ENERGY DOSSIER

04 EL SALVADOR

IDB

Prologue

This publication forms part of a series of monographs produced by the Energy Division of the Infrastructure and Environment Department of the Vice President of the Research Department at the Inter-American Development Bank (IDB) for regional public good. It is designed to increase the base of knowledge about the characteristics and functions of the Energy Sector in Latin American and Caribbean countries (LAC).

This is the first step in a project that will culminate in books that organize the countries according to the subregions in which the IDB groups the countries of LAC. The purpose of publishing each country separately is to obtain feedback from the descriptive analysis provided by local authorities, academics and the general reading public.

Comments and observations can be sent to the authors via email at: ramones@iadb.org

The sources of information are made explicit and the responsibility for their use and interpretation is exclusive to the authors of this monograph.

The authors would like to thank their supervisors at the Inter-American Development Bank for their unconditional support: the head of the Energy Division, Leandro Alves; the Manager of the Infrastructure and Environment Department, Alexandre Rosa; and the Vice President of the Research Department, Santiago Levy.

We hope that this contribution to regional knowledge will be useful,

Ramón Espinasa

Lenin Balza

Carlos Hinestrosa

Carlos Sucre

Banco Interamericano de Desarrollo
1300 New York Avenue, N.W.
Washington, DC 20577 USA

Introduction

This Energy Report is part of a series that includes all Latin American and Caribbean countries (LAC) that are members of the Inter-American Development Bank (IDB). The publications will be made in sequential order and grouped according to the geographic regions organized by the IDB in the following order: countries of the Central American Isthmus and the Dominican Republic (CID); countries of the Andes (CAN), countries of the Southern Cone (CSC); countries of the Caribbean (CCB).

The Report on each country has two components: the Energy Flows and the Description of Industrial Organization and Institutional Framework of the energy sector. For both components, the most recent description will be presented first and then the historic development will be discussed.

In the case of Energy flows, the information is gathered from the energy balances that the International Energy Agency (IEA) produces for almost all of the countries in the world. The use of a single source allows comparisons between countries and also a long-term analysis without methodological distortions. Schematic flows derived from this information and are used to describe the energy sector in each country during a specific period.

The most recent "photo" with information from the IEA is from 2009. Even though it is from a few years ago, we used this matrix in order to ensure consistency among countries. It reflects the current situation because energy matrixes change slowly. What follows is an analysis of the historic evolution of the matrix from 1971 to 2008. It is divided into four periods: 1971-74; 1984-87; 1999-02; and 2005-08.

The reason for using an average of four years as the break between periods is to neutralize the distorting impact that sudden natural, economic and political events could have in a given year. The unit of measurement for the energy flows is thousands of barrels of oil per day (kboe/day), a simple transformation of the unit of measurement used by the IEA, equivalent to tons of oil per year.

For the description of the Industrial Organization and the Regulatory Framework, the work is more complex because they don't have a single source of common information. Even when all the countries are presented under a single descriptive framework, the work of gathering basic information was ad-hoc by country.

In addition to the public information from various agencies and organizations, legal texts, academic publications and press reports are referenced. Beyond a strict description of the sector, this report seeks to link information with the political evolution of a country, which makes the reading more enjoyable and provides a clear picture of institutional changes.

INDEX

GUIDE TO ACRONYMS

ARENA	Nationalist Republican Alliance
CEL	Lempa River Executive Hydroelectric Commission
CNE	National Energy Board
COS	System Operations Center
DEE	Electrical Energy Directorate
DNHM	National Office of Hydrocarbons and Mines
ETESAL	El Salvador Electricity Transmission Company
FINET	National Investment Fund for Electricity and Telecommunications
FMLN	Farabundo Martí National Liberation Front
GDP	Gross Domestic Product
GWh	Gigawatt Hour
kboe/day	Thousand barrels of oil equivalent per day
kV	Kilovolt
LGE	General Electricity Law
mbd	Thousands of barrels per day
MINEC	Ministry of Economy
MRS	Market System Regulator
MW	Mega Watt
PEP	Primary Energy Production
PES	Primary Energy Supply
RASA	Acajutla Petroleum Refinery
SIGET	Superintendency of Electricity and Telecommunications
TEC	Total Energy Consumption
TU	Transactions Unit

