



ACTION AGENDA

For the

SUSTAINABLE ENERGY FOR ALL

CAPE VERDE



SUSTAINABLE
ENERGY FOR ALL

April 2015



Inserted in the process and strategy for the development of Action Agenda of Sustainable Energy for all (SE4ALL), of the National Action plans of Renewable Energies (NREAPS) and the National Action plans Energy Efficiency (NEEAPS) in the Member States of ECOWAS

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Abbreviations and acronyms

AE	Energy Access
EE	Energy Efficiency
ER	Renewable Energy
NPRE	National Plan for Renewable Energy
PNAEE	National Plan for Energy Efficiency
SE4ALL	<i>Sustainable Energy for All</i> (Energia Sustentável para Todos)
AA	Action Agenda
AEB	Waters and Energy of Boavista
APP	Water of Ponta Preta
ARE	Economic Regulation Agency
WB	World Bank
DECRP	Strategy Document for Growth and Poverty Reduction
DGE	General Director of energy
ECREEE	ECOWAS Centre for Renewable Energy and Energy Efficiency
ECV	Cabo Verdean Escudo CVE
ELECTRA	Electricity and Water (Public Company)
ENACOL	National Fuel Company
EDF	European Development Fund
IMF	International Monetary Fund
LPG	Liquefied Petroleum Gas
GWh	Giga watt-hour
INE	National Statistics Institute
VA	Volt-ampere
W	Watt
MTIDE	Ministry of tourism, Investment and Business Development
MTIE	Ministry of Tourism, Industry and Energy
MW	Mega watt
MGS	Millennium Development Goals
ONG	Governmental Organization
GDP	Gross Domestic Product
UNDP	United Nations development programme
GVA	Gross Value Added
INDRANIL	Coordination core for renewable energy and energy Efficiency
IEA	Energy Island Agency
ECOWAS	Economic Community of West African States

Preamble

The sustainable energy initiative for all (the SE4ALL acronym in English of Sustainable Energy for All) is a partnership between Governments, the private sector and civil society. Launched by the Secretary-General of the United Nations in 2011, has three interconnected objectives to be achieved by 2030:

- To ensure universal access to modern energy services.
- Double the overall rate of improvement in energy efficiency.
- Doubling the share of renewables in global energy matrix.

But, more important, these goals together should act as a catalyst for the creation of conditions for the development of income-generating activities and as an engine of development and anti-poverty instrument.

To contribute to these goals, each country should draw up an Action Agenda for Sustainable Energy for everyone. Action Agendas in Africa to be developed by African actors follow fundamental guiding principles contained in the Guidelines for the Development of National Sustainable Energy:

- (i) Work on the basis of plans / Programs / existing strategies;
- (ii) Political commitment and leadership;
- (iii) A balanced and integrated approach;
- (iv) An interministerial and intersectoral approach;
- (v) Adherence to the principles of sustainable development;
- (vi) Participation and meaningful involvement of all stakeholders;
- (vii) Gender equality and inclusion,
- (viii) Transparency and accountability.

In Cape Verde, the objectives of the sustainable energy initiative for all are perfectly aligned with the strategies developed for the energy sector and the role it will have in the development of the country.

Since independence, Cape Verde has made constant progress having ceased to be part of the list of least developed countries since 2008. In recent years the economy of Cape Verde have registered a solid growth, the result of a significant transformation of the economy, which came to be turned to the services and led by the tourism sector. Cape Verde is well on track to meet the Objectives of the Millennium Development Goals (MDGs). The sharp reduction of poverty has been complemented with a significant improvement in access to education and health care.

But the country faces important challenges such as high unemployment, particularly among young people, pockets of poverty and rising inequalities. Also, the external environment of great uncertainty and great risks has negatively influenced the evolution of the Cape Verdean economy open to the world.

Direct support will slow down and Cape Verde will no longer be eligible for concessional loans from international institutions. And it has to manage a public debt which, despite being sustainable, is an embarrassment to more public investments that can serve as the engine for economic development.

Looking to the future, Cape Verde has to find ways to compete in the international market on the basis of quality, efficiency, high productivity and high innovative capacity. The future vision of Cape Verde is "an inclusive, just and prosperous nation, with equal opportunities for all". Cape Verde is at a crossroads and it's necessary an "acceleration of the process of transformation and modernisation of society". And this process should be led by a competitive private sector and able to create employment for the population and redistribute wealth.

Cape Verde being a country with limited natural resources and with an internal market with reduced dimension, this new agenda, the Agenda of transformation of Cape Verde, should be based on innovation and creation of value based on the strategic competitive factors – geographical position, stability and good governance, the young population and enabled and natural resources recoverable as the beaches, the wind and the Sun. It is therefore natural that the tourism, but also, the use of renewable energies, are between the bases of support, of the economy and society, in the new agenda of transformation.

The bet in renewable energies is considered essential to the country. First, ensures intrinsically the sustainability of the goal of universal energy access. In the context of Cape Verde, the use of endogenous sources will allow, on the one hand, greater energy independence and, on the other, access to energy at competitive costs for families and for companies.

Secondly, the ambitious goals pursued are a proposal for a profound transformation of the energy sector, implying change of technologies, processes, and markets and their agents. Taking into account the scale of the challenge, will need to innovate, both in technical aspect as in the processes, management and financing models and technical monitoring, social, and environmental. The way to do is thus a source of experience and knowledge that should be transformed into added value in extended regional context.

It is precisely the possibility of innovation that Cape Verde faces that opens opportunities for the export of knowledge and of high value added services in the sectors of renewable energy and energy efficiency for various international markets, with emphasis on small island States, in PALOPS "PORTUGUESE SPEAKING COUNTRIES" and ECOWAS.

The investment in sustainable energy in Cape Verde transcends so competitive availability of energy for the economy and for families, turning the entire energy sector in a motor of development and creation of more competitive added value in the national and international scenes.

The Action Agenda for energy is a document drawn up on the basis of the national plan of action for energy efficiency and in the national plan of action for Renewable energies. The development of these three documents is, in the countries of CEDAO, coordinated and supported by the Center for renewable energy and energy efficiency of ECOWAS (ECREEE), ensuring coherence with the energy policies and taking advantage of synergies with initiatives of the region in their implementation.

The preparation of three documents reflects a strategy for coherence and synergy between public policy instruments, enabling a more global framework, an integrated reflection and the optimization of resources. The three documents are so emanations of the same vision and strategy, being intrinsically interwoven and not three distinct parts.

Executive Summary

In this document is presented the Action Agenda for sustainable energy for all (SE4ALL). The SE4ALL action agenda is part of a triad of public policy documents, including the national plan of action for energy efficiency (PNAEE) and the national plan of action for Renewable energies (PNAER).

Launched by the General-Secretary of the United Nations in 2011, the sustainable energy initiative for all (the SE4ALL acronym in English of Sustainable Energy for All) is a partnership between Governments, the private sector and civil society that seeks to achieve three objectives linked to 2030:

- To ensure universal access to modern energy services.
- Double the overall rate of improvement in energy efficiency.
- Doubling the share of renewables in global energy matrix.

Access to sustainable energy is considered as a catalyst for the creation of conditions for the development of income-generating activities and instrument for combating poverty

In Cape Verde, the objectives of the sustainable energy initiative for all are perfectly aligned with the strategies developed for the energy sector and the role it will have in the development of the country.

The bet in renewable energies is considered structuring for the country since the use of endogenous sources will allow, on the one hand, greater energy independence and, on the other, access to energy at competitive costs for families and for companies.

Cape Verde is expected to achieve most of the Millennium development goals before 2015, although big challenges still persist in the fight against poverty, social inequality and unemployment. That is, the country should continue its eternal fight against its natural conditions. Because there will be no eradication of poverty without economic and social development. And, on this trajectory, the equilibrium with the environment have to be maintained to ensure the minimum conditions of habitability of the Islands. As a tourist destination, this being the engine of the economy sector, Cape Verde also cannot afford not to preserve its fragile ecosystem.

Aware of the challenge and obstacles, that Cape Verde is preparing to achieve 100% access to electricity even before 2017. But not least, the universal coverage of electricity shall be satisfied, in its entirety, with renewable sources of energy and at a lower cost in 2020.

The goal of 100% renewable electricity is a proposal for a radical transformation of the sector, implying a deep change of technologies, procedures, of market rules. It also implies the domain of knowledge and experience that, in this dimension, do not exist in any other country. And finally implies, training, retraining and training of human resources in sufficient quantity and quality needed for the challenge embraced.

And, of course, it can't, nor from a technical point of view, or from an economic point of view and not from the sociological point of view, disengage ambitious targets for renewable energy penetration, also ambitious measures of energy efficiency-to control and better manage demand, adapting it to the Intermittency of renewable sources; to reduce the consumption and the power to

install; but above all, to induce more efficient and sustainable behaviors and create a tangible relationship between citizens and the energy that goes beyond the monthly bill.

Around these goals, will have to be created the conditions for training at all levels, professional, higher and postgraduate degree, but also for certification, trials and tests of energy systems and the exchange of knowledge and experiences. In the end, Cape Verde will be in a position of leadership in the renewable energy sector which, by itself, is not only an asset to a sustainable tourist destination, as is a feature to be transformed into services with significant economic impact.

The strategy for the energy sector is a strategy based on the growing involvement of the private sector, whether companies or families, which will progressively replacing public investments in the sector. The State assumes in this context, its role as a promoter, facilitator and regulator of a market of production and offer of dynamic energy, innovative and efficient, creating the conditions for private investment to replace public investment in the transformation of the energy sector. The State is also a catalyst and facilitator in the pursuit of innovative solutions for financing of the energy market, which does not constitute direct support or subsidies.

The energy sector is regarded as one of the key sectors of the country's development and the the established targets are so dynamic goals for economic and social transformation, focusing on three main axes and ambitious:

- 1. Universal access to electricity, 100% produced by renewable energy sources in 2020:**
- 2. Eradication of three stones stove for cooking until 2020 and make the use of wood energy choice in 2030.**
- 3. Adoption and internalization of rational and efficient practices of production and consumption of energy, allowing a 20% reduction of Final energy demand in 2030.**

These targets, to be achieved by 2030, have as a starting point the electrification rates in above or excess 90% and a penetration of renewable energies in the electricity network in the order of 20% in 2013. Although recently there has been a stagnation of improving conditions of cooking by the Cape Verdean families, currently, over 70 % had access to modern and safe forms of energy to meet its energy needs in the kitchen.

Universal Access to a Modern Energetic Services	Renewable Energy in Global Energetic Mix	Energetic Efficiency
Percentage of Population with Access to Eletriccity: 2010: 80,8% 2013: 92,0%	Percentage of ER in Production of Eletriccity: 2010: 1,2% 2013: 20%	Final Energy Intensity (final consumption of energy final/PIB em kWh/Euros) 2010: 1,5 kWh/Euros 2013: 1,4 kWh/Euros
Percentage of Population with Access to Modern Cooking Option: 2010: 70,2% 2013: 70,1%	Percentage of ER in Production of Hot Water Sanitary: 2010: ND 2013: ND	

To 2030, in the framework of the sustainable energy initiative for all, Cape Verde has adopted the following goals:

Specific goals and objectives of access to energy for Cape Verde

Acesso Universal a Serviços Energéticos Modernos		
	Percentage of Population with Access to Electricity	Percentage of Population with Access to Modern Option for Cooking
Goals 2030	100%	100%
Specific objectives	<ol style="list-style-type: none"> 1. Network extension to the nearby Communities; 2. Electrification with renewable sources of all isolated communities still without access and away from the network 3. The scattered dwellings will benefit from the use of individual systems 	<ol style="list-style-type: none"> 1. Eradication of 3 stones and Stoves replaced by improved stoves (2020); 2. Promotion of Butane: penetration rate higher than 90%.

Specific goals and objectives of access to energy for Cape Verde

Doubling the Share of Renewable Energy in the Global Energy Mix		
	Percentage of ER in the production of Electricity	Percentage of ER in the production of domestic hot Water
Goals 2030	100%	100% of new buildings with Solar water heater Required Strong adhesion (> 20%) of existing hotels and restaurants to residences solar water heaters
Specific Objectives	<ol style="list-style-type: none"> 1. Achieve a penetration of 30/35% of ER in Power in 2016; 2. Achieve a penetration of 50% of ER in Electric Network in 2018; 3. Achieve a penetration of 100% of ER in Power in 2020. 	<ol style="list-style-type: none"> 1. Achieve a minimum of 10% conversion of homes that use AQS to solar heaters; 2. Achieve a minimum of 25% for the conversion of hotels and restaurants that use AQS to solar heaters; 3. Achieve a minimum of 50% percent for the conversion of public buildings that use AQS to solar heaters; <p>Note: percentage of buildings where such conversion is technically possible</p>

Specific Goals and Objectives of Energy Efficiency in Final Energy Demand for Cape Verde

Doubling the Global Rate of Improvement of Energy Efficiency	
	Final Energy Demand Reduction Relative to the Base Scenario
Goals 2030	-20% of Final Energy Demand compared to the Base Case
Specific Objectives	<ol style="list-style-type: none"> 1. Reduction of 10% in consumption of diesel, gasoline, kerosene, jet A1, in 2030 compared to the base case; Redução de 10% no consumo de gásóleo, gasolina, petróleo, jet A1, em 2030 em relação ao cenário de base; 2. Reduction of 20% in electricity consumption in 2030 compared to the base case; 3. Reduction of technical losses and totals in electric network for values of the order of 8% percent.

The strategy for access to energy groups constant measures in the action plan for energy efficiency and Action Plan for renewable energy. So, as set out in these plans, the electrification of the last communities will make, either by public network connection where it is technically and economically feasible; by the creation of isolated systems based on renewable energy sources, where that is the only option, for the distribution of individual equipment, also based on renewable sources.

In a first phase, to the eradication of the use of traditional stoves of three stones, will be tested and disseminated improved stoves. In a second phase it will be created the conditions so that families can have alternative energy sources for cooking.

The universe comprises about of 30,000 families, distributed throughout the country, especially in the rural areas. The gas, for their availability and familiarity, should be the best choice but the solutions to be applied should be solutions in partnership with the beneficiaries, taking into account technical aspects but also the social, cultural, economic and others, so not suitable preset dates and costs, taking risks to condition the solutions.

All the renewable energy strategy is based on the goal of achieving 100% of electricity produced from renewable energy sources in 2020. The definition of sources and technologies will be with the development of a master plan for the electricity sector. The goal of 100% renewable origin electricity refers to the entire electricity produced; whether on the main network, both in micro isolated systems, whether in individual systems.

Also, provides for the creation of a market of solar heaters for sanitary water heating or industrial preheating. The families, but also the hotel sectors, restorations and selected public facilities, are the target groups of this measure. In coordination with the PNAEE, the solar thermal systems will be mandatory in new residential buildings and buildings of selected services. In some cases, existing buildings with technical conditions for installation may benefit from this measure.

The implementation of the energy efficiency strategy outlined is based on:

1. The construction of an institutional building facilitator, complete and transparent underscoring the National System of energy certification.
2. The development of an energy efficiency market led by Energy Services Companies- ESCOs- ESE, properly regulated and certified.
3. Promoting energy education and citizenship.

For the implementation of the agenda for sustainable energy for all in the Governance functions, coordination, implementation and monitoring and evaluation, beyond the general direction of energy and regulatory Agency it is foreseen a A Insular Energy Agency Institution. The Insular Agency of energy will be the main instrument of intervention and dynamization of activities and behavioral changes, leading to better management of the consumption and production of energy.

Introduction

Cape Verde is an island nation with a population of small size (about 500000 inhabitants) and a territorial extension also reduced and dispersed (4073 km²), surrounded by an immense Atlantic Ocean.

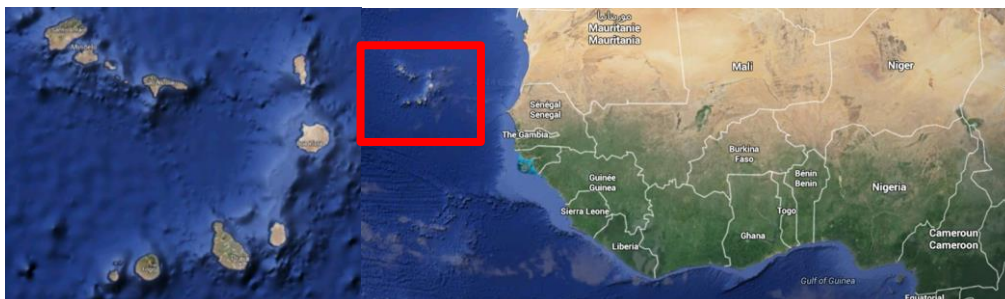


Figure 1 – Location of Cape Verde

Situated 500 km from the West African coast (Figure 1), off the coast of Senegal, the Group of countries of the Sahel, underscore a semi-arid, hot and dry, with scarce rainfall. The Islands are of volcanic origin and most bare of vegetation, and without substantial natural resources.

