

COUNTRY CHAPTER: CAPE VERDE

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ACRONYMS AND ABBREVIATIONS

CAPE VERDE

| | |
|---------|--|
| ARE | Agência de Regulação Económica (Agency for Economic Regulation) |
| CVE | Cape Verdean Escudo (1 Euro = 1,010 CVE) |
| DGIE | Direcção Geral da Indústria e Energia (General Direction of Industry and Energy) |
| GDP | Gross Domestic Product |
| HDI | Human Development Index |
| LPG | Liquefied Petroleum Gas |
| MDG | Millennium Development Goals |
| ONG/NGO | Organisation Non Gouvernementale (Non Governmental Organization) |
| PAICV | Partido Africano da Independência de Cabo Verde (African Party for the Independence of Cape Verde) |
| PAIGC | Partido Africano da Independência da Guiné e Cabo Verde (African Party for the Independence of Guinea-Bissau and Cape Verde) |
| PROMEX | Centro de Promoção Turística, do Investimento e das Exportações de Cabo Verde (Center for Tourism and Export Promotion of Cape Verde) |
| PRS | Programme Régional Solaire (Solar Regional Program) |
| PV | Photovoltaic |
| RE | Renewable Energies |
| UNDP | United Nations Development Program |
| USD | United States Dollar |

MEASUREMENTS

| | |
|-----------------|---|
| € | Euro (1 Euro = 1,010 Cape Verdean Escudo) |
| km | kilometer |
| km ² | square kilometer |
| kWh | kilowatt hour |
| m/s | meters per second |
| mm | millimeters |
| MW | megawatt (1 MW = 1,000 kW) |
| °C | degree Celsius |
| toe | tons of oil equivalent |



SUMMARY

The provision of modern energy services is a crucial aspect for economic development and the enhancement of social standards. The limited access to energy in general and modern energy services in particular, is a massive barrier towards future development of semi-urban and rural areas.

Likewise the lack of appropriate policies and regulations are significant constraints towards the development of an efficient market for Renewable Energies.

The Country Study of Cape Verde is to provide an overview of the country's energy market and to support decision-making for private investments for the Renewable Energy (RE) sector in Cape Verde. The study is structured as follows:

Chapter one provides **Background Information on Cape Verde**. This includes an overview of geographical and climatic conditions, as well as the most important facts in view of political, economic and socio-economic conditions of Cape Verde.

Chapter two summarizes facts and figures of Cape Verde's **Energy Market** including stakeholders and market actors involved as well as sector related regulations.

Chapter three presents the currently existing **Political Framework for Renewable Energies** in Cape Verde. This includes an overview of support mechanisms for photovoltaic (PV) as well as already existing regulations, incentives and legislative framework conditions concerning other RE technologies.

Chapter four provides a brief overview of the **Status Quo and Potential for Renewable Energies** in Cape Verde.

Chapter five summarizes the existing and potential **Market Risks and Barriers** in general with focus on RE.

Chapter six presents a compilation of the most relevant **Renewable Energy Business Information and Contacts** of Cape Verde.



1 COUNTRY INTRODUCTION

1.1 GEOGRAPHY AND CLIMATIC CONDITIONS

Cape Verde is an archipelago off the western coast of Africa, located between the equator and the Tropic of Cancer at 15°02' North and 23°34' West. It is situated about 455 km from the West African coast (Dakar, Senegal) and 1,400 km South South-West of the Canary Islands.

With a surface of 4,033 km², it consists of ten major islands and about eight islets. The relief is mountainous and of volcanic origin. Cape Verde has a Sahelian climate tempered by the oceanic position of the country.

Rainfalls vary from 300 mm/year in the South West to 1,500 mm/year in the North East of the island. Rainfall is very irregular from one year to another and poorly distributed in space. The driest areas are located at the coast. They receive an average of 0 to 300 mm of water per year. The slopes under wind receive more rain and areas of altitude above 600 m may receive up to 800 mm of rain per year. The rainy season is between July and October in low altitude, but mountain areas may also receive small rains during the dry season. The seasons are marked by the alternation of winds from North and East during the dry season (November to July) and by marine winds in South East South direction during the rainy season. In the dry season, the winds of the North provide a cool climate and weather, while winds of continental North East – corresponding to the Harmattan¹ – bring a dry climate. These winds can be violent during the winter for several days. Extreme temperatures remain within a relatively restricted interval because of the oceanic position of the territory. These temperatures rarely exceed 38°C in summer, while minimum temperatures around 0°C can be observed at high altitudes e. g. on the volcano of Fogo, particularly during the months of December and January. The average temperature per month varies between 22°C and 28°C. It is higher during the wet season, sometimes softened by the ocean, with maximum values in September and minimum values in February.

