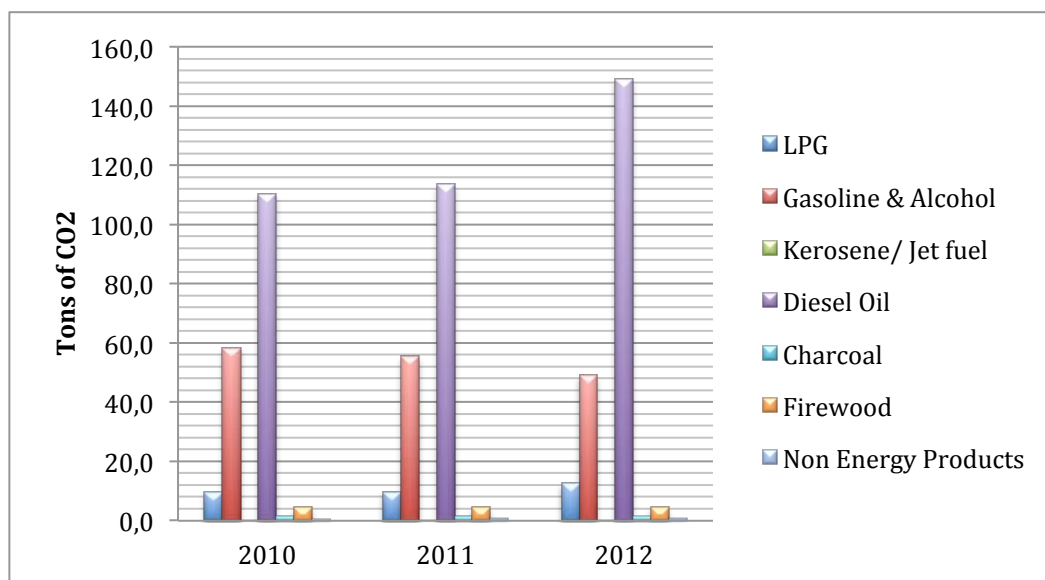


Graph 20. Percentage of emissions by Activity (2010-2012)

Source: Saint Vincent and the Grenadines Gas Inventory (2010-2012)

On the other hand, as it is shown on Graph 21, if we analyze the emissions by source we find that Diesel Oil is the most pollutant source with almost 150 tons of CO₂ in 2012. Considering that the total of emissions in 2012 was 218 tons of CO₂, Diesel Oil itself generated 68% in 2012. It is important to notice that there has been an increase of 35% of the emissions caused by Diesel oil comparing the years 2010 and 2012.

Another important source of emissions is Gasoline, which had almost 50 tons of CO₂ in 2012 that represents 22.5% of the total emissions.



Graph 21. Percentage of emissions by Source (2010-2012)

Source: Saint Vincent and the Grenadines Gas Inventory (2010-2012)

10.2. Reference approach

Procedure of calculation of Emissions of CO₂ based on basic indicators of Apparent Consumption, Content of Coal and non-energy Consumption of the energy sources. The obtained results are emissions in Gg CO₂. The factors can also be consulted used in the calculation process (See Greenhouse Gas Emissions calculated by Reference approach, page 109).

For the purposes of this chapter, presented results are related to Technology approach. Reference Approach results may be revised in Annex Greenhouse Gas Emissions calculated by Reference approach, page 109.

10.3. CO2 Emissions According to Technology approach

ENERGY SOURCE		FIREWOOD	OTHER PRIMARIES	TOTAL PRIMARY	LPG	GASOLINE / ALCOHOL	KEROSENE	DIESEL OIL	CHARCOAL	NON-ENERGY PRODUCTS	SECONDARY	TOTAL
SUPPLY	PRODUCTION			0,00							0,00	0,00
	IMPORT			0,00							0,00	0,00
	EXPORT			0,00							0,00	0,00
	INVENTORIES			0,00							0,00	0,00
	UNUSED			0,00							0,00	0,00
TOTAL	SUPPLY	0,00		0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
TRANSFORMATION	REFINERY			0,00							0,00	0,00
	POWER PLANTS		0,00	0,00				94,72			94,72	94,72
	SELF PRODUCERS		0,00	0,00				0,66			0,66	0,66
	GAS TREATM.PLANT			0,00							0,00	0,00
	CHARCOAL PLANT			0,00					0,51		0,51	0,51
	COKE/BLAST FURNAC			0,00							0,00	0,00
	DISTILLERY			0,00							0,00	0,00
	OTHER CENTERS			0,00							0,00	0,00
TOTAL	TRANSFORMATION	0,00		0,00	0,00	0,00	0,00	95,38	0,51	0,00	95,89	95,89
FINAL CONSUMPTION	OWN CONSUMPTION			0,00							0,00	0,00
	TRANSPORTATION			0,00		47,04		25,68			72,72	72,72
	INDUSTRY			0,00				19,66			19,66	19,66
	RESIDENTIAL	4,72		4,72	8,75		0,14		0,99		9,88	14,61
	COMMERC.,SERV.PUB			0,00	3,90	1,90		3,97			9,78	9,78
	AGRIC.,FISH.MIN.			0,00		0,16					0,16	0,16
	CONSTRUCTION,OTH.			0,00				4,45			4,45	4,45
CONSUMPTION	ENERGY	4,72	0,00	4,72	12,65	49,09	0,14	53,77	0,99	0,00	116,65	121,37
	NON-ENERGY			0,00						0,73	0,73	0,73
CONSUMPTION	FINAL	4,72	0,00	4,72	12,65	49,09	0,14	53,77	0,99	0,73	117,38	122,10
TOTAL	EMISSIONS	4,72	0,00	4,72	12,65	49,09	0,14	149,15	1,50	0,73	213,27	217,99

Table 26. Saint Vincent and the Grenadines Gas Inventory 2012 (Technology Approach)