Cape Verde is extremely dependent on the outside, imports about of 80% of what it consumes. And it is out there that many Cape Verdeans find conditions of livelihood. The Cape Verdean diaspora is larger in number, than the population that stay and resid on the Islands. Therefore, remittances from emigrants and foreign aid to development have been, historically, the levers of economic growth in Cape Verde.

The other pillar is tourism, which represents about 20% of GDP, mostly from Europe. The Foreign direct investment has concentrated on real estate and tourism and, as a result, Cape Verde was one of the African countries that suffered with the international crisis, with a recession of the economy of -0.9% in 2009.

Cape Verde is a country where the presence of life is just tolerated. The history of the country's fight against the adversity of nature, with deadly periods of drought and famine, in the first half of the 20th century XX. And the more recent history is always an emergency. Without tradeable natural resources and without ability to feed the population, the development has been the fight against poverty.

But the country has managed to circumvent their weaknesses and, for example, to overcome the shortage of drinking water through desalination of abundant seawater that surrounds it. Desalination, which provides most of the water for consumption in Cape Verde and in some islands such as S. Vicente and Sal, the only source of drinking water, is made using a great amount of energy resource. Despite this power is mainly originated in petroleum products, which are imported, extremely expensive and extremely polluting and emitting greenhouse gases.

Endogenous energies, biomass for cooking and renewable energy for the production of electricity, contributed with 15% of the total with of gross internal energy offer in 2010 and with almost 20% in 2013. The remaining 80% are derivatives of petroleum and imported (butane, gasoline, oil, diesel fuel, fuel oil and Jet A1).

In the last years, the total gross energy internal offer went from 2,340 .7 GWh in 2010 for 2,311 .0 GWh in 2013, having reached a peak of 2,477 .2 GWh in 2011. The break between 2010 and 2013 was largely due to the introduction of renewable energies parks in the production of electricity. Indeed, the penetration of renewable energy in the electric mix in Cape Verde has gone from 1.2% percent in 2010 to 20% percent in 2013, due to the installation of 26 MW of wind turbines and 7.5 MW of photovoltaic panels in 2010 (Figure 2).

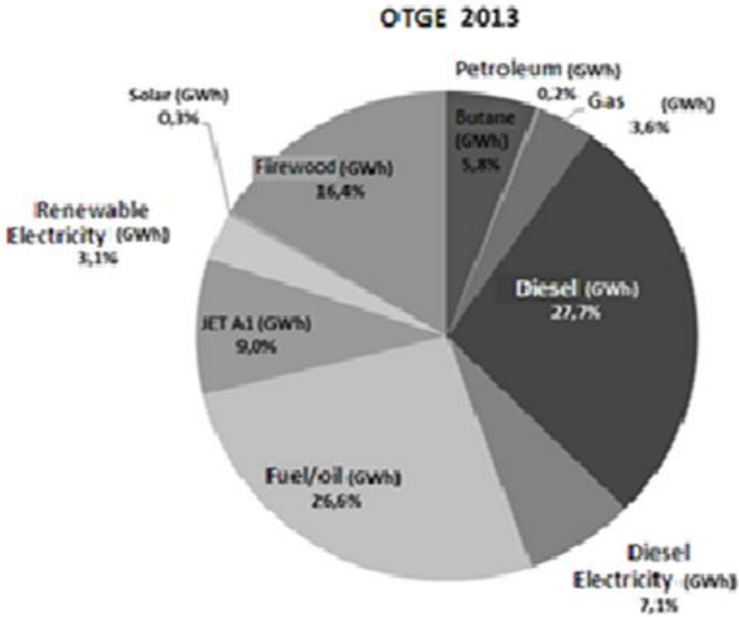


Figure 2 - Distribution of gross energy in 2013 (source: Costa A., 2014)

The installed power is growing apace, and a jump of 109.2 MW in 2011 to 156.5 MW in 2012, while the production of electricity has been growing at an annual pace of 4%, having reached a little more than more of 390,700 MWh in 2013.

The main company operating in the electricity sector in Cape Verde is the public company of electricity and water – ELECTRA S.A.R.L. that has, since 2000, the granting of distribution network and operates the largest production centers. The exception is the island of Boavista where public-private Water Company and energy from Boavista (AEB) is the public service dealership. On the island of Sal operates, independent producer, the company Águas de Ponta Preta (APP).

In the area of renewable energy, the largest producer of wind-generated electricity is the Cabeólica, S.A., a public-private partnership that began its activity in Cape Verde in 2009. The private company ELECTRIC WIND has developed and operates a wind farm on the island of Santo Antão.

But the fuel market, which has supported the production of electricity, is shared by two private companies: the ENACOL and the VIVO Energy. It's a market, rather small, subdivided into 9 even smaller markets and scattered. Although more than 90% of sales are affected on 4 islands of São Vicente, Sal, Boavista and Santiago, it is necessary to supply the comparatively higher costs, the remaining 5 islands.

Thus, it is not surprising that the cost of energy is high in Cape Verde and that has always been growing in the last years. For example, the price of kWh of electricity for the 2nd domestic level grew 50 % from 2006 to 2012 and even 10, 5% between 2011 and 2012 (Figure 3).

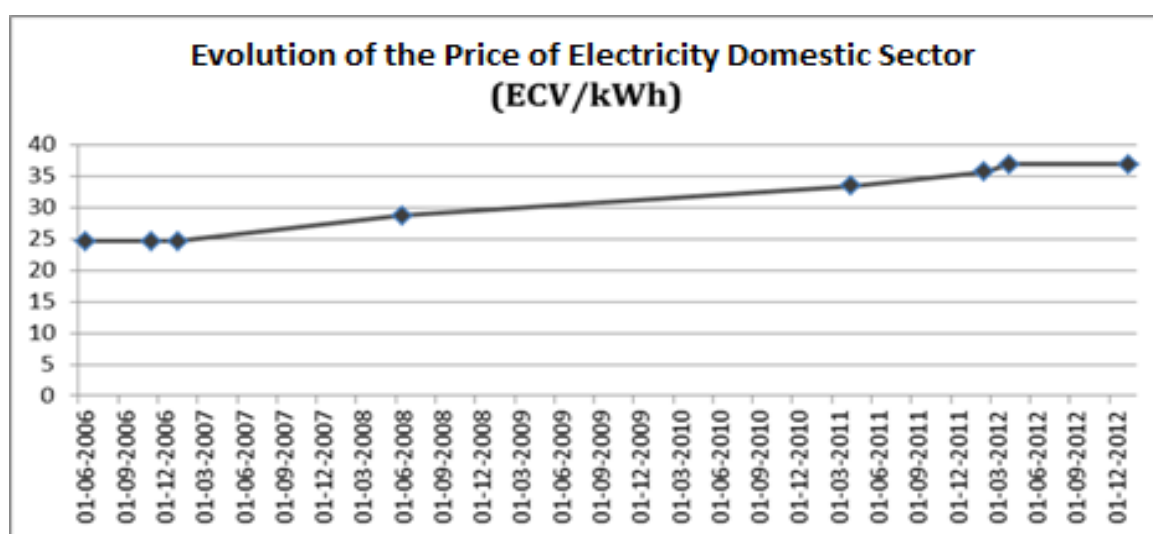


Figure 3 – evolution of the price of electricity in Cape Verde-values without VAT (source: www.are.cv)

High energy costs, transport costs, including inter-island, cost and water scarcity, cost and scarcity of food and other bare soil and without marketable natural resource and a small market, describe the context of the Cape Verdean economy and the place where Cape Verdean families live.

And it is in this context that, over the last three and a half decades, Cape Verde has presented a consistent development trajectory, with various indicators above the average of other African countries. The level of human development, Cape Verde is medium development country, with a GDP per capita of 6,311 (2011 PPP \$) is, since 2008, considered lower-middle-income country.

The real growth in terms of gross domestic product (GDP) per capita was, on average, 7.1% between 2005 and 2008. However, following the global crisis the economy extremely dependent on relations with Europe slowed down with GDP growth falling to 4% in 2011, to 2, 5% in 2012 and 1% in 2013.

The primary sector that occupies much of the population employed (11% in 2010), especially the poorest, represents only about 9% percent of wealth in Cape Verde. Industry, undeveloped, 8.7% of contribution to total gross value added (GVA). The economy of Cape Verde is therefore based on the tertiary sector (70% of the VAB and almost 53% of the population employed) with tourism being the fastest growing sector.

Economic growth, especially since the beginning of the crisis, has been compelled by public investment in infrastructure. But successive budget deficits of two digits (12% percent in 2010) have led to a significant increase in the divide publishes that, despite continuing sustainable, may exceed 100% percent of GDP.

Also a consequence of the high middle-income country, Cape Verde will not be eligible for concessional loans from major international institutions. Including Cape Verde negotiated with key partners a debt plan until 2018 and can not borrow more than that is contractually specified.

The banking sector in Cape Verde, which has 5 private institutions, is modern and dynamic. Interest rates are freely set by banking entities from basic rates of the Bank of Cape Verde. And the high interest rates (between 7% and 14%) explain, in part, the weak dynamics of financing of private activities (growth of total credit extended to the private sector by 1.9% in 2013, compared to 2012). It should be noted, however, that this value already includes the growth of risk of default as a result of the financial crisis.

The population (491,875 in 2010) is quite young, with 39 % under the age of 17 and predominantly urban (61.8 %). The average life expectancy is estimated at 79 years for women and 70 years for men, with an average literacy rate of 77% for women and 88% for men. The poverty rate, currently in 26.6% of the population, was reduced in little more than 10% percent between 2001 and 2007.

The Cape Verdean health system, despite evident weaknesses and limitations, has achieved significant improvements. Various indicators such as maternal, newborn, children's, General mortality, etc., have, over the years, increasing improvements, putting the country among the better situated in the ranking of African countries. In addition, the national social protection system includes support for the elderly, support in disease and to cover funeral expenses.

The literacy rate of the population with 15 years or more is about 83% (2010). Universal primary education was reached with 97% percent of children complete primary education. In secondary education, 96% of school-age children access the first cycle of secondary education, 81% complete it and 52% percent complete upper secondary education.

Little more than 6% of the population had, in 2010 the average or higher education completed. But, if formerly it was necessary to leave the country to obtain a college degree, today, in addition to the University of Cape Verde, the country has over 8 private institutes and universities. The annual growth rate in the last decade was 32.3%.

Cape Verde is constitutionally a Republic and had its independence from Portugal on July 5, 1975. The first multi-party democratic elections were held in January 1990. In the last 25 years, Cape Verde had two Prime Ministers and three Presidents, all democratically elected representatives. Since 2011 the President of the Republic and the Prime Minister belong to different parties.

Cape Verde is expected to achieve most of the Millennium development goals before 2015, although big challenges still persist in the fight against poverty, social inequality and unemployment. That is, the country should continue its "fight against their natural conditions. Because there will be no eradication of poverty without economic and social development. And, on this trajectory, the equilibrium with the environment has to be maintained to ensure the minimum conditions of habitability of the Islands. As a tourist destination, this being the engine of the economy sector, Cape Verde also cannot afford not to preserve its fragile ecosystem.

The context found on the first day as an independent country with an illiteracy rate of over 60%, great shortages of all types of infrastructure, with 91 % of the population depending on agriculture and a severe drought early in the year of 1977 were overcome.

But, as at the time, Cape Verde is at a crossroads between recyclers of external aid and the creation of a dynamic economy, able to attract foreign investment and create and redistribute wealth, reducing and eradicating poverty. At this stage, in view of the need, in a Transformation Agenda.

The young population and properly educated, political stability but especially and paradoxically, the absence of natural resources and isolation, explain in part the relative success of Cape Verde as a country. But, is perhaps the resilience and resourcefulness and transformation that explains the survival of Cape Verde as a country.

Energy as a Transformation factor

It is aware of the challenge and the obstacles that a country which on the date of its independence, had a population in which less than 20% had access to electricity, is preparing to reach 100 % access even before 2017. But no less importantly, the universal coverage of electricity will be satisfied in full, with renewable energy sources and at a lower cost in 2020.

The goal of 100% renewable electricity is a proposal for a radical transformation of the sector, implying a deep change of technologies, procedures, market rules. It also implies the domain of knowledge and experience that, in this dimension, do not exist in any other country. And finally implies training, retraining and training of human resources in sufficient quantity and quality needed for the challenge embraced.

And, of course, it can't, nor from a technical point of view, or from an economic point of view and not from the sociological point of view, disengage ambitious targets for renewable energy penetration, also ambitious measures of energy efficiency-to control and better manage demand, adapting it to the Intermittency of renewable sources; to reduce the consumption and the power to install; but above all, to induce more efficient and sustainable behaviors and create a tangible relationship between citizens and the energy that goes beyond the monthly bill.

Around these goals, will have to be created the conditions for training at all levels, professional, higher and postgraduate degree, but also for certification, tests and tests of energy systems and the exchange of knowledge and experiences. In the end, Cape Verde will be in a position of leadership in the renewable energy sector which, by itself, is not only an asset to a sustainable tourist destination, as is a feature to be turned on to provide services with significant economic impact. Not to mention

with the impact that the availability of sustainable and affordable electricity will have on the economy and the well-being of families.

The goal of 100% renewable electricity with a strong component of energy efficiency is therefore a means of transformation of society and the Cape Verdean economy to a path of development and more sustainable behaviour.

But if the access to electricity is today more than 90%, the same cannot be said of access to modern fuels and safe for cooking. Despite a significant increase in the penetration of butane gas checked in the years of 80s/90s, stalled near the 66%. And, in rural areas, this value reaches 36% (about 81% in the urban area).

The alternative is the wood, in a country where this feature is not only scarce, as from a fragile ecosystem, with meagre water resources and low productivity. Besides, cooking with firewood made the three stones stoves, with an extremely low efficiency.

The butane is physically accessible, in service stations of fuel companies or small distributors, in almost all parts of the country. For domestic consumption is sold in bottles of 3, 6, 12.5 and 55 kg. Most families have at least one of these bottles available at home, even those that give preference to wood.

The choice between wood and gas is not a choice. Despite the physical availability, financial availability is what prevents access to gas for almost 65% of rural families and 20% urban families.

It is possible to increase the efficiency of the use of wood with the promotion and universalisation of improved stoves but, the increase in the effective access of the Cape Verdean families the modern and safe forms of energy for cooking, can only be achieved with the increase of the income of families.

And, by the impact on health and well-being, by gender imbalances and as obstacle to family development, the improvement of households' cooking is an instrument to fight against poverty, against gender inequality and for equal opportunities. In Cape Verde it is also a tool to combat desertification and the improvement, beautification and enhancement of the environment and consequently a step towards a trajectory of sustainable development.

A replacement Strategy of Public Investment for Private Investment

The strategy for the energy sector is a strategy based on the growing involvement of the private sector, whether companies or families, which will progressively replacing public investments in the sector. The State assumes in this context its role as a promoter, facilitator and regulator of a market of production and offer dynamic, innovative and energy efficient, creating the conditions for private investment to replace public investment in the transformation of the energy sector. The State is also a catalyst and facilitator in the pursuit of innovative solutions for financing of the energy market, which does not constitute direct support or subsidies.

The State also assumes its role of facilitator of the process of development and dissemination of technology, focusing any effort of public investment in research, development and demonstration, as required for example for the introduction of technologies storage in the energy system of Cape Verde.

Part 1: Vision and Goals until 2030

The energy is by definition the ability to perform work. In other words, access to energy is not an end in itself, is what makes it possible to carry out productive activities or leisure. It is therefore at the same time, a factor of development and an indicator of development.

The Brundtland Report of the World Commission on environment and development of the United Nations, set in 1987, Sustainable Development as development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs or "as being the one who allows the increase of human well-being, respecting ecological limits and promoting intra and intergeneracional fairness."

Energy production is always based on the exploitation of natural resources. In theory, and according to the previous definition, the use of renewable resources is sustainable by definition, while the consumption of non-renewable resources would always be unsustainable, since each unit consumed today is less a unit for consumption in the future.

However, certain features, especially those available on biodiversity, such as forestry and agricultural activities, for example, can be sustainable or not, depending on the capacity for renewal. If the consumption rate exceeds the natural rate of replenishment, so the resources are no longer renewable and sustainable consumption.