1.2 POLITICAL, ECONOMIC AND SOCIO-ECONOMIC CONDITIONS

Cape Verde is a former Portuguese colony and one of the first countries in Sub-Saharan Africa to switch from a single-party to a pluralistic democratic system. During the first years after independence (achieved in 1975), the political landscape is dominated by the African Party for the Independence of Guinea-Bissau and Cape Verde (PAIGC), transformed in 1981 after the separation from Guinea Bissau to the African Party for the Independence of Cape Verde (PAICV).

The population of the Cape Verde is estimated at 487,118 inhabitants in 2006. 53% of the population is female. In the two major urban centers – Praia and Mindelo – approximately 39% of the population are concentrated. 700,000 inhabitants of Cape Verde constitute the Diaspora and live abroad. The growth rate of the population between 2000 and 2006 is 1.8%. The life expectancy is 72.3 years while the rate of schooling is 72% (for young people) and 79% (for adults).

FIGURE 1
Map of Cape Verde



In spite of the good development of its economy (see below), the unemployment of young people under 25 years is 21.1% in Cape Verde. The general poverty rate rose from 30% in 1989 to 37% in 2002, while the rate of extreme poverty changed from 14% to 20% over the same period. 70% of the poor and 85% of very poor live in rural areas. In general, poverty rate and unemployment are on the decline.

The economy of the Cape Verde is characterized by the prevalence of the following sectors: tourism (177 hotels), fishing (14% of the population), construction, trade and services of public administration. The agricultural sector is fragile, but constitutes the principal activity of the rural population by employing more than 50% of the working population. Insufficiency of local resources is compensated by the flow of goods and services from outside the country, financed by international cooperations in form of gifts and loans and by the Diaspora (the latter is providing approximately 140 million USD per year).

The revenue per capita has risen from 190 USD in 1975 to 2,316 USD in 2006. Primary school enrolment is about 100% while life expectancy is over 70 years. There has been a strong and continuous improvement in human development. The Human Development Index (HDI) increased from 0.587 in 1990 to 0.722 in 2006². Today, Cape Verde has already achieved some of the Millennium Development Goals (MDP) while it is on target to achieve the rest by 2015. Between 2001 and 2006, the Gross Domestic Product (GDP) showed an average growth of 6.2% (10.9% in 2006) while inflation remained weak at around 2%. Table 1 presents an overview of the economy of Cape Verde.

¹ THE HARMATTAN IS A DRY AND DUSTY WEST AFRICAN TRADE WIND, BLOWING SOUTH FROM SAHARA INTO THE GULF OF GUINEA BETWEEN THE END OF NOVEMBER AND THE MIDDLE OF MARCH (WINTER).

² UNDP, AS OF 2006



TABLE 1
Cape Verde Economy Overview (2001–2006)

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|-----------------------|------|------|------|------|------|------|
| GDP growth (%) | 6.1 | 5.3 | 4.7 | 4.4 | 5.8 | 10.9 |
| Inflation (%) | 3.4 | 1.9 | 1.2 | 61.9 | 0.4 | 5.4 |
| Budgetary deficit (%) | 4.8 | 3.4 | 3.4 | 1.3 | 4.0 | 4.7 |