ENERGY SOURCE		FIREWOOD	OTHER PRIMARIES	TOTAL PRIMARY	LPG	GASOLINE / ALCOHOL	KEROSENE	DIESEL OIL	CHARCOAL	NON-ENERGY PRODUCTS	SECONDARY	TOTAL
SUPPLY	PRODUCTION			0,00							0,00	0,00
	IMPORT			0,00							0,00	0,00
	EXPORT			0,00							0,00	0,00
	INVENTORIES			0,00							0,00	0,00
	UNUSED			0,00							0,00	0,00
TOTAL	SUPPLY	0,00		0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
TRANSFORMATION	REFINERY			0,00							0,00	0,00
	POWER PLANTS		0,000	0,00				71,783			71,78	71,78
	SELF PRODUCERS		0,000	0,00				0,458			0,46	0,46
	GAS TREATM.PLANT			0,00							0,00	0,00
	CHARCOAL PLANT			0,00					0,524		0,52	0,52
	COKE/BLAST FURNAC			0,00							0,00	0,00
	DISTILLERY			0,00							0,00	0,00
	OTHER CENTERS			0,00							0,00	0,00
TOTAL	TRANSFORMATION	0,00		0,00	0,00	0,00	0,00	72,24	0,52	0,00	72,76	72,76
FINAL CONSUMPTION	OWN CONSUMPTION			0,00							0,00	0,00
	TRANSPORTATION			0,00		54,404		24,626			79,03	79,03
	INDUSTRY			0,00				9,017			9,02	9,02
	RESIDENTIAL	4,702		4,70	6,578		0,171		1,011		7,76	12,46
	COMMERC.,SERV.PUB			0,00	3,305	0,979		2,703			6,99	6,99
	AGRIC.,FISH.MIN.			0,00		0,173					0,17	0,17
	CONSTRUCTION,OTH.			0,00				4,898			4,90	4,90
CONSUMPTION	ENERGY	4,70	0,00	4,70	9,88	55,56	0,17	41,24	1,01	0,00	107,87	112,57
	NON-ENERGY			0,00						0,73	0,73	0,73
CONSUMPTION	FINAL	4,70	0,00	4,70	9,88	55,56	0,17	41,24	1,01	0,73	108,59	113,29
TOTAL	EMISSIONS	4,70	0,00	4,70	9,88	55,56	0,17	113,49	1,53	0,73	181,35	186,06

Table 27. Saint Vincent and the Grenadines Gas Inventory 2011 (Technology Approach)

ENERGY SOURCE		FIREWOOD	OTHER PRIMARIES	TOTAL PRIMARY	LPG	GASOLINE / ALCOHOL	KEROSENE	DIESEL OIL	CHARCOAL	NON-ENERGY PRODUCTS	SECONDARY	TOTAL
SUPPLY	PRODUCTION			0,00							0,00	0,00
	IMPORT			0,00							0,00	0,00
	EXPORT			0,00							0,00	0,00
	INVENTORIES			0,00							0,00	0,00
	UNUSED			0,00							0,00	0,00
TOTAL	SUPPLY	0,00		0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
TRANSFORMATION	REFINERY			0,00							0,00	0,00
	POWER PLANTS		0,00	0,00				75,33			75,33	75,33
	SELF PRODUCERS		0,00	0,00				0,43			0,43	0,43
	GAS TREATM.PLANT			0,00							0,00	0,00
	CHARCOAL PLANT			0,00					0,53		0,53	0,53
	COKE/BLAST FURNAC			0,00							0,00	0,00
	DISTILLERY			0,00							0,00	0,00
	OTHER CENTERS			0,00							0,00	0,00
TOTAL	TRANSFORMATION	0,00		0,00	0,00	0,00	0,00	75,76	0,53	0,00	76,29	76,29
FINAL CONSUMPTION	OWN CONSUMPTION			0,00							0,00	0,00
	TRANSPORTATION			0,00		56,26		18,31			74,58	74,58
	INDUSTRY			0,00				8,14			8,14	8,14
	RESIDENTIAL	4,72		4,72	6,04		0,19		1,03		7,26	11,98
	COMMERC.,SERV.PUB			0,00	3,49	2,08		1,05			6,62	6,62
	AGRIC.,FISH.MIN.			0,00		0,17					0,17	0,17
	CONSTRUCTION,OTH.			0,00				7,08			7,08	7,08
CONSUMPTION	ENERGY	4,72	0,00	4,72	9,52	58,51	0,19	34,59	1,03	0,00	103,84	108,56
	NON-ENERGY			0,00						0,73	0,73	0,73
CONSUMPTION	FINAL	4,72	0,00	4,72	9,52	58,51	0,19	34,59	1,03	0,73	104,57	109,29
TOTAL	EMISSIONS	4,72	0,00	4,72	9,52	58,51	0,19	110,34	1,57	0,73	180,86	185,58

Table 28. Saint Vincent and the Grenadines Gas Inventory 2010 (Technology Approach)

Chapter VII. Energy and Economic Indicators

In table 29 there is a comparison between different economic indicators from the average of Latin American and Caribbean countries and also with some other OECS countries that OLADE has already processed the Energy Balances.

In terms of the Final energy consumption per capita of Saint Vincent and the Grenadines, it has increased through the periods of time of study. This means that the consumption has increased more than the population along these years. It is interesting to see the contrast with the average indicator from Latin America and the Caribbean of the year 2011, which is 7.38 kBoe/10(3)inhab. Saint Vincent and the Grenadines shows in the year 2011 a Final Energy Consumption per capita of 3.15kBoe/10(3)inhab, which is almost half of the value registered in Latin American and the Caribbean countries.

The indicator from the total Energy consumption per capita varies with those of Saint Lucia and Dominica, the difference might be in terms of the access for electricity compared with the number of habitants that each country has. Saint Lucia is around 173,000 and Dominica almost 73,000 habitants.

In terms of the Total Energy Consumption in the Residential sector per capita, it is remarkable that Saint Vincent and the Grenadines has lower energy consumption per capita than Dominica, Saint Lucia and the Latin American and the Caribbean countries.