So, one of the features of sustainable development, would be a sustainable energy system based on renewable or regenerative capabilities. This is a necessary but not sufficient condition. Inherent in the definition of sustainability, we have the concept of equity, which implies social justice, that is, the notion that every human being is entitled to a minimum of well-being and that this tended must be shared and grow, not only within the current generation but also of the current generation for the future generation.

Sustainability involves economic, environmental and social factors. The way societies are organized (vision and political) influence the development trajectory, so that the institutional factor is also important.

The characteristics of an energy system are made explicit through indicators, not only of the degree of development of a society, but also the quality of the development. **A sustainable energy system must be based on renewable or regenerative capabilities, universal accessibility, today and in the future, and promote the welfare, within the present generation and for future generations. This is the vision that Cape Verde promotes to its energy system (MTIE, 2008).**

But, more than a point to reach in the future, and because the process is even more important, this is a dynamic and transformative vision structuring. The energy sector is regarded as one of the key sectors of the country's development and the proposed targets are dynamic and goals of economic and social transformation. Therefore, the strategy focuses around two main axes and ambitious:

- 1. Universal access to electricity, 100 % generated from renewable energy sources in 2020:**
- 2. Eradication of three stones stove for cooking until 2020 and make the use of wood energy choice in 2030.**

The replacement of the eletroprodutor system, based mainly on combustion of petroleum derivatives, for intermittent renewables, will imply a reformat of demand to optimize the relationship production - consumption. The demand-side management, with displacement of loads, promoting more efficient processes and technologies, and promoting rational and efficient behaviour, is an essential part of the strategy of electricity 100% of renewable origin.

But the practice of energy efficiency is, above all, a way to make tangible, to materialize the energy and, with it, change the way families and business deal and consume energy. Such as saving water is a natural process and common in Cape Verde, you learn from an early age, it is expected that the relationship with the energy will be similar. So we can add a third goal more transversal character, structural and permanent.

5. Adoption and internalization of rational and efficient practices of production and consumption of energy.

The goal of 100% of renewable energy in the eletroprodutor system implies the creation of a radically different from the existing system and the field of production technologies and distribution management but also large-scale energy storage. It implies new knowledge, new practices and new ways of managing the system. Also implies, dare, risk and innovation.

And, over time, the domain of these technologies and processes will have future impacts in other sectors (if you choose for synthetic methane storage, for example, this will also be available for the transport sector and even cooking).

On the other hand, when it comes to cooking, the replacement sources or even technologies generally involve abandoning traditional cuisines and cultural practices, which will not occur without strong resistance. The proposed elimination of three stone stoves, involves the widespread introduction of improved stoves, which means a change, even if slight, in habits of families that consume firewood.

However, the wood can only be a choice if the families have the possibility of also acquiring alternative fuels, in this case the gas. The main barrier is financial. Even for those who already have the equipment (gas bottle), the problem is to have financial availability to refill when necessary. To overcome this barrier or increasing the income of families, or lower gas costs. On the other hand, a growing number of families, with the constant and rapid urbanization, will have difficulties in access to firewood, which is another way of making access to gas more attractive, and constitutes a third possibility. But, it is mostly through social action in partnership and with beneficiaries that this goal can be achieved.

The combination of renewable goals and change socio-cultural practices of cooking combined with the internalization of rational and efficient practices constitute a proposal for amendment of the energy culture in Cape Verde, changing the predominantly carbon trajectory for an eminently sustainable.

1.1 Path of the Energy Sector

The energy consumed in Cape Verde is mostly made up of petroleum derivatives-butane (LPG), petrol, oil, diesel fuel, fuel oil and JET A1. The biomass used in cooking, and solar and wind energy used in the production of electricity, are endogenous and primary forms of energy consumed in Cape Verde. Energy consumption per capita in Cape Verde was, in 2010, of 233 ktep/capita, for each 1,000\$ of income, the country consumed 62.4 ktep.

The Cape Verdean economy went from a subsistence economy based on the work of the land, to an economy based on services, especially in tourism. Over the past few decades, the tertiary sectors were gradually gaining prominence, while the secondary sector and mainly, the primary sector, and almost became stagnant (Figure 4).

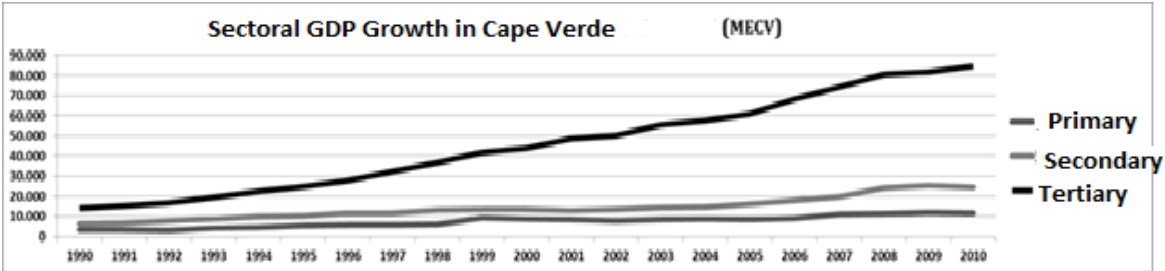


Figure 4-evolution of GDP Sector in Cape Verde (millions of ECV). (Source: BCV, 2012)

From 1990 to 2010 the tertiary sector earned more than ten percentage points, from a relative weight of 59% to 70% in 2010. In the same period, the primary sector was losing weight and, in 2010, was responsible for just 10% percent for wealth in Cape Verde (Figure 5).

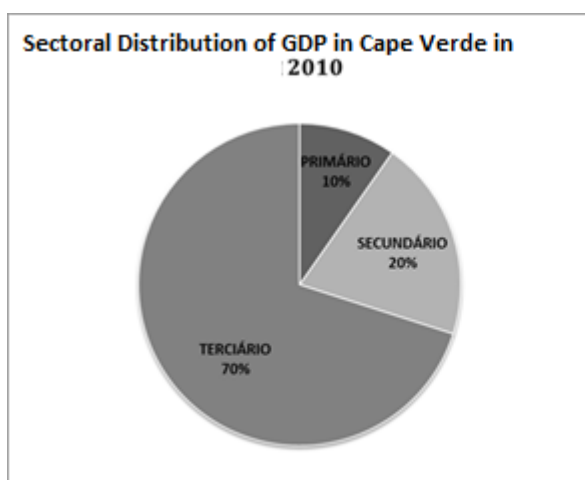
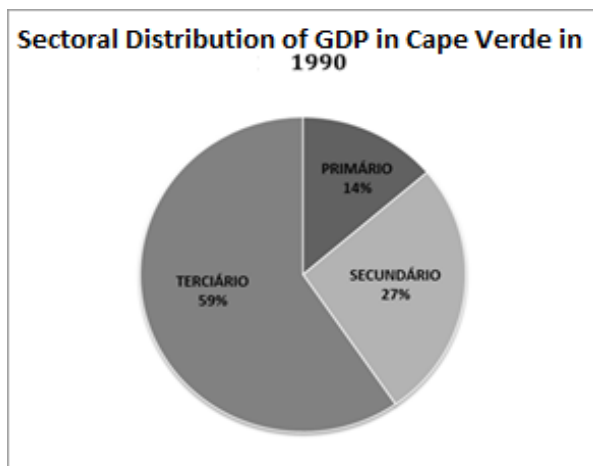


Figure 5 – evolution of the Weight of different sectors in the GDP Percentage in Cape Verde (source: INE, 2012)

The change in the real GDP in recent years clearly shows the impact of the global financial crisis in the country (Figure 6). In 2009 there was a recession with a drop of -0.9% in real GDP, followed by a recovery to 4% GDP growth in 2011. For 2012 and 2013 estimates are modest, pointing to values around a growth of 1%, when the country grew over 6% before the crisis

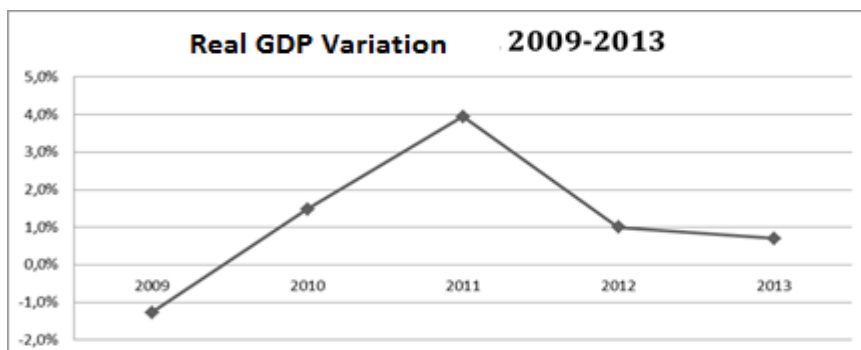


Figure 6 – Real GDP growth in Cape Verde 2009-2010 (source: INE, 2012)

In the same period between 1990 and 2010, the population grew at a rate of 1.8% per year, and between 2000 and 2010, growth was only 1.2 % (Figure 7). Since 1997, the population in urban centers has exceeded the rural population and, in 2010, the urban population was almost 62 % of the total.

The average size of households has gone from little more than 5 people per household, in 1990, to just less than 4 persons per household in 2010. Access to electricity in urban areas is already universal and nearly 80% of households use gas in the kitchen. In rural areas, more than 90% has access to electricity but around 65% still depends on the wood for the preparation of meals.

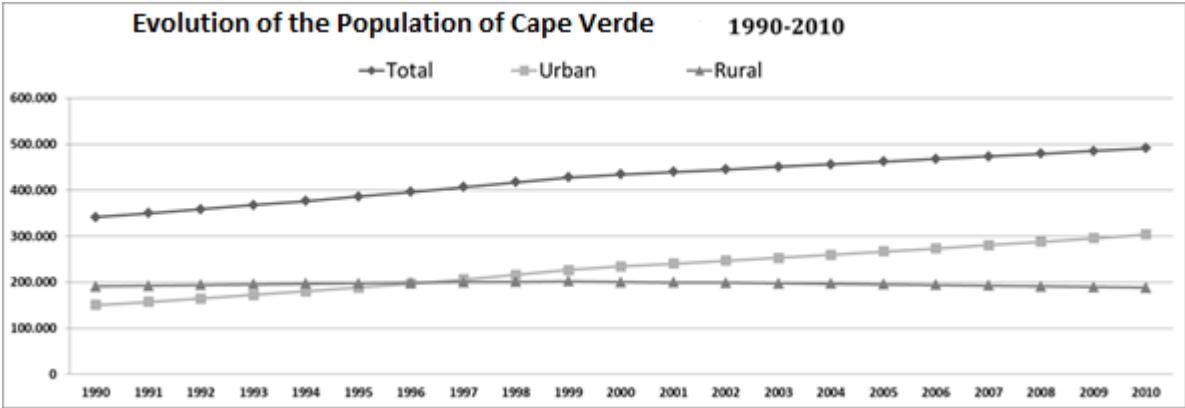


Figure 7 – evolution of the population in Cape Verde between 1990 and 2010

Thus, the trend is for a country with an economy increasingly based on services, with a mostly urban population and of small size. It is not surprising, in this context, a little energy-intensive economy and a population essentially urban, that is electricity energy vector that has grown the most. With a growth rate that has been double-digit in the 90s and even early 2000s, electricity production grew by 7.5% between 2000 and 2010.

In recent years, growth has slowed to an annual rate of 4%. , Due to the stagnation in the number of new customers and the economic slowdown. Of the approximately 345,680 MWh produced in 2010, it moved to a production of more than 390,700 MWh in 2013.

It is therefore expected that, in a scenario of continuity, the engine of demand for electricity will continue to be the families and economic growth. The total demand of electricity, in a scenario of continuity, would grow at a rate of 6% a year until 2020, slightly higher than the economic growth, taking into account the ongoing investment in capacity may, to allow the unlock repressed consumption, provide a higher consumption during this period. During the 2020-2030, the growth of final consumption of electricity is 6% per year, in line with the economic growth (Figure 8).

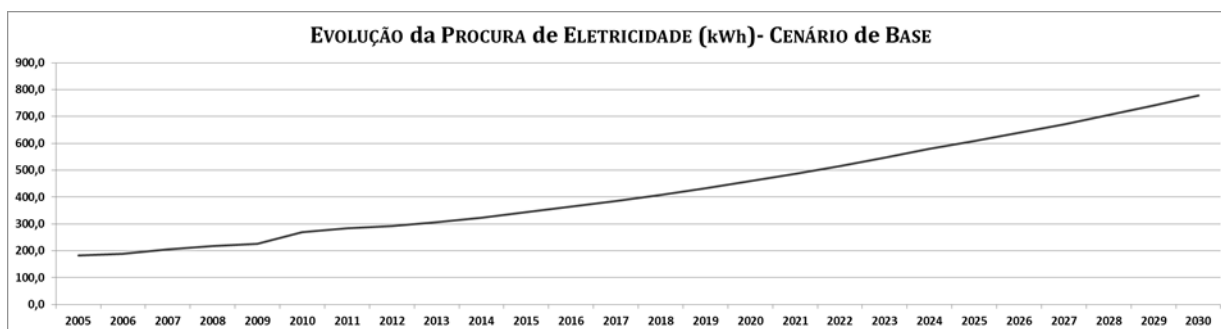


Figure 8 – evolution of the Total demand for electricity in Cape Verde until 2030

The production of electricity has been the target of large investments and restructuring with power enhancement and integration of renewable energy sources conversion technologies. The installed capacity is growing at a rapid pace, with a big leap of 109.2 in 2011 to 156.5 MW in 2012. This power includes 26 MW of wind turbines and 7.5 MW of photovoltaic panels.

In 2013, 20% of the electricity produced was renewable, with the remainder being produced in mineral oil derivatives, in particular diesel and fuel oil. With the introduction of the fuel oil and diesel replacement on the main islands, slightly improved efficiency. But the combined action of this substitution and the introduction of more renewable sources in eletroprodutor system, meant that there was a fall in total demand of diesel and in smaller, fuel oil.

Apart from oil, formerly very common in lighting and cooking, the use of which is in rapid decline, in recent years, an almost stagnation of the amount of gas consumed in the country as well as the low variation in consumption of gasoline. The relative economic stagnation is one factor that can explain this behavior, but there will be other dependencies that the lack of data does not allow to evaluate.

Wood, whose consumption has been almost constant in recent years, is likely to suffer a fall until 2030, as a result of the constant urbanization in Cape Verde.

So, in a scenario of continuity (base scenario) based on recent historical development, the supply of raw energy would grow moderately at the rate of 2.9% per year by 2020 and at a pace slightly faster of 3.3% by the year 2030, reaching this point, near 3900 GWh (Figure 9).

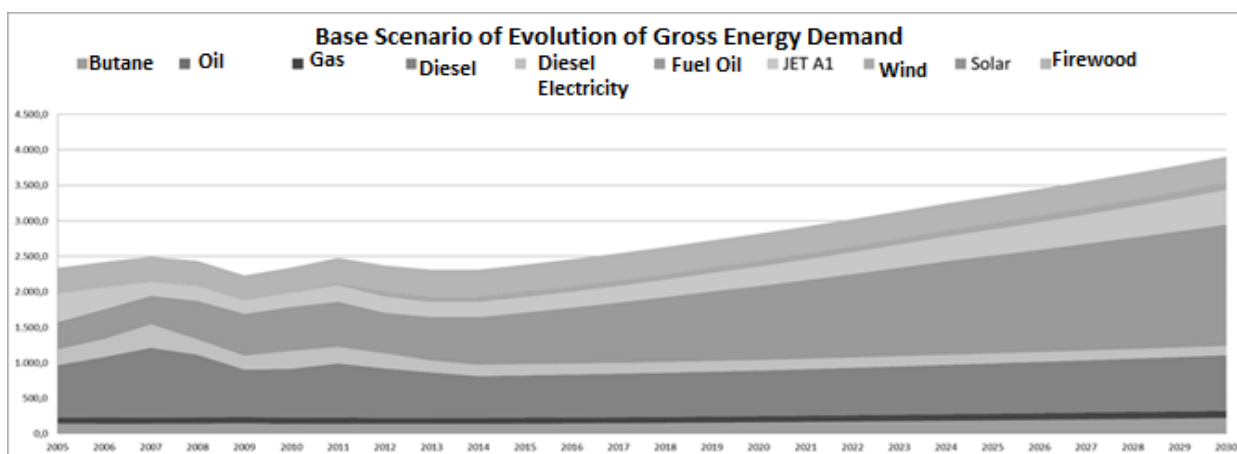


Figure 9 – evolution of supply of raw energy in Cape Verde until 2030

In the base scenario, the energy mix in Cape Verde would remain predominantly based in mineral oil derivatives, with a small amount of solar and wind power to produce electricity; and the consumption of biomass for cooking.