Source: Bank of Cape Verde and National Institute of Statistics, as of 2007

2 ENERGY MARKET IN CAPE VERDE

2.1 OVERVIEW OF THE ENERGY SITUATION

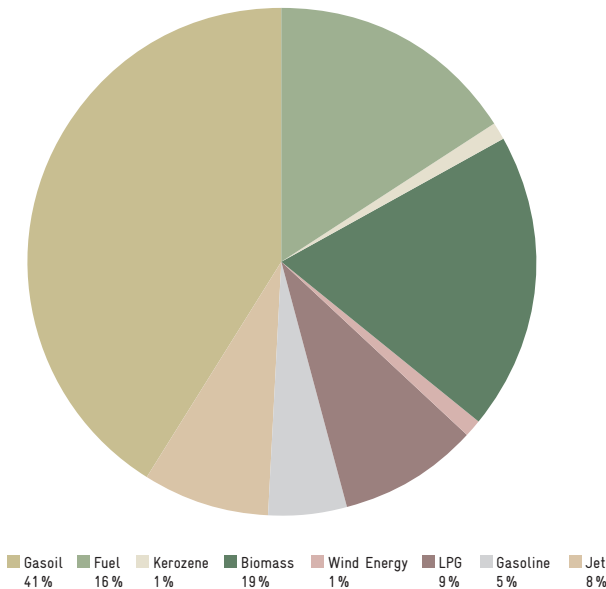
The energy sector of Cape Verde strongly depends on imported petroleum products, primarily imported oil. The use of solar power is quite negligible. The electrical network covered 60% of the country in the year 2000 (against 25% in 1990).

2.2 ENERGY CAPACITIES, PRODUCTION, CONSUMPTION AND PRICES

The energy sector of Cape Verde comprises of three sub-sectors: petroleum, electricity with RE and biomass. Figure 2 presents the energy mix of Cape Verde.

The main energy consumers are the transport sector (47%) and the residential sector (34%). A major part of the energy consumption is for domestic use, transport, electricity production and water desalination.

FIGURE 2
Energy Mix of Cape Verde



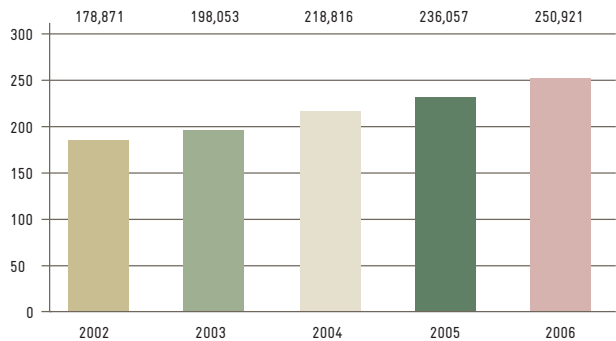
Source: Direction General of Industry and Energy of Cape Verde, as of 2003

Electricity Sector

Concerning electrical power, the overall production registered a growth rate of 8.8% between 2002 and 2006. The main company Electra produced 236,000 MWh in 2005 and 250,000 MWh in 2006. Cogeneration capacities of steam turbines at water desalination plants contributed a total of 4.4%. Figure 3 presents the annual increase of electricity production.

The electricity production by wind power went down from 16% in 1995 to 3% in 2005 in the total production of electricity. This decrease is due to the lack of investments in the wind energy production during this period. Electricity tariffs are fixed according to decree No. 03/2008. Table 2 presents an overview of current electricity tariffs.

FIGURE 3
Evolution of Electricity Production (1,000 MWh)



Source: Direction General of Industry and Energy of Cape Verde, as of 2006

TABLE 2
Electricity Tariffs

| CATEGORY | PRICE (CVE/kWh) ³ |
|---------------------|------------------------------|
| up to 40 kWh | 23,91 |
| > 40 kWh | 33,41 |
| Street lighting | 19,31 |
| Special low voltage | 25,75 |
| Medium average | 20,91 |

Source: Direction General of Industry and Energy of Cape Verde, as of 2008

Petroleum Sector

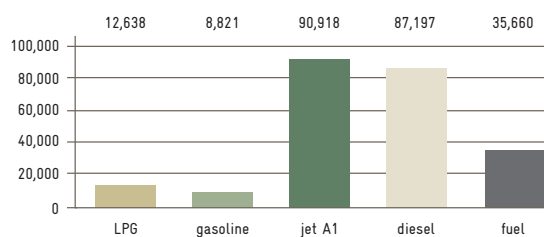
Cape Verde has no proven oil reserves. Therefore, the country has to import petroleum products to meet its requirements. The overall fuel demand of Cape Verde includes diesel, gasoline, kerosene for cooking, LPG, lubricants, marine diesel and Jet A1. Diesel (43,378 toe) and LPG (12,927 toe) are the most important in terms of oil product consumption. The major consumption of LPG is due to the country's lack of biomass resources (firewood and coal). Figure 4 visualizes the amount of imported petroleum products while table 3 presents the prices for different petroleum products.