Accordingly, the country shows an average of 1.19GWh/10(3) inhab of total Electricity consumption per capita. This value is the lowest if we compare it with the Latin American and the Caribbean countries, Dominica and Saint Lucia. On the contrary, the value from the Total Electricity Consumption in the Residential sector per capita is higher than the rest, due to the low energy efficiency measurements that are being held in this sector. Now, if we compared both indicators, it might be possible that the number of industries in the country is not that big, compared with the number of industries from the Latin American and the Caribbean Countries.

The Energy Intensity indicator of the country is lower than the average because both, the GDP and the Energy Consumption values, are modest if we compare with Saint Lucia, and the Latin American and the Caribbean Countries.

In terms of the Industrial Energy Intensity, it can be seen that the values from the OECS countries are lower due to the small levels of industrialization, compared with the industrialization from the Latin American and the Caribbean countries.

In relation with the indicator for the Total CO₂ emissions per capita, the difference with the Latin American countries might be in terms of the transportation, which in this case is related to the higher prices of fuels in Saint Vincent and the Grenadines, Saint Lucia and Dominica. However this figure is also influenced by the CO₂ emissions that each country generates within all of the economic sectors.

It is important to highlight the figures for the Intensity of CO₂ emissions in electricity generation that shows that the average for the 3 years for Saint Vincent and the Grenadines are higher than the ones of Latin America and the Caribbean countries due to the hydropower installed capacity potential for electricity generation. This situation is related to the high levels of consumption of Diesel oil for electricity generation, the same situation can be seen in Dominica and Saint Lucia.

Year	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 Intensity	Industrial Energy Intensity	Total CO2 Emissions per capita	Intensity of CO2 Emissions in Electricity Sector / Generation
	(kboe/10(3)inhab)	(GWh/10(3)inhab)	(kboe/10(3)inhab)	(kWh/inhab)	(boe/10(3) EC\$)	(boe/10(3) EC\$)	(Gg CO2 /boe/10(3)inhab)	(Gg CO2/GWh)
St. Vincent & The Grenadines								
2010	3,08	1,17	0,61	0,56	0,18	0,29	1,69	0,59
2011	3,15	1,18	0,62	0,55	0,19	0,33	1,69	0,56
2012	3,38	1,20	0,67	0,55	0,20	0,68	1,98	0,72
<i>Average</i>	<i>3,20</i>	<i>1,19</i>	<i>0,63</i>	<i>0,55</i>	<i>0,19</i>	<i>0,43</i>	<i>1,79</i>	<i>0,62</i>
Dominica								
<i>Average</i>	<i>3,65</i>	<i>1,85</i>	<i>0,76</i>	<i>0,35</i>	<i>0,22</i>	<i>1,84</i>	<i>1,75</i>	<i>0,55</i>
St. Lucia								
<i>Average</i>	<i>4,63</i>	<i>1,43</i>	<i>0,69</i>	<i>0,42</i>	<i>0,71</i>	<i>0,12</i>	<i>1,29</i>	<i>0,72</i>
Latin America and Caribbean								
2011	7,38	1,21	1,14	0,52	1,29	2,82	2,7	0,22

Table 29. Energy and Economic Indicators (2010 – 2012)

Chapter VIII. Conclusions and recommendations

- As OLADE was gathering the information to build the Energy Balance, remarkable and important data was found about the country, for example the number of fishing vessels and their number of engines and the fuel that each consumes, among others; in terms of the supply and the demand side of the energy sector. Public and private institutions manage their own information depending on the subsectors. For example, the private importers have their own data and the tourism sector has the consumption from the hotels. The Energy Balance has become an important instrument in which the country could give the first steps in order to centralize all the information related to Energy. With all the information gathered, the country could promote the energy planning process with the base of investigation and real data.
- In terms of the Energy Consumption, which is very important to determine and analyze along with the supply and the transformation side, there was limited access to reliable information related to each sector in terms of the final consumption. Therefore, the consumption of the energy sources, classified by economic subsectors was estimated by a calculation processes based on the structural characteristics of the country and also the consumers.

For transportation and household consumption, there was gathered information such as the size of the vehicle fleet, type of vehicle, number of vessels, cruise ships and ferries, with number of engines, by year, number of dwellings, number of households, total population, type of fuel used for cooking and for lighting , among others for the years 2010 –2012.

For the Industrial, Commercial, Agriculture, Fishing and Mining sectors, variables such as production, added value, number of employees, electricity bills, purchased fuels and their specific use, among others, were gathered to elaborate some estimates. Therefore, thanks to all the above mentioned information, the Energy Balances can be considered as adequate and reliable, mainly taking into account the statistical adjustment by source and for total energy.

- Considering that Saint Vincent and the Grenadines is mainly reliant on imported energy sources, whose prices fluctuate depending on the international scenario; it is very important for the country to optimize their use and also to keep promoting the energy efficiency in all economic activities and subsectors. Therefore, continuing with the process of elaboration of the Energy Balance is important for the country to create a consistent energy forecast for the future.
- The use of hydropower, as well as, photovoltaic and wind farms might change in a favorable way the matrix of the energy use in the country and also will reduce the quantity of imported fuels. This situation will reduce the CO₂ emissions caused by most of the fuels that have been consumed.
- It is important to consider that Saint Vincent and the Grenadines has a strong seasonal tourism sector that requires a clean environment for their activities and that also depends highly on competitive energy costs to increase their size. Tourism activities are one of the major contributors to the Gross Domestic


Product of the country. Considering these facts, the potential of wind as well as solar resources might be promoted to supply this sector.

- The increase of the energy efficiency in the use of each source, each year, could be unveiled through the Energy Balance analysis, and it will have long-term economic and environmental benefits under the energy planning process that Saint Vincent and the Grenadines could pursue after reading this report.