In this same scenario, total final energy demand, which had a considerable fall in 2009 (with a search of 1, 621, 5 GWh), returned to grow to reach a peak in 2011 (to 1,820 .3 GWh) and fall again from 2012, would have a moderate growth from 2014 and until 2020 (close to 2000 GWh), when taking sustained growth until 2030 (2,731 .7 GWh) (Figure 10).

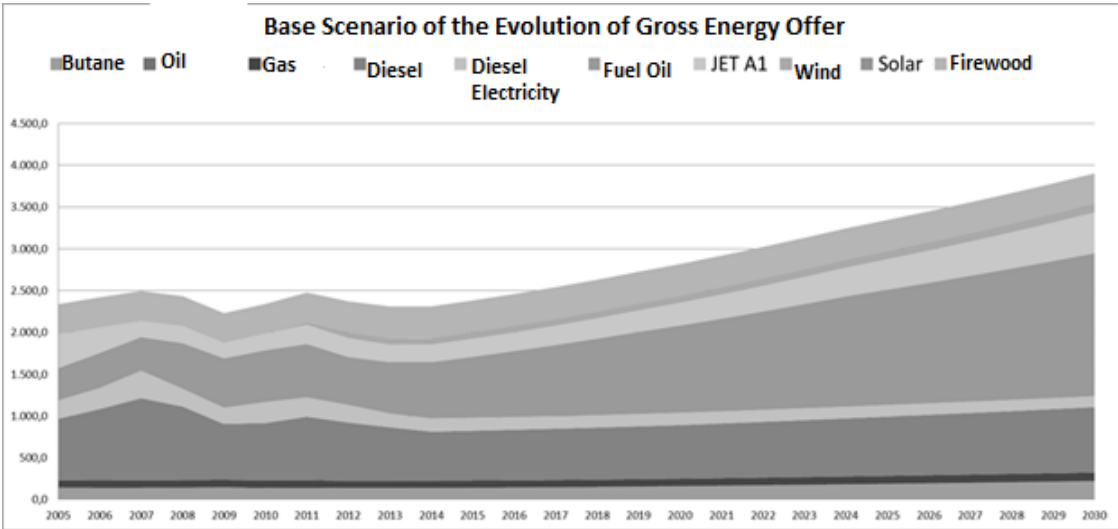


Figure 10 – Total supply of energy for Cape Verde until 2030

The baseline scenario for gas and firewood is based on minimal assumptions change of use by families. After the slight indentation verified in recent years, the percentage of families who prefer the cooking gas would slightly increase in the urban environment, as a result of the improving economy, of 88.1% in 2010 to a little over 91% in 2030. In rural areas, where the fall was higher, 35.5% in 2010 to 33% in 2013, the takeover would be minimal, to 34.6% of rural families who prefer gas in 2030.

Both petrol as diesel should, according to the hypotheses assumed, to maintain the trajectory of almost stagnation until 2020. In the 2020-2030 gasoline would grow on average 1.5% a year against 2% for diesel.

The JET A1, in the latest behavioral sequence follows the economy returning to growth even before 2020 (average of the year 3.5%) and accelerating between 2020 and 2030, the pace of economic growth (6% per year).

The socio-economic development of Cape Verde and, in particular, the energy services sector, has been consistent, with visible impact on the well-being of families. Having reached this point, Cape Verde has chosen inserted in its Transformation Agenda for 2030 by a significant change towards a more sustainable path, from the environmental and economic point of view, of the Cape Verdean energy sector.

The following table illustrates, using some energy indicators, the starting point, in terms of access to energy, renewable energies and energy efficiency, to this new stage in the industry:

Table 1: point of departure-State of energy macro-indicators

Universal Access to Modern Energy Services	Renewable Energy in the Overall Energy Mix	Energy Efficiency
Percentage of Population with Access to Electricity: 2010: 80,8% 2013: 92,0%	Percentage of ER in the Production of Electricity: 2010: 1,2% 2013: 20%	Final Energy Intensity (Energy consumption final/GDP in KWh/Euros) 2010: 1,5 kWh/Euros 2013: 1,4 kWh/Euros
Percentage of Population With Access to Modern Cooking Option: 2010: 70,2% 2013: 70,1%	Percentage of ER in Production of Domestic Hot Water: 2010: ND 2013: ND	

1.2 Energy Access Goals by 2030

The goals of access to energy to Cape Verde are contained in the action plan for energy efficiency and Action Plan for renewable energy. In 2030, it is expected that all families, companies and institutions of Cape Verde have effective access to electricity. And, it is hoped that in 2030 every family can have access to modern fuels and cooking insurance.

While the goal of access to electricity will probably be reached before 2017, with regard to access to alternative fuels, the challenge is much bigger. Therefore, it is expected that in a first phase, favoring

the efficiency with the introduction of improved stoves. The goal is to eradicate completely the use of ranges of three stones already in 2020.

Biomass is a scarce resource in Cape Verde and the current rate of use is superior to natural replacement rate. The intention is not to eliminate the use of firewood, but reduce it so that, on the one hand, their use can be sustainable and, on the other, can be a choice of each family and not the only option.

In 2030, and the efficiency scenario, it is expected that the use of firewood in urban areas will be (less than 2%) and that, in rural areas, remain still about 10% of households with preference for firewood in cooking. Part of this reduction would be natural consequence of urbanization. This reduction, associated with the Elimination of the use of the stove of three stones (with reduction of specific consumption for values of the order of 50%), consumption would fall from nearly 90,000 tons in 2010 for a little more than 17,000 tons in 2030 (Figure 11).

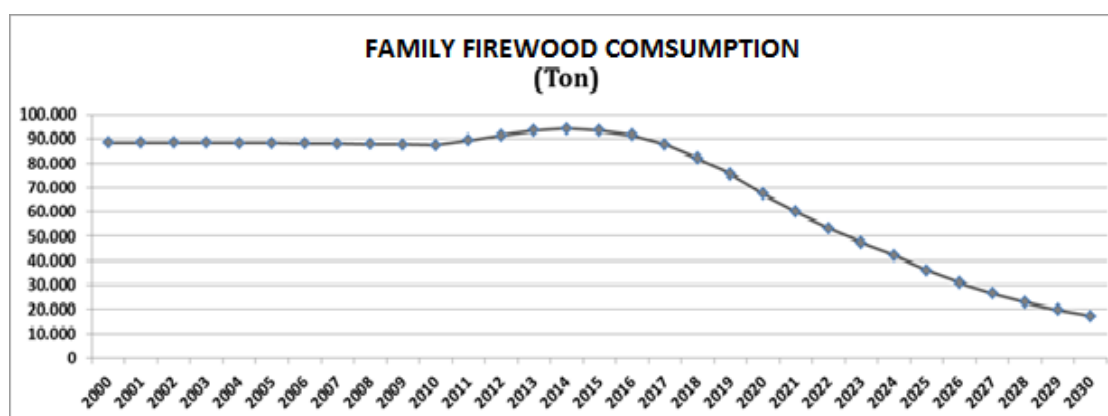


Figura 2 – Evolução da Procura Total de Lenha pelas Famílias em Cabo Verde Figure 11 – evolution of Total demand of Firewood by households in Cape Verde

With a current rate of more than 90%, the task of universal access to electricity will be more facilitated and reached even before 2017. In addition to various rural electrification projects and strengthening of the network are laid down to the isolated communities still without access to the public network, the creation of micro-networks electrified based on renewable energy sources. In case where the dwellings are too dispersed, the use of individual systems will be encouraged.

There is an ongoing ambitious project of extension and strengthening the power grid and rural electrification, by that, currently there is no exact quantification of the number of families who should have access to electricity in the coming years. In total can be estimated at about 5000 families.

Table 2 summarizes to the specific goals and objectives set out for Cape Verde:

Table 2 - Goals and Specific Objectives of the Access to Energy for Cape Verde

Access to Modern Energy		
	Percentage Of Population with Access to Electricity	Percentage of Population with Access to Modern Cooking Option
Goals 2030	100%	100%
Specific Objectives	4. Network Extension to nearby Communities; 5. Electrification with Renewable Sources of all isolated communities and without access and away from the network 6. The scattered housing benefit from the use of individual systems	3. Eradication of three stones stoves and replacement with improved stoves (2020); Erradicação dos Fogões 3 Pedras e substituição por fogões melhorados (2020); 4. Promoting Butane Gas penetration rate exceeding 90%

1.3 Renewable Energy Goals by 2030

The Renewable Energy targets for Cape Verde are detailed in the Action Plan for Renewable Energy sources. Cape Verde has chosen the electric sector, whose growth has been consistent in recent years, as the target for ambitious targets for renewable energy penetration: It’s expected that, from 2020, all the electricity consumed in Cape Verde to be from a renewable source.

This goal is equivalent to passing a little more than 100 GWh provided in the baseline scenario based on continuity, to 760 GWh of electricity produced from renewable energy sources, representing an increase of nearly 7.6 times. The weight of the energy mix for electricity from renewable sources would increase from 3.4% in 2013 to almost 40% in 2030. However, in the same period the consumption of firewood would breakdown from 19, 4% to 3, 8%, while the gas would double the weight in the total offer of gross energy. (Figure 12)

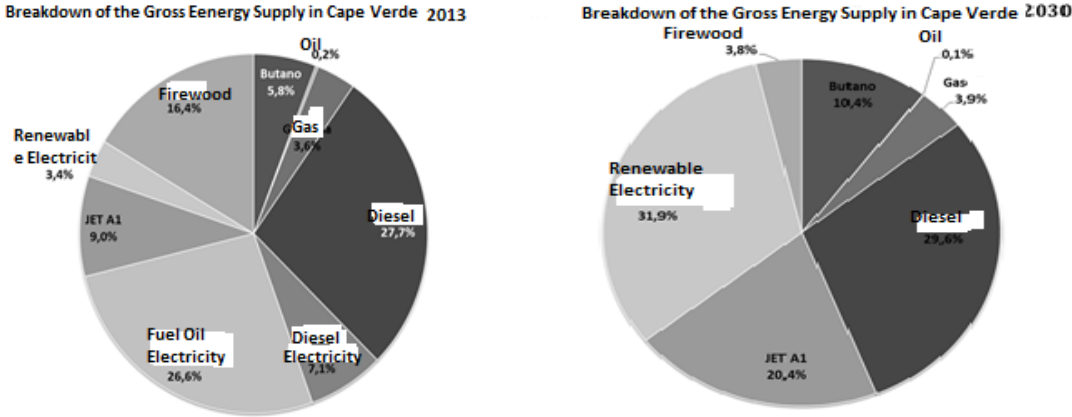


Figure 3 Evolution of the breakdown of gross energy in Cape Verde and changes in the distribution of gross energy in Cape Verde

That is, with this substantial change in the eletroprodutor system, the combined effect of measures of access, of energy efficiency and renewables make the weight of renewable energy sources in total gross energy supply increase to nearly double (1, 8 times larger).

In the case of heat production, has opted for the heat used in the consumption of domestic hot water. This problem is particularly significant in hotels that use, for the most part, individual electrical heating systems in the rooms, with consumption and high costs. Some families also have this equipment at home.

In certain cases, the conversion to solar thermal systems will be difficult, for architectural or other reasons, because the targets for existing buildings are modest. The exceptions are the public buildings that will have to lead by example and therefore are subject to more ambitious goals.

A

Tabela 3 Summarizes the Goals and Specific Objectives of Renewable Energies stipulated for Cape Verde:

Tabela 3 - Goals and Specific Objective of Renewable Energy for Cape Verde

	Doubling the Share of Renewable Energy in the overall Energy Mix	
	Percentage of ER in the Production of Electricity	Percentage of ER in the Production of Domestic Hot Water
Meta 2030	100%	100% of New Building with Solar Water Heaters Strong accession (> 20%) existing hotels and restaurants to residences Solar Water Heaters
Specific Objectives	4. Achieve a penetration of 30%/35% of ER in Electric Network in 2016; 5. Achieve a 50% of penetration of ER in Electric Network in 2018; 6. Achieve a penetration of 100% of ER in Electric newttwork in 2020.	4. Achieve a minimum of 10% conversion of residences that use AQS to solar heaters; 5. Achieve a minimum of 25% of the conversion of hotels and restaurants that use AQS to solar heaters; 6. Achieve a minimum of 50% of conversion of public buildings that use AQS to solar heaters; Note: percentage of buildings where such conversion is technically possible

1.4 Energy Efficiency Targets to 2030

Energy efficiency goals for Cape Verde are detailed in the action plan for energy efficiency. In the absence of detailed sectoral data in Cape Verde, the impact of energy efficiency measures is harder to quantify. The strategy outlined for the energy sector in Cape Verde, demand management, the promotion of more efficient process and equipment, promotion of rational energy use are both structural elements of transformation of culture and energy trajectory ; and complementary elements to the goals of renewable energy and energy access.

Renewable energy goals involve the construction of a modern and efficient electrical system with reduced losses, control of cargo and automated management. On the other hand, the introduction of improved stoves is a measure of energy efficiency in the conversion of wood into useful heat.

Other packages of complementary measures will try to introduce new ways of solving the energy in housing and offices, in home appliances and in production processes. This plan, it is impossible to quantify in absolute targets, proposes a reference scenario for energy efficiency measures, based on the following assumptions relative to the base scenario:

Fuel Consumption: 10.0% reduction goal in consumption compared to the baseline scenario.

- Reduction is made in two steps: first to an annual average of 6.0% of consumption until 2025 and then faster, at an annual average rate of 10.0% between 2025-2030.

Electricity Consumption: 20.0% reduction goal in consumption of compared to the baseline scenario.

- Also based on a reduction in two steps, first with an annual average of 8.0% of consumption until 2025 and then 15.0% from 2025 to 2030;

Efficiency in the Distribution of Electricity: Goal of reducing losses to the order values of 8, 0% in 2030.

- This reduction is based on the assumption of a quick technical and social intervention, with a rapid reduction of total losses of 28.0% in 2014/2015 to 8.0% in 2020.
- In the decade of 2020/2030, losses related to the distributed electricity remain around the average of 8.0%.

In short, the energy efficiency goals are (table 4):

Tabela 4 – Goals and Specific Objectives of Energy Efficiency in Final de Energy Demand for Cape Verde

Double the Overall Rate of Improvement of Energy Efficiency	
	Final energy Demand Reduction Relative to the Base Scenario
Goals 2030	- 20% of Final demand for energy in relation to the Baseline Scenario
Objetivos Especificos	4. Reduction in consumption of diesel, gasoline, Oil, jet A1, in 2030 compared to the base case; 5. Reduction of 20% of electricity consumption in 2030 compared to the base case; 6. Reduction of technical and total losses in the power grid to values of around 8%.

Stress that the goal of eradication of three stoves stones, stipulated in the goals of access to energy is a measure of energy efficiency, so there is still to add the measures provided for the access to energy:

Firewood and gas consumption: reduction the number of families using firewood and elimination of the use of the stove of three stones (with reduction of specific consumption to values of around 50%). In 2030, the use of firewood in urban areas would be residual (less than 2%) and in rural areas, would remain still about 10% percent of families with preference for firewood in cooking. It is assumed that this substitution will be made in favour of butane.

These goals all together will make the expected difference between the energy demand in the baseline scenario and the scenario efficiency will be almost 20% in 2030 (Figure 13).