3 1 EURO = 1,010 CAPE VERDEAN ESCUDO (CVE)



FIGURE 4

Imports of Petroleum Products in toe



Source: Direction General of Industry and Energy of Cape Verde, as of 2004

TABLE 3

Prices for Petroleum Products⁴

| PRODUCT (IN CVE/LITER) | GASOLINE | DIESEL | DIESEL ELECTRICITY GENERATION | MARINE DIESEL | KEROSENE |
|------------------------|----------|--------|-------------------------------|---------------|----------|
| Price (March 2003) | 145.80 | 106.30 | 94.30 | 78.70 | 78.60 |
| Price (January 2009) | 160.00 | 112.40 | 105.07 | 84.60 | 83.50 |

Source: ARE, as of 2009

Biomass Sector

Due to the climatic conditions, Cape Verde has a very low biomass potential. The total production was estimated at 22,264 toe in 2004. This is a problem for households, especially in rural areas with the urgent need for biomass energy for cooking purposes.

2.3 MARKET ACTORS AND REGULATION STRUCTURES

The management of the energy sector in Cape Verde is under the control of the General Direction of Industry and Energy (Direcção Geral da Indústria e Energia – DGIE) of the Ministry of the Economy, Growth and Competitiveness and the multisector Agency for Economic Regulation (Agência de Regulação Económica – ARE). The DGIE is responsible for the formulation and the implementation of the policy, while the ARE is in charge of regulatory issues. The National Assembly enacts the laws and provides the statutes under which the agency manages the energy sector.

In the petroleum sector, the National Company Fuel – ENACOL and Shell Cape Verde are responsible of the commercial system of supply.

For the production and the distribution of electric power and water produced by desalination, the Company of Electricity and Water (Electra) is fully in charge.

The biomass sector is managed by the Ministry of Environment, Rural Development and Marine Resources. This ministry also ensures the implementation of the production, the assembly of the wind pumps and the construction of improved stoves. It coordinates the Solar Regional Program – PRS (phase 1 and 2) of the European Union.

3 POLICY FRAMEWORK FOR RENEWABLE ENERGIES

3.1 POLICIES, STRATEGIES AND PROGRAMS FOR RENEWABLE ENERGY PROMOTION

The Government of Cape Verde already took important measures to create incentives for the implementation of RE. Article 16 of the law n° 20/VII/2007, for example, allows the import of RE equipment such as solar panels, wind generators etc. with remarkable tax exemptions. The Government further intends to strengthen the role of RE within its upcoming energy policies. The major objective is to reduce the high dependence on imported fossil fuels. The Government thus intends to meet 50% of the overall energy needs (as opposed to presently 3.2%) by 2020 through RE resources⁵. In the same period, the Government wants to reduce energy costs that are currently about 70% above the European Union average.

The strategy for implementing this ambitious program is to open the energy market to national and international private sector investments and to reorganize and privatize Electra. Using the various existing international instruments for RE management and promotion and creating a national conscience in favor of RE are the key elements of this strategy. The development of incentives for RE is a key objective of this policy; it will increase the participation of the private sector and facilitate the building and securing of the RE sub-sector in the country. Cape Verde will only achieve its vision of a fossil-fuel-free future through the investment in, and the development and adoption of technologies and innovative approaches that will reduce its energy use and dependency on oil products. It is why the country has decided to develop special partnerships with innovative firms in the area of RE and alternative energy. Capacity building will be facilitated, especially through the University of Cape Verde, to increase national capabilities. Strategic experimentation and public-private partnership will be encouraged.

3.2 REGULATIONS, INCENTIVES AND LEGISLATIVE FRAMEWORK CONDITIONS

The implementation of Cape Verde’s energy policy will reinforce the rural electrification. Thus, after having invested 500 Million CVE in the rural electrification over the 2005–2008 period, the Government intends to considerably increase the investments in this sub-sector of the energy sector. For providing rural energy services, the Government has decided the promotion of concessions. There will be two concession areas: one comprising the Santiago Island and the other comprising the remaining nine inhabited islands of Cape Verde. The concessions will not have geographic monopolies, but will be free to operate wherever chosen within a designated concession area. Concessions will be allowed for ten years and will be awarded via a competitive tender for which detailed bidding documents have been prepared. Concessions will have three

4 COSTS OF FUEL IN CAPE VERDE HAVE FALLEN STRONGLY IN 2009; SEE ALSO WEBSITE OF ARE (WWW.ARE.CV > ELECTRICIDADE > COMBUSTÍVEIS > TRANSPORTES)

5 SEE ALSO REN21, VIEWED IN SEPTEMBER 2009



main responsibilities: (i) sell off-grid electrification systems for either cash or credit, (ii) sell electricity or electricity services by a fee-for-service arrangement for consumers and (iii) manage publicly owned equipment. For isolated sites where the extension of the network is difficult or impossible, innovating solutions of electrification for these zones will be developed with focus on applications for solar energy.