ANNEX

Forms

Saint Vincent and the Grenadines Contact List

<div> SAINT VINCENT AND THE GRENADINES CONTACT LIST - 2014  <div> Organización Latinoamericana de Energía Latin American Energy Organization Organisation Latino-américaine d'Énergie Organização Latino-Americana de Energia </div> </div>							
N	SUB-SECTOR		CONTACT NAME	ADDRESS	PHONE	EMAIL	SURVEY
1	Main Energy Supply Demand and National Variables	Ministry of Finance and Economic Planning / Statistical Office	Director General Mr. Maurice Edwards				Q1_F03_SVG_2014 Q12_NV_SVG_2014 Q4_CTR_SVG_2014
2		Mustique Company	Roger Pritchard / Stewart Wood (operations director)				Q1_F03_SVG_2014 Q7_CCO_SVG_2014 Q4_CTR_SVG_2014 Q8_CCOH_SVG_2014
3	Hydrocarbons	Rubis	Elroy edwards				Q2_HC_SVG_2014
4		Sol	Steve Francis				Q2_HC_SVG_2014
5		Petrocaribe	Ms. Fay Ferguson				Q2_HC_SVG_2014
6	Electricity	VINLEC	DR. VAUGHN LEWIS				Q3_EE_SVG_2014
7	Renewable Energy	Reykjavik Geothermal	Mr. Trent Phillips				Ask for Studies
8		Light & Power Holdings (Barbados /Geothermal)	Mr. Peter Williams				Ask for studies
9	Industry	Ministry of Agriculture, Industry, Forestry, Fisheries and Rural Transformation	Permanent Secretary Mr. Raymond Ryan				Q5_CIN_SVG_2014 Q11_CRW_SVG_2014
10		East Caribbean Group of Companies.	Mr. Osmond Davy				Q6_CIN2_SVG_2014
11		East Caribbean Metal Industry Ltd.	Mr. Michael Persaud				Q6_CIN2_SVG_2014
12		Kimya Glasgow Design Inc.	Ms. Kimya Glasgow				Q6_CIN2_SVG_2014
13		St. Vincent Brewery Limited.	Theodore Browne Chief Engineer				Q6_CIN2_SVG_2014
14		The Chamber of Industry and Commerce	Mr. Tony Regisford/ Mrs. Christine				Q5_CIN_SVG_2014 Q6_CIN2_SVG_2014
15		St. Vincent Distillers Ltd.	Mr. Kenrick Greaves/ Mrs. Phillippa Greaves				Q6_CIN2_SVG_2014
16		St Vincent Corrugated Containers Inc	Mr. Monty Maule				Q6_CIN2_SVG_2014
17		St. Vincent Packaging Ltd.	Mr. Adolph Veira				Q6_CIN2_SVG_2014

20	Transport	Ministry of National Security, Air and Sea Port Development	Permanent Secretary Mr. Godfrey Pompey				Q4_CTR_SVG_2014
21		St Vincent and the Grenadines Maritime Association	Director Mr. David Robin				Q4_CTR_SVG_2014
22		Ministry of Transport , Works , Urban Development And Local Government	Mr. Brent Bailey				Q4_CTR_SVG_2014
23	Hotels/Resorts	Tourism Administration (Ministry of Tourism, Sports and Culture)	Permanent Secretary Mrs. Lavern Grant				Q7_CCO_SVG_2014
24		Palm Island Resort	Mr. Robert Barrett				Q8_CCOH_SVG_2014
25		Sugar Reef	Ms. Judith Simpson				Q8_CCOH_SVG_2014
26							
27		The Cotton House	Mrs. Saibrina Dickson Mustique Company				Q8_CCOH_SVG_2014
28		Pink Sands	Ms. Sabrina Mai				Q8_CCOH_SVG_2014
29		Petite St. Vincent Resort (Private Island)	Mr. Matthew Semark/ Mr. Otnel Samuel				Q8_CCOH_SVG_2014
30		Firefly Plantation Bequia	Mr. Shion Quashie				Q8_CCOH_SVG_2014
31		The Old Fort	Mr. Quirin Schaedle				Q8_CCOH_SVG_2014
32		Young Island Resort	Ms. Bianca Porter				Q8_CCOH_SVG_2014
		The Grenadine House	Laela Constantine / General Manager				Q8_CCOH_SVG_2014
33		Bequia Hotel Beach	Ms. Florinda Marshall				Q8_CCOH_SVG_2014
34	Supermarkets/Retailers	C. D. Veira Ltd (Singer).	Mr. Ian Veira				Q10_CCOSC_SVG_2014
35		Corea's Hazells Limited.	Mr. Joel Providence				Q10_CCOSC_SVG_2014
36		C. K. Greaves & Co.	Mr. Nigel Greaves				Q10_CCOSC_SVG_2014
37		Super J IGA Supermarket	Ms. Lorene Charles				Q10_CCOSC_SVG_2014
38		Courts (St. Vincent) Limited.	Mrs. Michele Samuel				Q10_CCOSC_SVG_2014
41	Restaurants	Firefly	Mr. Shion Quashie				Q9_CCOR_SVG_2014
43		Flow Wine Bar	Mr. Andrew Williams				Q9_CCOR_SVG_2014

Table 30. Saint Vincent and the Grenadines Contact List 2014

Note: Personal information was deleted due to a confidential agreement

Surveys

Main Energy Variables



Q1_F03_SVG_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
F03A	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.

SAINT VINCENT AND THE GRENADINES ENERGY BALANCE



Organización Latinoamericana de Energía
Latin American Energy Organization
Organisation Latine-Américaine d'Énergie
Organização Latino-Americana de Energia

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 olade-celac@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)			

SAINT VINCENT AND THE GRENADINES ENERGY BALANCE



Organización Latinoamericana de Energía
Latin American Energy Organization
Organisation Latine-américaine d'Énergie
Organização Latino-Americana de Energia

MAIN ENERGY VARIABLES FORM

MINISTRY NAME:	0
ADDRESS:	0
CITY:	0
CONTACT NAME:	0
EMAIL:	0
DATE:	0

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 olade-celac@olade.org

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 & steel	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			

(**) Specify calorific value

SAINT VINCENT AND THE GRENADINES ENERGY BALANCE



Organización Latinoamericana de Energía
Latin American Energy Organization
Organisation Latine-américaine d'Énergie
Organização Latino-Americana de Energia