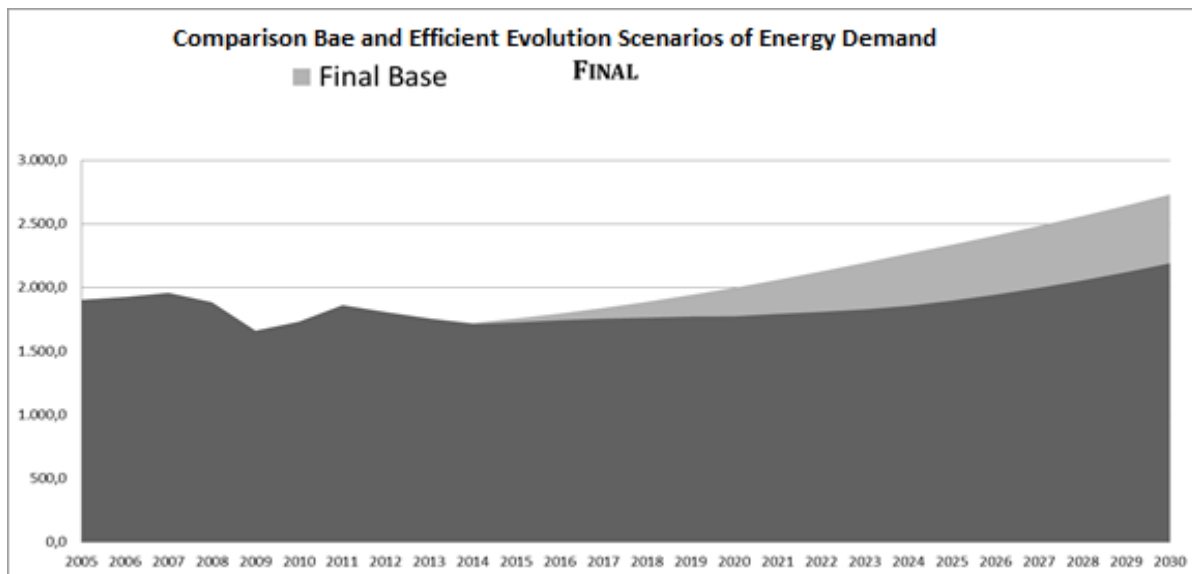


Figura 4 –Comparison of Final energy demand in the Base case and the efficiency in Cape Verde

But the National Action Plan for Energy Efficiency is closely linked to the National Action Plan for Renewable Energies (PNAER). The replacement of oil derivatives used in the production of electricity (gas oil and fuel oil currently) for renewable energy, as provided in PNAER, will have a major impact on the efficiency of the energy system as a whole.

The combination of measures, both on the supply and demand side, will lead to the gross energy needs of Cape Verde will suffer a reduction of almost 40 % in 2030 , of 3,900 GWh as provided in the Basic Scenario, to 2,382 GWh in Scenario Efficiency scenario (Figure 14) .

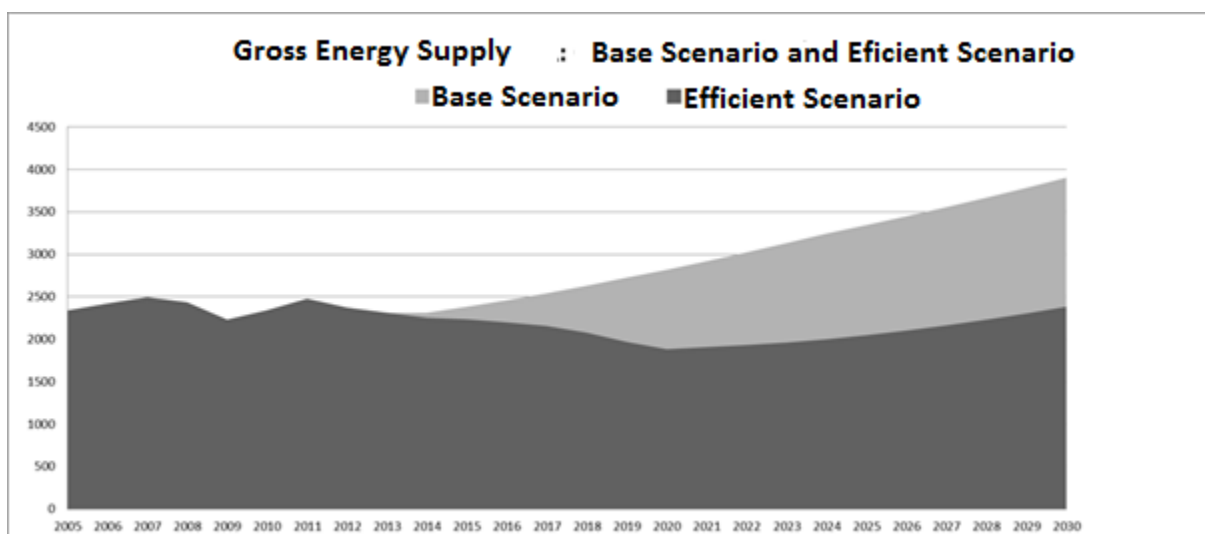


Figura 5 – Comparison of supply of gross energy in the Base case and the efficiency in Cape Verde

In this global scene supply – demand, fuel oil would disappear from the energy mix in Cape Verde and diesel would have a significant reduction. The wood suffers in this scenario a significant reduction, of just over 75%, but is the Elimination of fossil fuels to produce electricity, as provided in PNAER, which contributes more to the potential for energy efficiency, with an associated savings of 1,842 GWh (Figure 15).

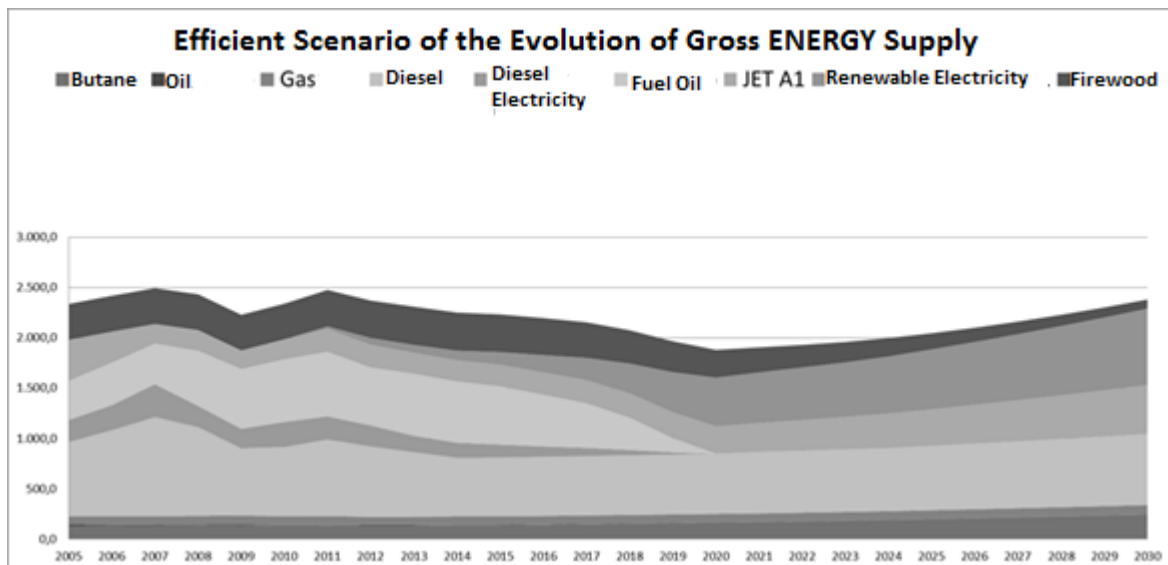


Figura 6 – Changes in the supply of gross energy Efficiency scenario in Cape Verde

1.5 Nexus Relevant Goals until 2030

The universalization of access to electricity, for families, businesses and institutions, especially in rural areas, will allow the creation of more opportunities for income generation and access to factors of well-being and personal development as information and entertainment or education. Also, the impact on health and gender inequalities will be minimized with measures aimed at reducing the consumption of firewood.

But the most relevant and complementary goal, is the reduction of the unit cost of energy for families and businesses and reducing the weight of the energy bill in the family expenses and the cost of production.

With the current levels, the main barrier to the achievement of the proposed objectives is, precisely, the cost of access and / or purchase. The reduction of these costs is, thus, essential for the proposed strategy.

Cost reduction must be guidance of technological choices and other decisions that will be taken in the implementation of the strategy. Without imposing quantified targets, **the unit costs must always be lower than the prices in 2015, the reference year** on which it will begin to monitor the implementation of this plan.

Today, most of the Cape Verdean population already is fed by desalinated water. In S. Vicente and Sal islands and, mostly part, Boavista, it is the only source of drinking water. Currently the technology used is reverse osmosis, which was a massive improvement in energy efficiency in the production of drinking water. The energy consumption for desalination, which has already represented a little more than 7% of total final energy consumption in Cape Verde, it rounds today only a little over 1% of final energy demand but it still represents almost 6% of the electricity produced in Cape Verde.

And its cost, as a result of the high cost of electricity, is high (around € 2/ ton), so that your access is very restricted. So the reduction in the cost of energy would have a direct impact on reducing the financial barrier to access to safe drinking water and improve sanitary conditions and comfort of the population.

Although water always is a scarce commodity in Cape Verde, especially for agriculture (since the cost prohibitive of desalinated water to prevent its use in agriculture), the availability of cheap energy for pumping, would enable the reduction of costs of foods grown and sold in Cape Verde.

Parte 2: Priority Action Areas

2.1 Access To Energy

2.1.1 2.1.1 What is the current state and trajectory?

With an electrification rate over 90 % in 2014, the goal of universal access to electricity does not seem difficult to achieve. Particularly because this value has grown in recent years, a steady and consistent value. Since 1990, it has seen a rapid growth of electrification rate, from 25.5% in 1990 to over 90 % in 2014. In the same period , the gas has grown from a little over 40 % in 1990 to values close to only 65 % in 2014 (Figure 16)

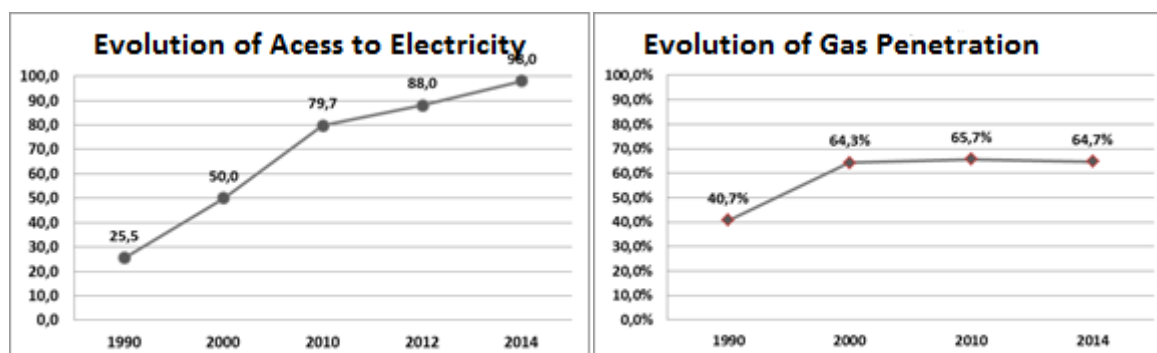


Figura 7 –Electrification Rate Evolution and Use of the Gas in Cape Verde

However, several factors must be considered. In addition to the cost of electricity and the weight that the electricity bill has on the income of families, it's necessary to change the social relationship that is created with this feature. In fact, the average electricity distribution losses in Cape Verde exceed 28%, most commercial losses due to several fraud.

With regard to gas, the end of the subsidy system which ran between the 90s and the early 2000s, as well as the current economic crisis, explain part of almost stagnation of demand that exists today, not explaining however all. In addition to the factors referred to ingrained habits, socio-cultural preferences, the free resource and the perception of a lack of options, among others, are also factors that can weigh when choosing fuel for cooking, and can also explain the stagnation of gas penetration.

In this way, only technological solutions will not be sufficient to achieve the universal access to sustainable energy in Cape Verde. The solutions to be efficient and effective, must integrate social aspects, cultural, economic and institutional.

2.1.2 What are the existing strategies and plans, what are the gaps?

The energy sector in General and the electricity sector in particular, have, since the early 1990s, suffering deep changes. But the new have begun in 2008, with a new institutional framework and great bet on renewable energy. This framework allowed to start diversifying electricity production sector and the emergence of independent power producers, such as the Caboeólica and the ELECTRIC WIND.

The vision of the Government of Cape Verde to the energy sector, expressed in the document of energy policy of Cape Verde (MECC, 2008) is to "Build a safe, efficient, sustainable energy and

without dependence on fossil fuels". It was expected, since at the time, the increased penetration of renewable and alternative energies, as well as the promotion of energy conservation and efficiency in the energy sector. Also stated that it was possible to "ensure 100% of electricity coverage by 2015".

The National Strategy for Domestic Energy (2005), as the main instrument multisectoral director of policies that concern the sector of domestic energy, fits properly, the access to modern forms of energy in their social and economic context, in a country with a fragile ecosystem and weak biomass resources. The document establishes as the main goal the improvement of the comfort and quality of life of families, adopting as a specific goal, the satisfaction of demand of energy for Cooking in a sustainable way, minimizing the negative impact on Health and the Environment from the use of solid fuels ".

But the two sectors had different evolution. While access to electricity increased and are currently over several projects aimed at increasing of the electrification rate and an assessment of the last communities yet to electrify the use of firewood has grown in recent years. In other words, we need to give more attention to the issue of access to modern energy for cooking, incorporating important social aspects such as gender inequality and health.

Although there is no independent energy access plan, this is a central concern of both the action Plan for Energy Efficiency as the Action Plan for Renewable Energy.

2.1.3 What are the actions needed to achieve the global goal in the field of access to energy?

The strategy for energy access groups the measures contained in the Action Plan for Energy Efficiency and Action Plan for Renewable Energy. So, as stated in these plans, the electrification of the last communities will be, either by connecting to the public network where it is technically and economically feasible; either by creating isolated systems based on renewable energy sources, is where this is the only option for the distribution of individual equipment, also based on renewable sources. There is an ongoing general census of communities for electrify and the specific conditions of each area, which will allow analyzing the best options for each particular case.

Both projects already underway as the ones provided, have a strong component of public-private partnership involving the Government, the municipalities, civil society organizations and individuals.

The analysis of some of the recent cases of rural electrification advise that it is necessary to think the business model to adopt, taking into account the specific characteristics of each case and to guarantee sustainability and equal opportunities.

The Census of the last communities is estimated at around 3,000 families, the definition of the best technological options and the definition of best management model adopted for each case will allow the elaboration of concrete projects for funding and running between 2015 and 2016. Already the task of universalization of access to alternative forms of energy for cooking, will have to be based on an integrated, multisectoral and multidisciplinary action.

In a first phase, to the eradication of the use of traditional stoves of three stones, will be tested and disseminated improved stoves. In a second stage the conditions will be created so that families can have alternative energy sources for cooking.

The universe spans about of 30,000 families, distributed throughout the country, especially the rural areas. The gas, for their availability and familiarity, should be the best choice but the solutions to be applied should be solutions in partnership with the beneficiaries, taking into account technical aspects but also the social, cultural, economic and others, so not suitable preset dates and costs, taking risks of conditioning solutions.

So, the proposed objectives for access to energy would be achieved through the implementation of three main groups of results:

Result EA 1: electrification of about 3,000 families until 2017.

Result EA 2: eradication of three stoves stones until 2020;

Result EA 3: promotion of alternative energy sources for cooking, reaching a penetration rate exceeding 90 % in 2030.

With a strong political commitment and environmental benefits, rather than financial reasons are sociological risks that could compromise the achievement of the proposed goals. The cuisine has a strong cultural component and ingrained habits so it is not to replace technologies but processes and rituals of life. In addition to the economic situation of the families may limit or influence the decisions. Therefore, it is expected that the whole process is done in partnership with the beneficiaries, in a truly participatory action, especially in the definition of solutions. Co-authoring of solutions ensures to be accepted and ensures to be successful in the future.

On the other hand, there is the risk of financing must not be completely covered. This is because the investment in this sector has no direct benefits tangible to beneficiaries and can be overlooked by investors and by his own political power. So we must ensure enough funding from the outset to prevent the accomplishment of the objective proposed. So, it is necessary to find models of financing of households that do not create dependency or distortions in the markets.

The following actions will be performed to ensure universal access to modern energy services:

ACCESS TO ELECTRICITY	
	<ol style="list-style-type: none"> 1. Mapping of households without access to electricity; 2. Analysis and Elaboration of electrification options for each community; 3. Network Extension if feasible; 4. Implementation of Micro-network of Renewable Energy; 5. Development and Implementation of individual systems of Electricity to isolated dwellings.
ACCESS MODERN COOKING SERVICES	
	<ol style="list-style-type: none"> 1. Creating of a Multidisciplinary team follow-up; 2. Monitoring and Evaluation of the Situation near the families; 3. Participatory Analysis of Solutions for the eradication of three stones and stoves and butane promotion; 4. Definition of Financing Models; 5. Implementation of solutions; 6. Monitoring and Evaluation.

Cooking solutions to be implemented should nevertheless respect certain rules such as capacity building, endogeneização of technologies and the creation of a local market. For example, improved stoves that will replace the three stone stove should be built locally.