4 STATUS AND POTENTIAL FOR RENEWABLE ENERGIES

4.1 BIOMASS/BIOGAS

Due to the existing climatic conditions, the status and future potential of biomass energy in Cape Verde is very low.

4.2 SOLAR ENERGY

The potential of solar energy of Cape Verde is very high. The solar irradiation is one of the highest of the ECOWAS countries: 6 kWh/m²/day. Due to the high potential of solar energy, it is intended to cover 2% of the total energy consumption by 2010. Up to now, there are several successful PV-based applications for water pumping, lighting and telecommunication systems.

4.3 WIND POWER

The average wind velocity in Cape Verde is more than 6 m/s; thus Cape Verde is one of the rare ECOWAS countries with an unusually high and interesting potential for wind energy. Cape Verde has been exploiting wind energy mainly for electricity production and desalination since 1995. This proves that the economic potential for this resource is substantial.

4.4 HYDRO POWER

Like the biomass potential, there is almost no (economically feasible) potential for Hydro Power.

5 MARKET RISKS AND BARRIERS

Cape Verde offers many advantages in view of business activities for the development of RE. Over the last years, successful investment strategies gained up to 1 billion USD (as was the case in 2007). Through the commitment of the Cape Verde Government adequate taxation, tariffs and financial mechanisms in favor of RE have been promoted.

This is mainly due to the existence of a reliable legal framework with guarantees for intellectual property rights and guaranteed safety for investments. In addition to this, Cape Verde offers good infrastructural prerequisites (three international airports, ports, hotels, the University of the Cape Verde, a large number of specialized educational institutions etc.).

The conditions for setting up a company are very flexible in Cape Verde. The Government adopted the Foreign Investment Law (Law No. 89/IV/93)⁶ and the Industrial Statute (Decree Law No. 108/89)⁷ establishing general conditions, rights and guaranteed measurements for investments in the country.

The Foreign Investment Law defines the conditions for foreign direct investment in any sector of economic activities. All sectors are open to investment unless the enterprise is a threat to national security, the environment or public health or violates domestic laws and regulations (see section IV.3 (d) for further discussion on the Foreign Investment Law).

The new investment policy ensures that applicable procedures are open, efficient and transparent. Investors can easily obtain clear guidance on these procedures from the Center for Tourism and Export Promotion of Cape Verde (PROMEX), a Government department under the supervision of the Ministry of Economy, Growth and Competitiveness in charge of promoting trade and investment opportunities in Cape Verde.

Cape Verde offers quite a range of investment incentives and guarantees for foreign investors, companies in free trade zones and companies producing goods and services exclusively for exports.

⁶ PUBLISHED IN THE OFFICIAL BULLETIN 13/12/93

⁷ PUBLISHED IN THE OFFICIAL BULLETIN 30/12/89



6 RENEWABLE ENERGY BUSINESS INFORMATION AND CONTACTS

TABLE 4

Local Business Partners

| NAME | CONTACT/ADDRESS | PROFILE |
|---|--|---|
| Association of the Friends of the Nature (ONG) | S/C Direction of Environment and Sustainable Development Phone: +238 261 8984 | Capacity building and distribution of RE products |
| General Direction of Industry and Energy | Phone: +238 261 48 00 Fax: +238 261 33 15 abrao.lopes@govcv.gov.cv | Energy policy (fossil and RE) |
| Direction of Environment and Sustainable Development | Phone: +238 261 89 84 | Environment and energy policy (biomass) |
| National Institute of Management of Hydraulic Resources | Phone: +238 261 24 13 prs_cv2@yahoo.fr | Hydraulic and energy policy (solar and wind pumping) |
| Fuel ENACOL | Phone: +238 251 1120 Fax: +238 231 4873 | Distribution of oil products |
| Authority Regulation (ARE) | Phone: +238 260 0424 Fax +238 261 6053 are@are.cv | Regulation of energy sector and other sectors such as water, communication etc. |
| Electra | Phone: +238 230 3030 Fax. +238 232 44 46 | Electricity production, transport and distribution |



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