MAIN ENERGY VARIABLES FORM

MINISTRY NAME:		0
ADDRESS:		0
CITY:		0
CONTACT NAME:		0
EMAIL:		0
DATE:		0

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 oolde-celac@olade.org

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			
- Agriculture, Fishing and Mining	GWh			
- Other	GWh			
9.3 LOSSES	GWh			
9.4 EXPORTS				
- Volume	GWh			
9.5 IMPORTS				
- Volume	GWh			

Hydrocarbons



Q2_HC_SVG_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_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

Storage

Q2_HC_SVG_2014

SAINT VINCENT AND THE GRENADINES 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 oalde-celac@olade.org



Organisation Latino-américaine de l'Énergie
Latin American Energy Organization
Organización Latinoamericana de Energía

SECTION 1: STORAGE GENERAL CHARACTERISTICS

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

Page 1

Hydrocarbons' Total Sales

SAINT VINCENT AND THE GRENADINES ENERGY BALANCE

HYDROCARBONS SURVEY

COMPANY NAME:	0
ADDRESS:	0
CITY:	0
CONTACT NAME:	0
EMAIL:	0
TELEPHONE:	0
DATE:	0

YEAR: 2012

SECTION 2: HYDROCARBONS' SUPPLY SIDE AND OTHER VARIABLES

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

SECTION 3: HYDROCARBONS' TOTAL SALES

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

Electricity Sector Survey



Q3_EE_SVG_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 four 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
	Section 1. Power plant description
EE_2010	Section 2. Power plant annual variables of year 2010
	Section 3. Total customers and sales for year 2010
EE_2011	Section 2. Power plant annual variables of year 2011
	Section 3. Total customers and sales for year 2011
EE_2012	Section 2. Power plant annual variables of year 2012
	Section 3. Total customers and sales for year 2012

Power Plants Annual Variables

Q3_EE_SVG_2014

SAINT VINCENT AND THE GRENADINES ENERGY BALANCE



Organización Latinoamericana de Energía
Latin American Energy Organization
Organisation Latine américaine d'énergie
Organização Latino-Americana de Energia

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 oalde-celac@olade.org

SECTION 1: POWER PLANT GENERAL CHARACTERISTICS

N	Name	Location	Service S=Self-producer	P=Public R=Private	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									

Page 1

Hydro energy Technical Specifications Total Sales and Consumers

SAINT VINCENT AND THE GRENADINES ENERGY BALANCE



Organización Latinoamericana de Energía
Latin American Energy Organization
Organisation Latine américaine d'énergie
Organização Latino-Americana de Energia

ELECTRICITY SURVEY

COMPANY NAME:	0
ADDRESS:	0
CITY:	0
CONTACT NAME:	0
EMAIL:	0
DATE:	0

YEAR: 2012

SECTION 2: POWER PLANT ANNUAL VARIABLES

N	Technology Type *	Plant Factor (%)	Electricity Generation (GWh)	Fuel Consumed for Electricity Generation	Quantity of Fuel Used (kbbt)	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							

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

SECTION 3: TOTAL SALES AND CUSTOMERS

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

Page 4

Transport Sector Survey

Form 1.



Q4_CTR_SVG_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 four 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
CTR_2010	Section 1. General Characteristics of transport sector for year 2010
	Section 2. Consumption of energy sources of year 2010
	Section 3. Transport Fleet by Category for year 2010
CTR_2011	Section 1. General Characteristics of transport sector for year 2011
	Section 2. Consumption of energy sources of year 2011
	Section 3. Transport Fleet by Category for year 2011
CTR_2012	Section 1. General Characteristics of transport sector for year 2012
	Section 2. Consumption of energy sources of year 2012
	Section 3. Transport Fleet by Category for year 2012

Characterization of Transport Sector; Energy sources and Characterization of Transport Sub-Sector

SAINT VINCENT AND THE GRENADINES ENERGY BALANCE
TRANSPORT SECTOR



Organización Latinoamericana de Energía
Latin American Energy Organization
Organisation Latine-Américaine d'Énergie
Organizações Latino-Americanas de Energia

Date:

name of the institution:

country: parish:

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 calde-celac@olade.org

2012

SECTION 1. CHARACTERISTICS OF SUBSECTORS

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. ENERGY SOURCES

Subsector	Electricity	Crude Oil	LPG	Kerosene	Gasoline	Diesel Oil	Fuel Oil	Coke	Charcoal	Firewood
(GDP 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. CHARACTERIZATION OF TRANSPORT SUB-CATEGORIES

Category	Private		Public		Average Annual Mileage
	Units		Units		
	Gasoline	Diesel	Gasoline	Diesel	
Subtotal light vehicles					
Automovil					
Campero					
Pickup					
Subtotal buses					
Small bus					
Big bus					
Subtotal heavy cargo					
Heavy cargo					
2 axes					
4 axes					
6 axes					
>6 axes					

Individual Transport Survey



Q5_CTR_SVG_2014

Transport characteristics

Addressed to

Owners of vehicles

Description

This survey is designed to identify the energy demand on the private owned vehicles

Section 1 – Characterization of energy demanda in transport sector

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

Characteristics of the vehicle

SAINT VINCENT AND THE GRENADINES TRANSPORT SECTOR									
SECTION 1. CHARACTERIZATION OF TRANSPORT ENERGY DEMAND									
	Type of vehicle	Vehicle Brand	Year of production	Fuel Used	Average Annual Mileage	Unit		Owner	
						Km	Miles	Public	Private
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									

Industrial Sector Survey

Q5_CIN_SVG_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
CIN_2010	Section 1. General 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. General 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. General 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

Characteristics of Industry Sector

[illegible]

Industry Specific survey



Organización Latinoamericana de Energía
Latin American Energy Organization
Organisation Latino-américaine d'Énergie
Organizaçao Latino-Americana de Energia

Q6_CIN2_SVG_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.