2.1.4 What opportunities (globally) of high impact are relevant?

Having regard to the strategy adopted in Cape Verde to promote universal access to modern energy services, identified four Relevant Impact opportunities (High Impact Opportunity-HIO):

1. **Universal Adoption of Sustainable Solutions of Cooking:** the program provides, by replacing inefficient equipment by other more efficient enough or by replacement of the type of fuel used, a positive change of everyday life of families. With this, the families earn more time, both by reducing the need for collection of firewood, as on improvement of food confection of time, freeing women to income-generating tasks and their children to devote themselves to studies.
2. **Energy, Health and Gender:** traditional practices linked to the kitchen and endanger the health of women and children, especially pregnant women and children at a young age. This program, in which it was designed, is an opportunity to, in partnership with all relevant institutions and agents, including health technicians, trying to warn and change harmful practices through awareness-raising and replacing equipment and practices.
3. **Sustainable Micro-networks:** Cape Verde chose the promotion of micro-networks exclusively fed with renewable energies. Promotes, however, the financial sustainability of these networks, building services management systems that can ensure the maintenance and renovation of structures. The high costs of the diesel options for isolated areas is a unique opportunity to test technologies and management models in favor of the sustainability of micro-networks.

4. **Innovative Financing Systems:** in addition to the promotion of innovative management systems, Cape Verde will bet on innovative financing system, using for example its wide diaspora to finance micro-networks in their home localities. Also, when betting on the market to implement the strategy outlined, will be necessary to find appropriate financing mechanisms in partnership with the national banking and international partners.

By its insular condition, Cape Verde is a candidate to contribute, in this and in other subjects, to the opportunity of Relevant Impact

5. **Sustainable Energy Insular Economies:** the Islands present common features that may benefit from the mutual exchange of experiences. One of the constraints is the reduced size of the market and the energy projects, which complicates international funding. The Union and coordination between the Islands can help alleviate this and other problems.

Cape Verde already sharing experiences in SIDSDOCK, institutional collective mechanism to help the SIDS (the acronym in English is Small Islands Developing States) to transform their national energy sectors in a catalyst for sustainable economic development and help generate funds for adaptation to climate change. Also shares with the European Islands, including the islands of Macaronesia (Azores, Canary Islands and Madeira) across the Islands Pact, goals, ambitions, knowledge and experience that can benefit everyone.

2.2 Renewable Energy:

2.2.1 What is the current state and the trajectory?

Cape Verde has had, throughout its history, a close relationship with renewable energy, especially wind which, initially, was the prime source for pumping water into wells. Naturally were the first wind farms to produce electricity, even in the 1980s. However, the strong focus on renewable energy is achieved with the publication of Decree-Law No. 1/2011 of January 3, 2011, which is creating a licensing regime and exercise of specific activities and adapted to renewable energy.

The wind farms of Caboeólica and ELECTRIC WIND as well as solar parks of ELECTRA, all connected to the electric network, allowed to increase the penetration of renewables, and in 2013, 20% percent of the electricity produced in the country was of renewable origin (Figure 17).

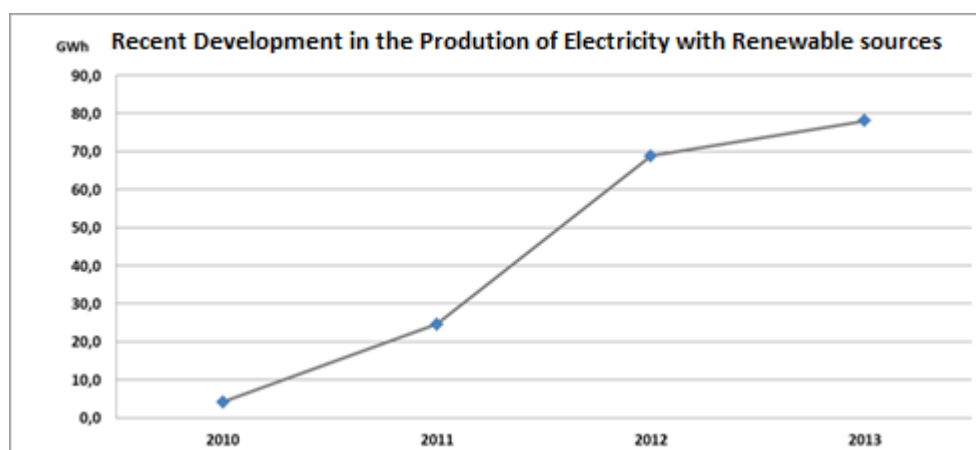


Figura 8 – Evolution of the Production of Electricity of Renewable Origin in Cape Verde

However, if we the production of electricity, to other forms of renewable energy (including solar thermal) are still waste. Also, since 2010 that barely appeared major projects in the area of renewable energy worthy of the objectives proposed.

That is, the entry into force of Decree-Law No. 1/2011 did not induced the creation of a genuine market for renewable energies. On the contrary, the situation of the island of Sal, and to a lesser extent on the island of São Vicente, with over- production of wind and solar energy compared to the electrical network can absorb, raises important questions of a technical nature.

But, also, the legal framework has not been sufficiently heeded. The Government itself acknowledges, in Decree-Law No. 18/2014 that came slightly change the Decree-Law No. 1/2011, that "despite all the efforts undertaken, institutional reforms still require tweaking in order to be more effective in the promotion of investments" and that "it must be better clarification of the roles of all stakeholders in the process of licensing and interconnection to the distribution network and at the same time the decision-making process".

On the other hand, the introduction of wind energy in the energy mix has had no significant impact on the energy bill. Well, the main reason to bet on renewable energy is precisely the invoice reduction and increased competitiveness of the economy. The main factors contributing to this situation have to do with the current difficulties of the main operator, ELECTRA, the chronic inefficiencies of the whole system and the immaturity of the electricity market, still dominated by a single agent. Associated with this, we must take into account social practices, however, rooting and generalizing. There are several illegal connections made by consumers, with a significant weight in the public electricity company's revenues. The weight of this final factor is yet to be fully elucidated but, the fact is that there are no strong incentives to improve the efficiency of the whole system.

2.2.2 What are the plans / existing strategies and what are the gaps?

The Cape Verde government's vision for the energy sector, expressed in the Cape Verde Energy Policy Document is to " build an energy sector secure, efficient, sustainable and without reliance on fossil fuel." The report quantifies some goals, the main one being the cover 50.0 % of electricity needs by 2020 from renewable sources and have at least an island with 100.0 % renewable energy.

Decree-Law No. 1/2011 of January 3, 2011, in addition to technical and safety issues, provides a framework of investment incentives, fiscal and customs. This also defines special treatment for components, such as exemption from environmental impact study and specific tax benefits.

The Master Plan of renewable energy (PDER) was prepared and approved in 2011 by resolution of the Council of Ministers No. 7/2012 and take some coherence and direction to actions aimed at achieving the goals proposed. The Sectorial strategic plan for Renewable energies (PESER), approved the December 9, 2012, analyzes and identifies areas of high interest to the exploration of renewable energy potential in the country, the development of Renewable Energies (ZDER), areas that, for having an excellent renewable potential, are reserved for the installation of equipment eletroprodutores use of renewable resources

But, despite these guidance documents, it was not possible to create a sufficiently transparent and flexible production market, with real guarantees for investors. The institutional, legal and regulatory environment, as well as the definition of clear institutional responsibilities, will be essential for the promotion and creation of a market for renewable energy.

Currently, under the appointments of Cape Verde in the economic region of West Africa (ECOWAS), was drafted an Action Plan for renewable energy (PNAER), which brings together a series of measures for the sector, and a structuring element, since it aims to create a clear and transparent market for renewable energy.

2.2.3 What are the actions needed to achieve the global goal in the field of renewable energies?

The strategy described in this action agenda is part of the strategy developed under the Action Plan for Renewable Energy. In PNAER, the strategy of promoting renewable energy outlined favors the production of electricity from renewable sources; and domestic hot water based on solar energy. Active cooling with renewable energies will also be an area to develop, although initially with small demonstration projects and feasibility studies.

The promotion of **solar water heaters** will be attached to the strategy of energy efficiency for buildings and intensive consumers, both manufacturers as the hospitality industry.

For the production of electricity with renewable sources, the strategy will treat differently the grid connection, attached to the premises; isolated rural networks and rural dwellings scattered; and the production by independent producers coupled directly to the public network.

Isolated Rural Existing Networks should be, where it is technically and economically possible, connected to the public network. Where this is not possible, or where the maintenance of an isolated system is a reasoned option (to promote sustainable rural tourism for example), it will resort

exclusively to renewable energy sources. For **Rural Dwellings Scattered** propose individual autonomous systems based on renewable energy sources.

The strategy to encourage Microgeneration will be restricted to self-consumption, avoiding as much as possible, in a first phase and for technical reasons, the injection of electricity on the network. This will be based on financial incentives for investment.

The Strategy for the 100% of Renewables Energy in the Electricity Network is based on advances by prudent steps, with a strong component of research, learning, knowledge generation and demonstration.

The penetration rate is incremented of phased way, passing through 2 intermediate steps, 30% /35% (planned for 2016) and 50% p(scheduled for 2018), before reaching the 100% in 2020. This process involves 6 phases:

- → **Initially** set up the target of **30 % / 35%** of renewable sources of electricity injected into the network in all the islands. This value should be possible without recourse to storage.
- In a **second phase** - initiated small storage projects with the greatest possible diversification of technologies.
- A **third phase** progresses to an island with **50%** of renewable origin electricity injected into the network;
- In a **fourth phase**, after a learning time , advances to a minimum of 50 % of renewable sources of electricity injected into the network in all the islands
- In a **fifth phase** progresses to **an island with 100%** with renewable technologies that have the most suitable and easier to endogenize
- A **sixth and last phase**, after a time of learning and control of technologies and processes, continue to the goal of 100%.

The energy required would be mostly produced from mature technologies, mainly by converting wind, photovoltaic and not ruling out other sources, such as geothermal energy and biodiesel, with the potential to demonstrate in some areas of the country. Promising technologies, but still in the research stage and demonstration, such as ocean energies, should be part of a range of technologies to develop, creating the conditions for Cape Verde receive and develop demonstration projects.

For the storage of energy needed for penetration exceeding 30 %, the initial range of technologies to test the learning phase must be as varied as possible, including pumping water, bioenergy, synthetic fuel, batteries, and flywheel, among others.

The selection of technologies to adopt for larger projects will depend on the consumption profile of each island, the characteristics of the associated source and socio-economic conditions of the island.

It should, where possible, encourage the diversification of technologies, taking into account the complementarity, such as wind and solar.

The path presents itself, therefore, with a number of barriers:

- The **first barrier is technical**: the goal of 100% of renewable energies on the network, will only be reached using **the storage** of energy produced through intermittent sources or fickle. And the main barrier to take into account is that storage technologies available, or are not appropriate to the capabilities required (batteries), or are in the demonstration phase (storage with pump / water turbine). This barrier will be minimized with the introduction of testing and learning.
- Associated with this technical barrier, do not yet exist, **human resources** with ability, knowledge and experience necessary to carry out this transformation.
- Another important **barrier is financial**: the aim is to replace the entire current system for initial investment-intensive technologies, by which the amount to invest in a short time will be bulky. In long-term will be the best option but, in the short term, the problem of financing can be complicated.

Private involvement will be needed to overcome the financial obstacles. However, it will be necessary to give guarantees to private, building a long-term market, transparent, with clear rules and strong statements and fair, so that the last barrier, the institutional market, is perhaps the most important to the success of policies now drawn.

The implementation of the strategy would go through four steps:

Activity ER 1: Prior Studies;

Activity ER 2: construction of a Facilitator Institutional Building, complete and transparent:

Activity ER 3: Learning: development and implementation of small demonstration projects on storage technologies;

Activity ER 4: Development of the renewable energy market.

The actions provided for in each group of activity are:

PRIOR STUDIES	
	<ol style="list-style-type: none"> 1. Analysis of the current Legal and institutional framework and analysis of alternatives; 2. Detailed mapping of Renewable energy potential; 3. Detailed and thorough Study of the conditions of Operation of the transmission and distribution of Electricity and electricity losses including socio-cultural factors and public lighting; Estudo; 4. Study and analysis of the market for the different options (Microgeneration, connected to the network and remote networks); 5. Study of the impact of the bet in the sector of Renewable fuels; 6. Study of the Impact of investment in Renewable in state revenues; 7. Study of the impact of the bet in renewable trade balance; 8. Strategic Environmental Analysis of the plan: 9. Detailed studies Release to reach the target of 30 % / 35% from renewable sources of electricity in all the islands (analysis of the potential and the load curve, analysis of technological options, socio-economic and financial analysis, design and dimensioning); 10. Detailed studies of launch to reach the target of 50 % renewable source of electricity in all the islands (analysis of the potential and the load curve, analysis of storage needs and the excess energy produced, analysis of technological options, socio-economic analysis and financial, design and sizing); 11. Launch Detailed studies to reach the goal of 100 % renewable source of electricity in all the islands (analysis of the potential and the load curve, analysis of storage needs and the excess energy produced, analysis of technological options, socio-economic and financial analysis, design and sizing).
CONSTRUCTION OF A FACILITATOR INSTITUTIONAL BUILDING, COMPLETE AND TRANSPARENT	
	<ol style="list-style-type: none"> 1. Updating of the Legislation; 2. Regulation of the legislation; 3. Restructuring of the energy sector costumes; 4. Definition and clarification of the institutional responsibilities with the creation of Insular Agency of Energy; 5. Identification and removal of institutional Barriers; 6. Definition of Standards and certification of renewable energy equipment; 7. Clarification of technical parameters as access code and dispatch parameters; 8. Definition of Auction procedures for independent producers; 9. Definition of the criteria and requirements of contracts for purchase and sale of electricity to independent producers; 10. Regulation of purchase/sale electricity rates for independent producers and grid connection;
DEVELOPMENT AND IMPLEMENTATION OF SMALL DEMONSTRATION PROJECTS IN STORAGE TECHNOLOGIES	
	<ol style="list-style-type: none"> 1. Analysis of available technologies, taking into account the degree of industrial and technical maturity and storage technologies Selection taking into account the particularities of each island; 2. Preparation of pilot projects; 3. Implementation of pilot projects; 4. Project of An Island 100% of Electricity from Renewable Source 5. Follow-up, monitoring and evaluation of pilot projects;
MARKET DEVELOPMENT OF RENEWABLE ENERGIES AND ENERGY EFFICIENCY	
	<ol style="list-style-type: none"> 1. Development of a Simple and expeditious Procedure for the submission of projects for ER (connected to the network, in isolated networks and autonomous systems) and energy efficiency through a website with well defined acceptance criteria

	<p>For licensing</p> <p>For financing</p> <ol style="list-style-type: none"> 2. Promotion and Certification of Energy Service Companies-ESE 3. Programme of Microgeneration in public buildings 4. Programme of Universalization of access to Renewable Electricity 5. Creation of a storage Market 6. Creation of a market for Solar Heating of Domestic Water 7. Creation of an internal market of production of solar heaters 8. Encouragement and development of a system of financing in partnership with the banking and private investors for Microgeneration; 9. Development of a Business Model and Funding for isolated systems and stand-alone systems; 10. Auction pair Launch independent producers; 11. Information and Awareness for families and employers of the benefits of renewable energy; 12. Establishment of a Coordination and leadership of the Cluster of renewable energies for the promotion of companies and the energy sector of Cape Verde.
BIOMASS AND BIOENERGY INITIATIVES	
	<ol style="list-style-type: none"> 1. Test Solutions of Biodiesel from Jatropha Curcas 2. Test of bioenergy Solutions from Organic Waste 3. Improving the Biomass supply chain

These main activities would be accompanied by permanent and structural activities:

- i. **Human Resources Training;**
- ii. **Professional certification** of technicians and designers.
- iii. **for the Collection, Organization and Dissemination of Information;**
- iv. Measures for **Transparency and Decision Support;**
- v. **Education, Awareness-raising Campaigns and Information;**
- vi. and a constant **Monitoring and Evaluation;**
- vii. of an effective **coordination.**

2.2.4 What high-impact opportunities that are relevant?

The goals and the strategy outlined to achieve, as well as the necessary means and resources and its insular condition, identifying, for renewable energy in Cape verde, three Relevant Impact opportunities:

1. **Sustainable Micro-network;**
2. **Innovate Financing Systems;**
3. **Sustainable Energy for Insular Economies.**

2.3 Energy Efficiency:

2.3.1 What is the current state and the trajectory?

Energy efficiency is an area until now neglected in Cape Verde. Although some initiatives have already been carried out, mainly to raise awareness or exchange of light bulbs, energy efficiency has never been properly framed.