File Structure

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

Characteristics of the Industry

SAINT VINCENT AND THE GRENADINES 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 olade-celac@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

Manufactured Products	Product 1	Product 2	Product 3	Product 4	Product 5	Product 6	Product 7	Product 8	Product 9	Product 10
Product Code										
Production Unit										
2010										
Production Capacity										
Production										
Value										
2011										
Production Capacity										
Production										
Value										
2012										
Production Capacity										
Production										
Value										

Consumption

SAINT VINCENT AND THE GRENADINES ENERGY BALANCE



Organización Latinoamericana de Energía
Latin American Energy Organization
Organisation Latino-américaine d'Énergie
Organização Latino-Americana de Energia

INDUSTRIAL SURVEY

COMPANY NAME:	0
ADDRESS:	0
CITY:	0
CONTACT NAME:	0
EMAIL:	0
TELEPHONE:	0
WEBSITE:	0
DATE:	0

SECTION 2: PURCHASES AND SALES OF ENERGY

Energy Sources	Unit	2010		2011		2012	
		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							

Commercial Sector Survey



Organización Latinoamericana de Energía
Latin American Energy Organization
Organisation Latino-américaine d'Énergie
Organização Latino-Americana de Energia

Q7_CCO_SVG_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 four 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.

File Structure

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

Hotels and Restaurants General Information and Energy Purchases by Sources

SAINT VINCENT AND THE GRENADINES ENERGY BALANCE
COMMERCIAL - HOTELS AND RESTAURANTS



Organización Latinoamericana de Energía
Latin American Energy Organization
Organisation Latine-américaine d'Énergie
Organizacja Latino-Amerykańska do Energii

Date:

Name of the Institution:

Country: Parish:

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2012

SECTION 1. CHARACTERISTICS OF COMMERCIAL SECTOR

TABLE 1.2 CHARACTERIZATION OF HOTELS

Subsector	Number of Facilities	Number of Employees	Added Value
	(Number)	(Number)	(EC\$)
Hotels			
Small (25 rooms or less)			
Average (26-99 rooms)			
Above average (100-299 rooms)			
Large (more than 300 rooms)			

TABLE 1.2 CHARACTERIZATION OF RESTAURANTS

Subsector	Facilities	Capacity	Added Value
	(Number)	(persons)	(EC\$)
Restaurants			

SECTION 2. CONSUMPTION BY ENERGY SOURCE

Subsector	Electricity		LPG (MM3)	Diesel Oil (kbbl)	Charcoal KT	Firewood KT	Fuel Oil (kbbl)	Others (kbbl)
	Purchase (kWh)	Sell - (kWh)						
Hotels								
Small (25 rooms or less)								
Average (26-99 rooms)								
Above average (100-299 rooms)								
Large (more than 300 rooms)								
Restaurants								

SECTION 3. MAJOR CONSUMERS

TABLE 3.1 ENERGY CONSUMPTION BY HOTEL

HOTEL NAME	Location	Capacity		Occupation factor %	Added Value EC\$
		Rooms	Beds		
		Units	Units		

TABLE 3.2 ENERGY CONSUMPTION BY RESTAURANT

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

Hotels individual information



Q8_CCOH_SVG_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).

File Structure

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

Hotel Characteristics and consumption

SAINTVINCENT AND THE GRENADINES 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 oalde-celac@olade.org

SECTION 1: GENERAL INFORMATION

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

SECTION 2: ELECTRICITY AND FOSIL FUEL PURCHASES

Energy Sources	Unit	2010		2011		2012	
		Amount	\$ Per Year	Amount	\$ Per Year	Amount	\$ Per Year
Firewood	KT						
LPG	(MM3)						
Diesel oil	(kbbi)						
Fuel oil	(kbbi)						
Charcoal	KT						
Electricity purchased	(kWh)						
Self-generated Electricity	(kWh)						
Others _____	()						

Restaurants individual information



Organización Latinoamericana de Energía
Latin American Energy Organization
Organisation Latino-américaine d'Énergie
Organizaçao Latino-Americana de Energia

Q9_CCOR_SVG_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).

File Structure

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

Characterization of the Restaurant

SAINT VINCENT AND THE GRENADINES ENERGY BALANCE



Organización Latinoamericana de Energía
Latin American Energy Organization
Organisation Latino-américaine d'Énergie
Organizaçao Latino-Americana de Energia

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 olade-celac@olade.org

SECTION 1: GENERAL INFORMATION

Year	Number of invoices	Occupation factor	Sales value
	Nº	Capacity used / Capacity installed (%)	\$
2010			
2011			
2012			

Instructions:

Capacity is the number of persons that can be simultaneously served

Occupation Factor is the annual average of the number of persons served divided by the Capacity

Added Value is related to the annual sales value

SECTION 2: PURCHASES

Energy Sources	Unit	2010		2011		2012	
		Amount	\$ Per Year	Amount	\$ Per Year	Amount	\$ Per Year
Firewood	kt						
LPG	(MM3)						
Diesel oil	(kbb)						
Fuel oil	(kbb)						
Charcoal	kt						
Electricity purchased	(kWh)						
Self-generated Electricity	(kWh)						
Others	()						

Q10_CRW_SVG_2014

Characteristics of Agricultural Sector

Description

The questionnaire is designed to identify the general characteristics of the Agricultural Sector. Data is collected annually 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, livestock, 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

File Structure

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

Characterization of Energy Consumption

SAINT VINCENT AND THE GRENADINES ENERGY BALANCE AGRICULTURE, FORESTRY AND FISHING SECTOR



Date:

name of the institution:

country: parish:

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 oalde-celac@olade.org

2012

SECTION 1. GENERAL CHARACTERISTICS OF AGRICULTURAL SECTOR

TABLE 1.1 CHARACTERIZATION OF AGRICULTURE SUBSECTORS

Subsector	Added Value	Production		Agricultural Production Facilities	Waste to Energy	Area Harvested	Level of Mechanization
		Amount	Units				
	EC\$			Number	Tons	Km2	%
Agriculture							
Crops							
Bananas							
Other Crops							
Crop 1							
Crop 2							
Crop 3							
Crop 4							
Livestock							

TABLE 1.2 CHARACTERIZATION OF FISHING

Subsector	Added Value	Processed Fish
	EC\$	Tons
Fishing		

SECTION 2. CONSUMPTION BY ENERGY SOURCES

TABLE 2.1 CHARACTERIZATION OF ENERGY CONSUMPTION IN AGRICULTURE SECTOR BY ENERGY SOURCE

Subsector	Electricity		Crude Oil	LPG	Kerosene	Gasoline	Diesel Oil	Fuel Oil	Coke	Charcoal	Firewood	Others
	Purchase	Self-Generation										
	(MWh)	(MWh)	(kbl)	(MM3)	(kbl)	(kbl)	(kbl)	(kbl)	(KT)	(KT)	(KT)	()
Agriculture												
Crops												
Bananas												
Other Crops												
Crop 1												
Crop 2												
Crop 3												
Crop 4												
Livestock												

TABLE 2.2 CHARACTERIZATION OF ENERGY CONSUMPTION IN FISHING SECTOR BY ENERGY SOURCE

Subsector	Total	Gasoline	Diesel Oil	Electricity	Others
		(kbl)	(kbl)	kWh	()
Fishing					

SECTION 3. CHARACTERIZATION OF THE LEVEL OF MECHANIZATION

TABLE 3.1 CHARACTERIZATION OF THE LEVEL OF MECHANIZATION

Subsector	General	Irrigation		Tractors		Harvester	Fumigation	
		Electricity	Diesel Oil	Gasoline	Diesel Oil	Diesel Oil	Aerial	Manual
	%	%	%	%	%	%	%	%
Agriculture	0							
Crops	0							
Bananas	0							
Other Crops	0							
Crop 1	0							
Crop 2	0							
Crop 3	0							
Crop 4	0							
Livestock	0							

National Variables Survey



Q11_NV_SVG_2014

National Variables

Description

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

Addressed to

Ministry of Finance, Central Bank, National statistical 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 establishments and employees of hotels, restaurants, among others.

File Structure

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

Characterization of the Universe of Information

ENERGY BALANCE
NATIONAL VARIABLES



Organización Latinoamericana de Energía
Latin American Energy Organization
Organisation Latino-américaine d'Énergie
Organização Latino-Americana de Energia

Date:

name of the institution:

country: parish:

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 caide-celac@olade.org

SECTION 1. Characteristics of Population and Information Unit

TABLE 1. POPULATION

Census	Total population	Urban population	Rural population
Year <input type="text"/>			
Last <input type="text"/>			

TABLE 3. INFORMATION UNITS

	Households	Household size	Number of electrified households
Year <input type="text"/>			
Last <input type="text"/>			

SECTION 2. Consumption of Energy Sources

2.1 COOKING

Year

TABLE 4.1 HOUSING DISTRIBUTION BY COOKING ENERGY SOURCE

Energy Source	Urban area	Rural area
	%	%
LPG		
Kerosene		
Charcoal		
Electricity		
Firewood		
Others		
Total	-	-

Last

TABLE 4.2 HOUSING DISTRIBUTION BY COOKING ENERGY SOURCE

Energy Source	Urban area	Rural area
	%	%
LPG		
Kerosene		
Charcoal		
Electricity		
Firewood		
Others		
Total	-	-

2.2 LIGHTING

Year housing

TABLE 5.1 HOUSING DISTRIBUTION BY LIGHTING ENERGY SOURCE

Energy Source	Urban area	Rural area
	%	%
Electricity		
Kerosene		
Candles		
Firewood		
Charcoal		
Others		
Total	-	-

Last

TABLE 5.2 HOUSING DISTRIBUTION BY LIGHTING ENERGY SOURCE

Energy Source	Urban area	Rural area
	%	%
Electricity		
Kerosene		
Candles		
Firewood		
Charcoal		
Others		
Total	-	-

SECTION 3. EQUIPMENTS

Year

TABLE 6.1 HOUSING DISTRIBUTION BY ACCESS TO EQUIPMENTS

Equipment	Urban population	Rural 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	-	-


Last

TABLE 6.2 HOUSING DISTRIBUTION BY ACCESS TO EQUIPMENTS

Equipment	Urban population	Rural 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	-	-

Macroeconomic Variables

ENERGY BALANCE
NATIONAL VARIABLES



Organización Latinoamericana de Energía
 Latin American Energy Organization
 Organisation Latino-américaine d'Énergie
 Organização Latino-Americana de Energia

Date:

name of the institution:

country: parish:


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 oalde-celac@olade.org

SECTION 1. NATIONAL MACROECONOMIC VARIABLES

Description		2010	2011	2012
Total Gross Domestic Product (Constant)	Millions US\$			
Total Gross Domestic Product (Current)	Millions US\$			
Industrial	Millions US\$			
Agriculture, Fishing and Mining	Millions US\$			
Transportation	Millions US\$			
Commercial, Services and Public Sector	Millions US\$			
Construction and Others	Millions US\$			
Average Exchange Rate	EC\$/USD			
Total Imports of Fuels	kbbl			

Characteristics of the Transport Sector

ENERGY BALANCE
NATIONAL VARIABLES



Organización Latinoamericana de Energía
 Latin American Energy Organization
 Organisation Latino-américaine d'Énergie
 Organização Latino-Americana de Energia

Date:

name of the institution:

country: parish:

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 oalde-celac@olade.org

SECTION 1. GENERAL CHARACTERISTICS

Description	Unit	2010	2011	2012
Terrestrial Transport				
Motor vehicles	Number			
Licensed	Number			
Registered	Number			
Aircraft				
Movements	Number			
Sea Transport				
Cruiseship Arrivals	Number			
Travel				
Passenger Arrivals	Number			
Visitor Arrivals	Number			
Passenger Departures	Number			

Source:


General information of the Commercial Sector

ENERGY BALANCE
NATIONAL VARIABLES

Date:

name of the institution:

country: parish:



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Latin American Energy Organization
Organisation Latino-américaine d'Énergie
Organização Latino-Americana de Energia

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 olade-celac@olade.org

SECTION 1. GENERAL INFORMATION OF COMMERCIAL SECTOR

TABLA 1.2 HOTELS

Description	2010	2011	2012	2010	2011	2012
	Number of rooms			Number of employees		
Hotels						
Hotels						
Guest Houses						
Apartment/Cottages						