There are no data that allow to trace the recent trajectory with regard to energy efficiency but, in many sectors, including the productive sector, despite the high cost of energy in Cape Verde, energy efficiency is not considered a relevant factor for the choice of consumer equipment. Taking into account the small size of the market cost and availability are the factors that most count at the time of purchase.

There is also a clear lack of information about the impact that the choice of equipment may be in the making. This is always analyzed from a global point of view and the unit cost of energy, being high, just overshadowing other causes for the high energy bills of businesses and families.

Even in the production and distribution of electricity, the country still lives an emergency situation and the priority is the availability of energy. Eletroprodutor system optimization is still not even considered and efficiency in the distribution of electricity only very recently begun to be addressed, even if due to high technical and commercial losses.

2.3.2 What are the plans / existing strategies and what are the gaps?

Are currently under way some energy efficiency projects, particularly in improving the efficiency in the distribution of electricity, with the creation of a dispatch Center and network improvements.

In 2015, is expected to start a project "Removing barriers to energy efficiency in buildings and Appliances" with funding from the Global Environment Fund (GEF), whose main objective is to remove barriers to energy efficiency in buildings and appliances in Cape Verde. This project can serve as an aggregator and establish itself as the first step towards the development of an integrated policy for energy efficiency

Under the commitments of Cape Verde in the economic region of West Africa (ECOWAS), the Action Plan for energy efficiency (PNAEE) in Cape Verde is being prepared and in the process of finalization and approval. This plan, which brings together ongoing initiatives, will be the first structuring element for the sector, creating the conditions for the promotion of energy efficiency.

2.3.3 What are the priorities to be addressed in order to achieve the global goal in the field of energy efficiency?

The strategy for the promotion of energy efficiency, as described in the Action Plan for energy efficiency, has 4 main axes of intervention:

AXIS 1: Energy Efficiency in the Distribution of Electricity;

AXIS 2: Energy Efficiency in Buildings,

AXIS 3: Energy Efficiency in Home Appliances and Equipment;

AXIS 4: Energy Efficiency for Intensive Consumers, with an emphasis on hotels.

The first group of activities, targeting the electricity sector, encompasses a number of measures to improve efficiency in the transportation and distribution of electricity, including interventions in public lighting, replacement of counters, improving network transformation stations MT / BT, introduction of SCADA systems (Supervisory Control and Data acquisition system) and creating a dispatch Center.

While supporting the activities of firms and families, buildings account for a significant share of energy consumption. The second axis aims to promote the reduction of energy consumption in existing buildings and the definition of minimum requirements and energy consumption standards for new buildings.

Also, in order to reduce energy consumption and invoice in the residential sector, the energy efficiency of appliances shall be controlled in both their imports as on their marketing and use. Other equipment, such as air-conditioning systems and energy-intensive equipment in industry and services, will be the subject of measures of control and certification.

The last axis is aimed at all companies or groups whose consumption exceeds a certain level, to be defined in legislation, which should be properly framed and accompanied, in order to encourage more energy-efficient practices and processes, with strong benefits in energy consumption, costs and competitiveness. Of this group, the hotels will be the target of a series of measures and specific incentives.

Except for the first group of activities, where there will be public financing through the dealership network, ELECTRA, the other depend on the **creation of a Legal and institutional Environment Conducive**. Also depend on the availability of information and awareness of entrepreneurs and families, as well as access to adequate financing.

The risks will be more related to the accession of families and companies. Another risk factor has to do with the availability of human resources required to design and implementation of energy efficiency initiatives. In short with the creation of a market and to guarantee of the quality of its actors.

The achievement of the outlined strategy will be based on the construction of an Institutional Building Facilitator, complete and transparent and the establishment of a National System of training and certification in energy efficiency. Will be to that established a training and certification Entity responsible for the entire system.

The implementation of the strategy goes through strong public-private cooperation, with the **Development of a Market for Energy Services and the Promotion and Certification of Energy Service Companies-ESE**, which will be the actual performers of the measures:

CREATION OF A LEGAL AND INSTITUTIONAL ENVIRONMENT ENERGY EFFICIENCY FACILITATOR	
	<ol style="list-style-type: none"> 1. Updating of the legislation; 2. Regulation of the legislation; 3. Regulation of intensive Energy Consumers; 4. Building codes for energy-efficient Buildings; 5. Regulation and Energy certification and Comfort inside buildings; 6. Energy Labelling and Standards for equipment and Appliances; 7. Regulation of imports of Appliances and certification; 8. Mechanisms for encouraging the withdrawal from circulation of inefficient appliances and equipment; 9. Establishment of a system for the registration of Entry of equipment and Appliances; 10. Regulation of Projects and installation of HVAC Equipment; 11. Regulation of Projects and installation of industrial equipment; 12. The institution of an Insular Agency of energy
DEVELOPMENT OF THE ENERGY EFFICIENCY MARKET	
	<ol style="list-style-type: none"> 1. Regulation of the activities of the Energy Service Companies; 2. Encouragement and development of a system of financing in partnership with the banking and private investors to energy efficiency; 3. Information and Awareness for families and employers of the benefits of energy efficiency;

The State will have a leadership role by example, with the creation and implementation of specific programmes that stand out:

Program for Microgeneration and Energy Efficiency in Cape Verde State Governments Administrations.

Energy Efficiency Program in Electrical Distribution, including public lighting.

2.3.4 What are the high-impact opportunities that are relevant?

The goals and strategies adopted for energy efficiency coincide with the objectives of the following Relevant Impact opportunities:

1. **Advanced Lighting Efficiency Appliances;**
2. **Energy Efficiency in buildings;**

In these two particular points Cape Verde began a detailed analysis of the initial situation in a multidisciplinary and comprehensive forum for training and preparation of legislation for buildings and appliances. This work tries to meet the requirements of regulatory convergence in the scope of Cape Verde agreements with the European Union and it will have to fit in the ECOWAS policy for the sector. It will be a source of knowledge and experience useful for all countries that are walking the same path.

And of course, also for the theme of energy efficiency, the following Relevant Impact opportunities previously identified:

3. **Innovative financing systems;**
4. **Sustainable Power for Insular Economies.**

2.4 Additional Nexus

The energy is in the strategy of Cape Verde for the sector, one of the axes of development priorities and competitive differentiation. It is of course a catalyst and facilitator of families' access to income-generating activities. This bet on renewable energy has assumed a scope that goes beyond the simple provision of energy to households and businesses. In fact, several will be the impacts on the economy and on Cape Verdean society:

- ✓ Reducing energy dependency;
- ✓ Reduce the external deficit;
- ✓ Weight reduction of the energy bill for families and businesses;
- ✓ Development of innovation in the energy sector of Cape Verde;
- ✓ Private sector development in the area of energy;
- ✓ Creation of skills to provide services regionally and internationally;
- ✓ Improving of the living conditions of the most disadvantaged families;
- ✓ Conservation and enhancement of the fragile ecosystem;
- ✓ Substantial reduction of greenhouse gas emissions;
- ✓ Creation of a brand "Green islands" and an asset for the tourism industry.

The most important thing in this strategy is, however, the vision of an energy sector that place Cape Verde as service provider for the region of the economic region of West Africa (ECOWAS), to the African countries of Portuguese official language (PALOP) and for small island developing States (SIDS).

Coupled with the tourism sector , where the goal of 100 % renewable is an asset for attracting tourists with environmental sensitivity , the energy sector will be in the future one of the key sectors for economic growth in Cape Verde , receiving foreign direct investment and wealth creation.

Energy – Drinking Water

In Cape Verde, the energy sector has an umbilical relationship with the availability of clean water for consumption. Any verified transformation of the energy sector will impact on water sector, both in its availability and its cost. The reduction in the cost of energy would have direct impact on reducing the financial barrier to access to safe drinking water and thus the improvisation of sanitation conditions and comfort of the population.

The production of desalinated water will have an important role, benefiting from energy efficiency measures envisaged, but also being a means of energy storage and load control. Indeed, despite being a major consumer of energy, the water can be stored.

With enough deposits, will be possible to adapt the water production to the moments of less demand for energy, leveling the load throughout the day. In this setting, the desalination /storage acts as a water demand management tool.

Also, it can be possible to store water, the desalination process can be adapted to the availability of overproduction with intermittent renewable energy sources, producing water when there is excess and storing this water for consumption in times of reduced availability of supply of renewable energies. In this configuration, the desalination operates as an energy storage process.

Energy – Power Supply

Water scarcity in Cape Verde makes most food is imported. The small local production is made using the underground water pumped mostly with diesel-powered pumps or electricity and, therefore, a high cost that affects the final price to the consumer.

The reduction of energy costs, with the introduction of renewable sources for uses in agriculture, is one of the objectives defined as priorities by its impact on food security and on increasing access to local produce and then, in the reduction of food dependency of Cape Verde.

Energy – Families, Health and Gender

Traditional practices linked to the kitchen endanger the health of women and children, especially pregnant women and children at an early age. The strategy for the energy sector and subsector of cooking , the model that was designed , is an opportunity to , in partnership with all institutions and stakeholders, including health professionals , trying to alert and change harmful practices through awareness and replacement equipment and practices.

The availability of electric power will be an important factor for many women to contribute to the family income with the income-generating activities and at the same time gain financial independence.

And, by the impact on health and well-being, gender imbalances and while familiar development booster, the strategy for the energy sector is an instrument to fight against poverty, against gender inequality and for equal opportunities.

In Cape Verde is also an instrument for combating desertification and for the improvement, beautification and enhancement of the environment and, consequently, a step toward a path of sustainable development.

Naturalmente, relacionado com estas implicações da estratégia de desenvolvimento energético sustentável, pode-se identificar as seguintes Oportunidades de Impacto Relevantes:

Of course, related to these implications of the sustainable energy development strategy, it can identify the following Relevant Impact opportunities:

1. **Water-Energy-Supply Chain**
2. **Health and gender Power**
3. **Sustainable Energy for Insular Economies**

2.5 Action Area:

2.5.1 Planning and Energy Policies

Sustainable energy for all agenda in Cape Verde is a transformation agenda following a path even with areas of uncertainty. To maintain the direction and achieve the goals is important, firstly, to have a guiding document, a political plan and clear and consistent action. Secondly, taking into account the uncertainties, a monitoring and evaluation plan (M&A) that allows, after analysis of the path taken, reorient the actions in order to maintain the goals. On the other hand, the strategy has as an instrument the creation of renewable energy and energy efficiency market.

Agenda of Sustainable Energy for All in Cape Verde is a transformation agenda following a path even with areas of uncertainty. To maintain the direction and achieve goals is important, firstly, to have a guiding document, a political plan of action and clear and consistent. Secondly, taking into account the uncertainties, a plan for monitoring and evaluation that, after analysis of the journey, to redirect the actions in order to maintain the goals.

Thus, the establishments of an institutional building facilitator complete and transparent that can give confidence to investors is crucial. Likewise, investors, companies and individuals must have guarantees that the available equipment meets minimum requirements for quality and durability and have available qualified staff, at all stages of the process. This confidence in the market will be achieved by the establishment of a National Training System Certification in Renewable Energy and Energy Efficiency and defining a training and certification body responsible for the entire system.

To the governance, coordination, execution and M&A process, in addition to the general direction of energy and regulatory Agency, the implementation of the Insular Energy Agency. The Insular Energy Agency will be the main instrument of intervention and dynamization of activities and behavioral changes, leading to better management of the consumption and production of energy and access to energy.

In addition, the Insular Energy Agency will also be responsible for the development of activities of public interest in the field of energy efficiency, working together with the various agents in the sector, from the producers and distributions of energy to consumers. It will also be the organ in charge of doing the monitoring and evaluation of sectoral energy efficiency policies and propose corrections and new measures.

And it is precisely the need for M&A and collecting, processing and disseminating detailed information about the evolution of the pattern of energy consumption by sector, services and activities that makes Energy Agency Insular essential.

Finally, it will support the Government and companies in the development of energy efficiency policies and strategies.

2.5.2 Bussiness Model and Technological Inovation

The strategy adopted in Agenda of sustainable energy for all in Cape Verde has as a foundation for the creation of a global market of renewable energies and energy efficiency. But the agenda is an agenda of transformation of the market itself.

The transformation of Cape Verdean market, based on diesel for a sustainable market based on renewable sources and energy efficiency by creating a market for isolated systems and scattered dwellings open to private. But also innovation, by creating an energy storage market, based on new technologies and innovative processes.

The strategy outlined for the energy sector over the next 15 years will require, firstly, training, retraining and training human resources in sufficient quantity and quality needed for the challenge embraced. But, bearing in mind the scale of the challenge, will need to innovate, both in technical aspect as in the processes, management and financing models and technical, social, and environmental monitoring. The way to do is thus a source of experience and knowledge that should be transformed into added value in a regional context.

It is precisely the possibility of innovation that Cape Verde faces that opens opportunities for the export of knowledge and of high value added services in the sectors of renewable energy and energy efficiency for various international markets, with emphasis on small island States, in PALOP (Portuguese Speaking Countries) and ECOWAS.

The huge demonstration laboratory that will be in Cape Verde, will be a pole of attraction of international students. To this must be added the aspect of research and development required to maintain industry leadership and constant innovation, with improvement in processes and technologies and thus more competitive. It is proposed, in this sense, the creation of a postgraduate degree on the different aspects of energy production and consumption.

This postgraduate studies, to win international market, would have to be taught in English and French, as well as eventually enter an e-learning dimension. Also, to ensure quality and excellence, will have to combine technicians with advanced training and experience, in order to gain critical mass and international respectability.

2.5.3 Finance and Management Risk

Any strategy for sustainable energy for all is developed around the important role of the private sector. It is expected that, if there are institutional conditions and a transparent market, there is a greater private investment in the sector.

In the Cape Verdean context, taking into account the costs of energy production based on oil derivatives and the dispersion in nine islands with small markets, investment in renewable energy and energy efficiency is entrepreneurial point of view, an interesting investment with return. But, it is also a business with initial investment, which puts the question of financial capacity of national private and the role of private banks.

Therefore, solutions will be sought, in partnership with private banks and international development banks, in order to be possible to leverage private financing to projects of renewable energy and energy efficiency. The solutions may go through tax incentives, State guarantees, public-private partnerships or interest subsidy. This without neglecting the creation of mechanisms allowing the participation of communities in financing the electrification of their areas or the conversion to renewable energy. Cape Verde being a country with a wide diaspora in many different countries, these factors may contribute, if given this possibility.

On the other hand, not neglecting the technological risks, the whole plan is designed in order to minimize the institutional risks and market confidence.

The big challenge will be the development and adoption of sustainable funding models of access to modern energy for cooking. The use of direct and indirect forms of allowance will have to be well balanced, so as not to create distortions on the market that works well for some years. On the other hand, the use of mechanisms that can create some kind of dependency will not be advisable. The creation of a working group to examine this issue with the stakeholders, involving the beneficiaries in the analysis and search for solutions, reduce the identified risks.

2.5.4 Creation of Skills and Knowledge Sharing

The risks and uncertainties, social, cultural, technological and financial, are internalised in this plan, as well as the extent of transformation of the idealized goals. There is awareness that the goals will only be achieved with the support and participation of all actors, whether institutional, whether business and, above all, families. And that, too, Cape Verde individually, does not have the ability to achieve these purposes and must open up to the world and to those who want to cooperate and at the same time, learn from this process.

So, communication and transparency is a key feature of the entire process. In addition to the disclosure of the required information, constant awareness and education campaigns will be made.

These campaigns may use various means such as documentaries and TV spots, brochures, posters, or the internet, including through a website to be created specifically for this purpose. Seminars will be organized to exchange experiences and visits to successful cases, for example, to reduce costs with the implementation of renewable energy systems and / or energy efficiency measures.

The process will be a source of knowledge and experience and the association with universities and research and development centres ensures that on the one hand, they will be properly analysed and disseminated and, on the other, the process will benefit from the best contributions through a strong international cooperation.

First of all the presence of Renewable Energies and Energy Efficiency Centre of ECOWAS (ECREEE) is an asset for this plan, ensuring high-level technical support to the process.

Furthermore, the process already has the support of several international agencies and universities, whose role in the exchange of knowledge and experience, as well as in the dissemination of the results of the process will be beneficial to Cape Verde and for the entire sector of renewable energies and energy efficiency in the world.