TABLA 1.2 RESTAURANTS

Description	2010	2011	2012	2010	2011	2012
	Number of establishments			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
	Number of establishments			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								

Greenhouse Gas Emissions calculated by Reference approach

	Apparent Consumption (TJ)	CO2 emissions (Gg CO2)	Emission Factor (tC/TJ)	Fraction of Carbon Storage (%)	Fraction of Carbon Oxidized (%)
Diesel Oil	2.091,543	153,364	20,200	0,500	0,990
LPG	209,587	13,086	17,200	0,800	0,990
Gasoline / Alcohol	688,763	47,254	18,900	0,800	0,990
Kerosene/Jet Fuel	2,060	0,146	19,500	0,800	0,990
Firewood	72,304	5,382	29,000	1,000	0,700

Table 32. Greenhouse Gas Emissions by Technology Approach 2012

	Apparent Consumption (TJ)	CO2 emissions (Gg CO2)	Emission Factor (tC/TJ)	Fraction of Carbon Storage (%)	Fraction of Carbon Oxidized (%)
Diesel Oil	1.582,842	116,063	20,200	0,500	0,990
LPG	161,793	10,102	17,200	0,800	0,990
Gasoline / Alcohol	770,906	52,890	18,900	0,800	0,990
Kerosene/Jet Fuel	2,444	0,173	19,500	0,800	0,990
Firewood	72,540	5,399	29,000	1,000	0,700

Table 33. Greenhouse Gas Emissions by Technology Approach 2011

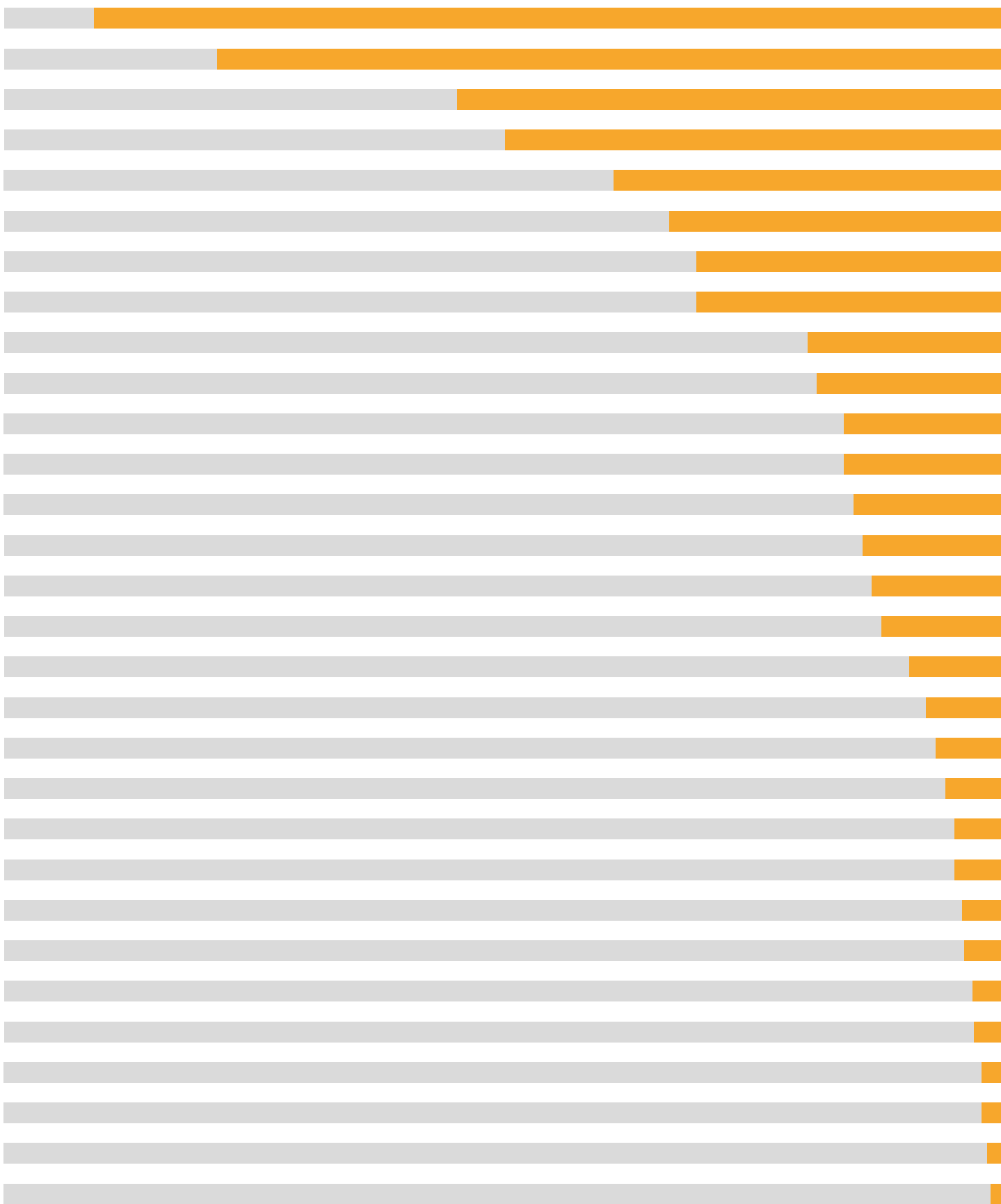
	Apparent Consumption (TJ)	CO2 emissions (Gg CO2)	Emission Factor (tC/TJ)	Fraction of Carbon Storage (%)	Fraction of Carbon Oxidized (%)
Diesel Oil	1,544,636	113,262	20,200	0,500	0,990
LPG	156,933	9,798	17,200	0,800	0,990
Gasoline / Alcohol	819,406	56,217	18,900	0,800	0,990
Kerosene/Jet Fuel	2,739	0,194	19,500	0,800	0,990
Firewood	73,181	5,447	29,000	1,000	0,700

Table 34. Greenhouse Gas Emissions by Technology Approach 2010

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