2.5.5 Others priorities

Inherent to the goals and the strategy adopted, are two fundamental assumptions:

- ✓ need for weight reduction of energy expenses in income of households and enterprises;
- ✓ need to reduce social inequalities, of gender and equal opportunities.

And these are the assumptions that should guide the way to go until the targets set. The choice of technologies and of the paths must always ensure these two fundamental objectives.

For every island and every community, the definition of energy system to implement should create synergies with other areas and allow retention of social, economic and environmental value in the community.

Part 3: Coordination and Monitoring

3.1 Structure of national Coordination of SE4ALL

The ambitious goals of Cape Verde for the energy sector, and the large number of actors involved, leading to the need to deepen or the creation of several bodies, both coordination and dialogue as operational:

Multisectoral Monitoring Committee, CAM-will be created, at the Government level a monitoring committee including the responsible for energy protection, responsible for health, social action, for finance, for infrastructure, for regional planning and the rural surroundings or others that are considered relevant to the objectives.

National Energy Board, CNE-consultative body on the energy sector, on issues of investment, planning and energy security, which includes in addition to the relevant actors in the energy sector, the private sector and other public institutions with respect to the energy.

Coordination of Renewable Energy and Energy Efficiency Center, NEREEE - sectoral working group ad hoc coordination and specific strategic dialogue for renewable energy and energy efficiency.

Multidisciplinary and Multisectoral monitoring group, GAMM - multisectoral and multidisciplinary group of dialogue and coordination between the various sectors involved in the implementation of the various action plans and agendas.

Sectorial Dialogue Group, GDS - created on the initiative of the European Union delegation in Cape Verde, brings together major donors in the energy sector.

Operating unit for renewable energy and energy efficiency, UOpEREE - Director of services of the General Direction of Energy created while operating arm to implement the program of renewable energy and energy efficiency of the Government.

Insular Energy Agency – organ of governance, Coordination, implementation and monitoring of policy Evaluation of energy efficiency and renewable energy.

All these agents and institutions are structured and arranged in order to allow smooth implementation, follow-up, monitoring and evaluation and monitoring, analysis and narrative of the entire implementation process of the National Action Plan for Energy Efficiency, the National Action Plan for Renewable Energy and action Agenda for Sustainable Energy for all.

Multisectoral Monitoring Committee shall include operational coordination body the Multidisciplinary and Multisectoral monitoring group, multisectoral and multidisciplinary group of dialogue and coordination between the various sectors involved in the implementation of the various action plans and agendas.

But the operational side of the agenda will be guaranteed, by the creation and operationalization of the Insular Energy Agency. The Agency will operational coordination, implementation and monitoring evaluation.

The supervision and the guarantee of functioning according to the rules of the market are of the competence of the Agency of Economic Regulation (ARE) while the national system of quality management, in which the energy certification program is the responsibility of the Institute of management, quality and Intellectual Property (IGPQIP).

For certain aspects of implementation of the National Quality System provided in this plan and the National Action Plan for Energy Efficiency and in the National Action Plan for Renewable Energy will be necessary to ensure that there is one or more certification institutions, public or private, equipped with the necessary laboratories and properly well trained in human resources (Entity (s) training and certification).

The buildings and the urban environment are dependent on several institutions. At the central level, it is the responsibility of the Minister of the Environment, Housing and Territorial Planning (and the General Direction of the Territorial Planning and Urban Development DGOTDU) frame buildings and the surrounding environment. The municipalities (local government) are mainly responsible for urban planning and the licensing and approval of the construction of buildings.

With regard to biomass, production falls under the purview of the Ministry of Rural Development (MDR), which which has as executive support from the Directorate General of Agriculture, forestry and Livestock (DGASP) for this purpose. Coordination with other sectors and institutions, in particular with the General Direction of Social Solidarity (DGSS), Will be additionally important links as well as with the National Centre for Health Development ((CNDS)) and the General Director of health (DGS).

The energy quality control of equipment will be at the entrance by Cape Verde Customs but also in the context of economic routine inspections carried out by the General Inspection of Economic Activity (IGAE).

But the energy efficiency program in electricity distribution account with the ELECTRA to its effectiveness. The DGE will have a coordinating role and, together with the Insular Energy Agency, will implement awareness and information measures for the prevention of theft and fraud.

ELECTRA and the other independent producers will also have an important role in the implementation of the PNAER whose main goal is to significantly improve efficiency in electrical production.

The issues of financial support or tax and customs authorities will be linked to the Ministry of Finance and Planning (MFP).

Figure 9 illustrates the coordination of the implementation of agenda SE4ALL and the institutions involved:

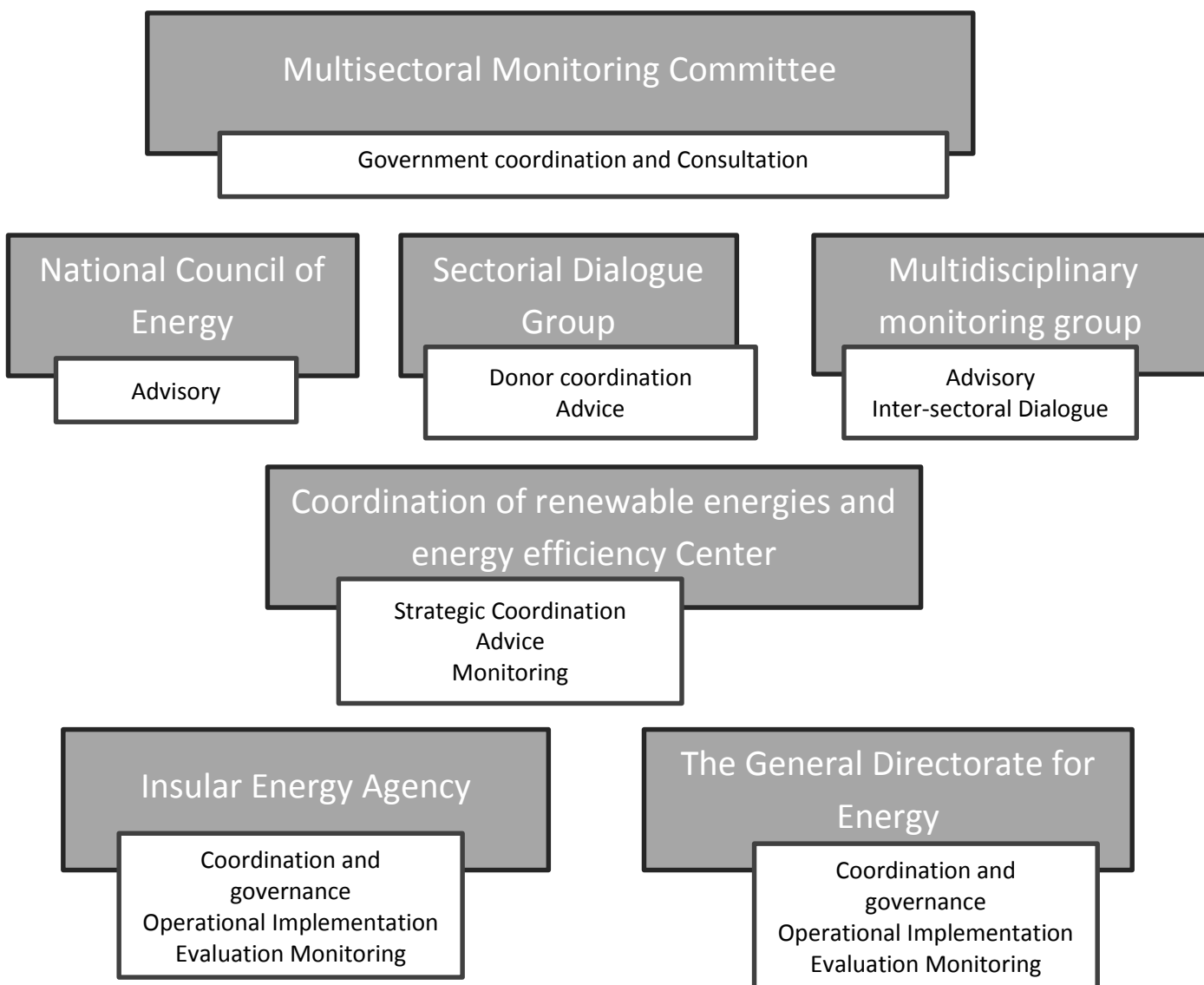


Figure 9 – Coordination scheme of SE4ALL Action Agenda

List of entities involved in the implementation:

National Public Institution	Responsibilities
Ministry of Tourism, Investments and Business Development (MTIDE)	Energy Sector Policy Definition
Ministry of Environment, Housing and Territorial planning (MAHOT)	Guardianship and fits the buildings
Ministry of Rural Development (MDR)	Supervision of the Forestry Sector (biomass)
Ministry of Youth, Employment and Human Resources Development (MJEDR)	Social Energy Nexus
Ministry of Health (MS)	Health Energy Nexus
Ministry of Finance and Planning (MFP)	Setor Financing
Municipalities	Licensing and approval of the construction of buildings
The General Directorate for energy (DGE)	Management and Administration of the energy sector
The general direction of the Regional Planning and Urban Development (DGOTDU)	Executive Organ of Guardianship of the Territory and Urban Planning
Institute of Management and Quality and Intellectual Property (IGQIP)	management of the National System of Energy Certification
National Civil Engineering Laboratory (LEC)	Implementation of the National System of Energy Certification of Buildings
Cape Verde Customs	Control at the entrance the equipment and appliances
General direction of Agriculture, Forestry and Livestock (DGASP)	Forest Management and Biomass Supply
The General Direction of Social Solidarity (DGSS)	Support follow-up of families that use firewood
National Centre for Health Development (CNDS)	Multisectoral Coordination of the activities underlying the health development
General Director of Health (DGS)	Joint Intervention of families that use firewood
General Inspection of Economic Activity (IGAE)	Commercial Control of equipment and appliances
Agência Insular Energy Agency	Core Operating Institution in the Implementation of PNAEE and PNAER

3.2 Analysis and Follow-up

The monitoring of the implementation of the Action Agenda for sustainable energy for all will be made permanent by the AIE which in turn reports and informs on the advisory bodies and the CMA. The AIE will also coordinate specific analyses on the progress of the process. This follow-up will allow us to anticipate the needs, prevent mistakes and present solutions.

Depending on the needs identified the AIE may require changes to the initial plans or the drafting of new plans that is considered necessary.

The AIE may also make use of the conclusions of the Monitoring and evaluation process to assess the correctness of the path followed and, learning from practical experience design safer roads.

The evaluation of progress and monitoring action will be supported by annual reporting of monitoring and carrying out follow-up meetings, also annual, of advisory bodies and the Multisectoral Monitoring Committee.

Follow-up meetings have as main objective to discuss the technical issues, to analyze the overall results and validate the overall progress, check the consistency of the actions with the initial objectives, analyze the strategies, planning and costs, and determine the necessary modifications in the strategy and to consolidate all periodic reports.

3.3 Monitoring and Evaluation

The Follow up and the monitoring and evaluation (M&A) of PNAEE implementation; the PNAER and AA SE4ALL will be made continuously by the Insular Energy Agency with oversight of the strategic coordination and dialogue organs. This will be a joint process for the three strategic documents of the energy sector, that is, the National Action Plan for Energy Efficiency, the National Action Plan for Renewable Energy and Sustainable Energy Action Agenda for all. The process of monitoring and (M&A) will focus on two aspects (Figure 19):

- 1.-On the actions and results of the process of implementation of plans and action agenda (PNAEE; PNAER and AA SE4ALL);
- 2.- About the impacts.

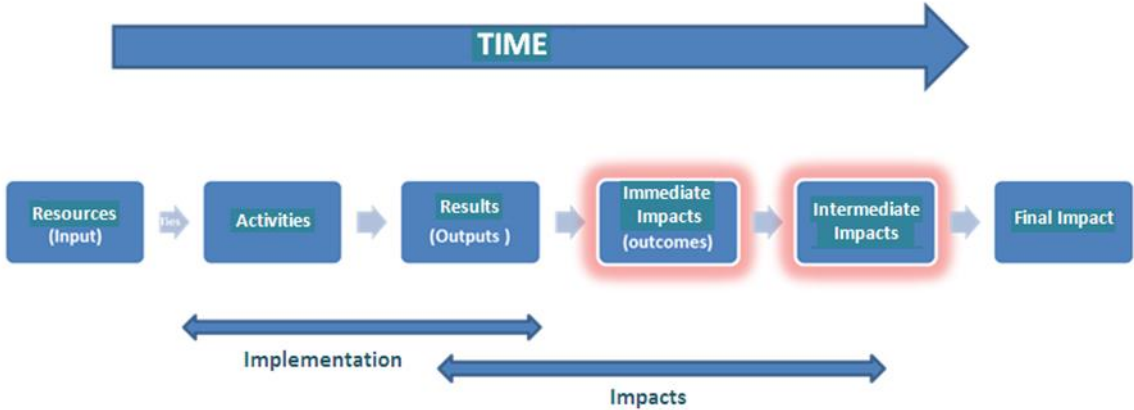


Figure 10 — Impacts Vs implementation results of plans and action agenda (PNAEE; PNAER and AA SE4ALL)

To the first point, in the case of a regular review of progress of implementation of an action, in addition to the goals set out in this document, will be defined and followed various indicators of progress to ensure that the activities are planned and executed successfully within the time limit set.

More importantly, the impact of the implementation of plans and action agenda will be constantly monitored and assessed. Will be elaborated a set of indicators of impact that will be evaluated periodically in order to identify potential impacts of implementation of plans and action agenda. These indicators will measure the results of the action, community involvement and impact, tangible and intangible, of PNAEE; the PNAER and AA SE4ALL.

The main purpose of plans and action agenda is the reduction of energy consumption, increased access to modern forms of energy, the increased penetration of renewable energy in the energy mix and reducing the dependency, and the evolution of indicators of consumption, production and access defined in PNAEE, in PNAER and in SE4ALL AA, will be constantly followed. The associated reduction in greenhouse gas emissions is another immediate quantitative indicator. Other indicators will be assessed such as:

- Impact on employment, for example, creation of new companies and the number of new registered professionals;
- Impact on energy balance;
- Impact on the budget of the companies and families;
- Development of innovation in the energy sector of Cape Verde;
- Creating skills to provide services regionally and internationally;
- Conservation and upgrading of the ecosystem of Cape Verde.

Other indicators, more of the behavioral and social forum will also be followed, assessed:

- Equity and gender issues;
- Improvement of living conditions of the most disadvantaged families;
- Lack of energy factor by families and businesses;
- Internalization of sustainable practices (e.g. use of energy criteria in consumption decisions);
- Awareness of the citizens;
- Education for energy.

Early in the implementation of plans and action agenda , sources and means of verification of these indicators will be clearly and realistically identified and methodologies for collecting , measuring and processing of data will be defined (questionnaires, interviews, observation , reporting , documentation, analysis, etc.) . The creation of an energy information system will provide the quantitative data necessary to establish and follow an indicators system.

The systematization of information on the production, distribution and use of energy will allow a constant reflection on the path below (Figure 20). This reflection will be a source of learning that will lead to new actions always aiming to maintain the trajectory of transformation in the direction of the intended Sustainable Energy Development.

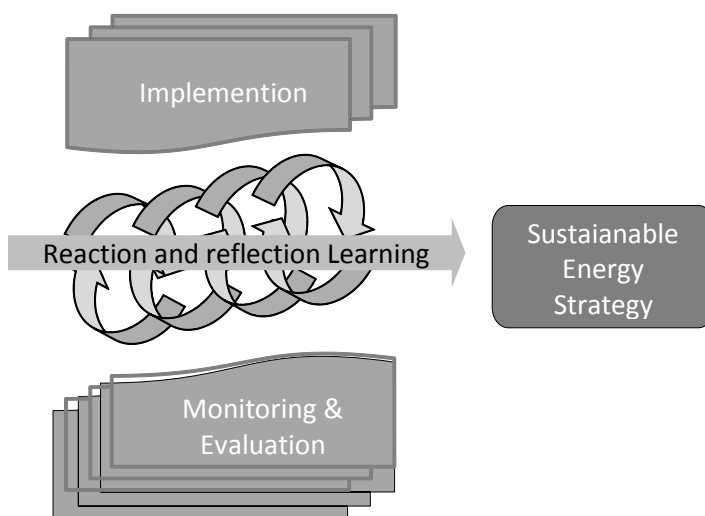


Figure 11 – Cycle of reflection and learning in the process of implementation of plans and action agenda (PNAEE; PNAER and AA SE4ALL)

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