El Salvador

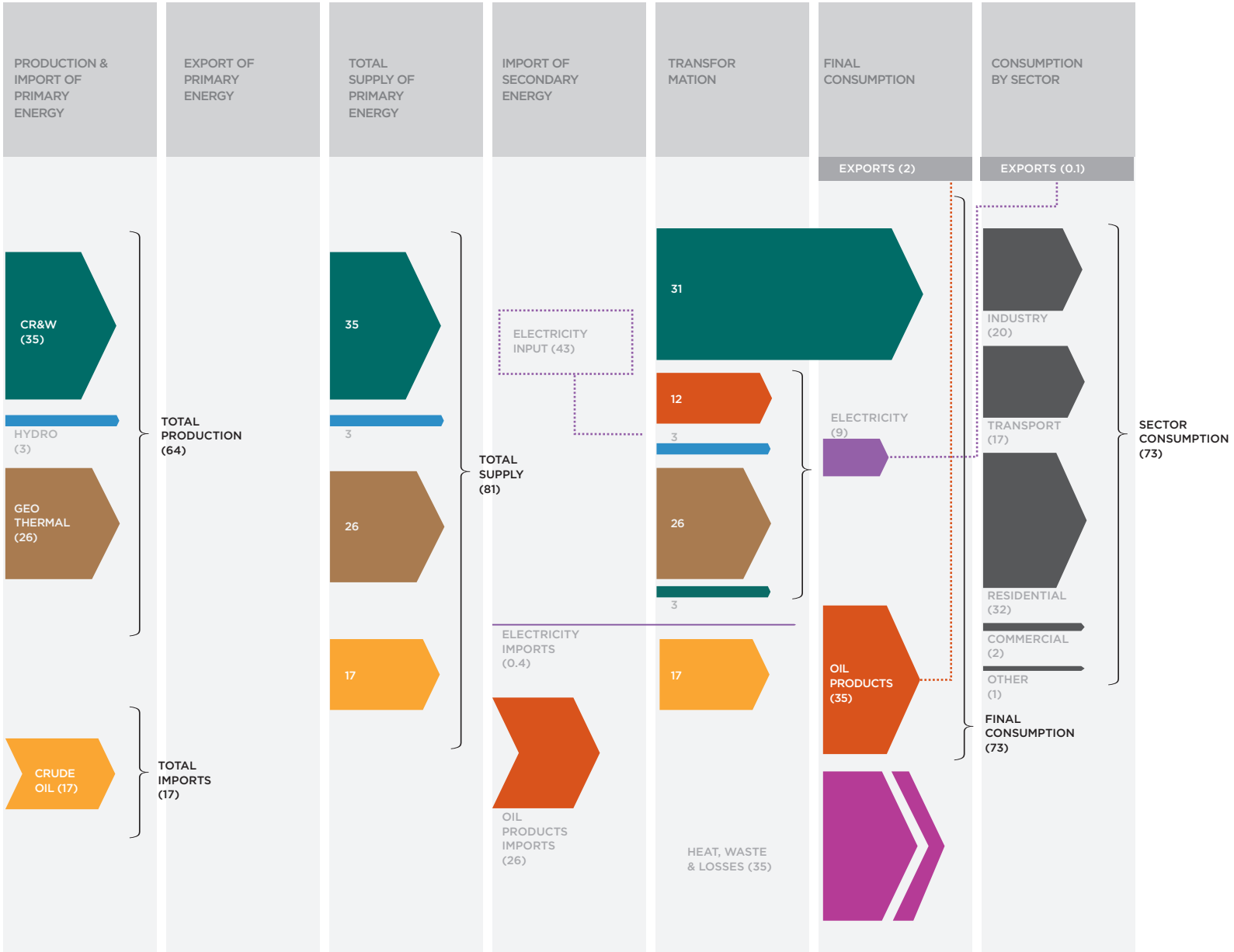
El Salvador is the country with the smallest geographic territory in the Central American isthmus. Its territory extends 21,041km2, and it is followed in size by Costa Rica, whose territory is 2.5 times larger. Its Gross Domestic Product (GDP) reached $21.1 million in 2009, and its population during the same year was 6.2 million inhabitants. Despite having the smallest land area in the region, El Salvador is located in third position (behind Guatemala and Honduras) in terms of the number of inhabitants. According to these last two measures, its GDP per capita reaches US $3,424, a number close to the regional average.

Recent statistics indicate that 39% of the population lives in rural areas and that 37.8% of its population lives below the national poverty line. Despite these results, El Salvador has a nationwide electricity coverage of 95.5%, one of the highest levels in the region, and its position on the human development index, 90 of 169 (2010), is considered average.

Current Energy Sector

Total Energy Consumption (TEC) in El Salvador in 2009 was based mainly on three energy sources: petroleum products, biofuels and geothermal energy. These three sources amounted to 106.7 kboe/day, slightly above its total between 2005 and 2008 of 100.2 kboe/day and 23% higher than the total between 1999 and 2002.

Energy Flow CURRENT

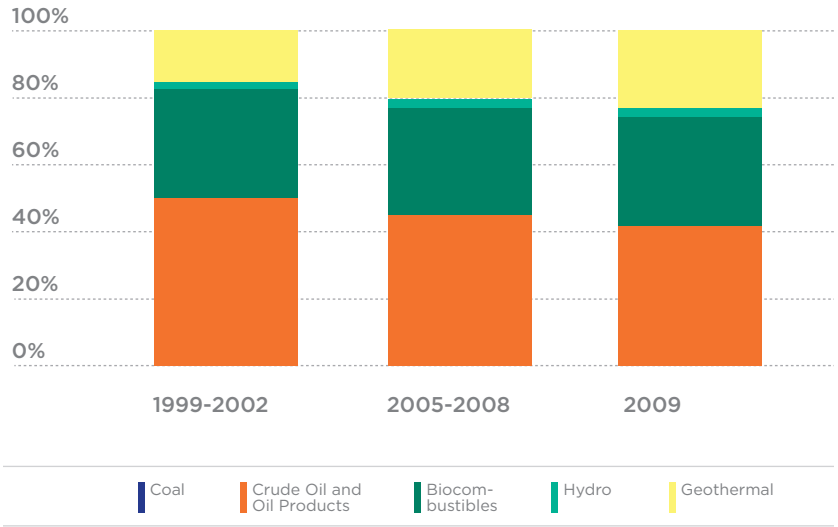


(kboe/day)

Source: Own Calculations based on IEA Energy World Balances

This consumption was made up of 43,000 barrels of oil per day of crude and its derivatives (17,000 of which were imported as crude to be refined in the country and the remaining 26,000 were imported as derivatives); almost 25 kboe/day of biofuels, composed of 75% wood and 25% cane products; 26.3 kboe/day consumed from geothermal energy. We should also note the contribution to the TEC of hydraulic energy, which totaled 2.6 kboe/day.

TOTAL ENERGY CONSUMPTION



Source: Own Calculations based on IEA Energy World Balances

Thus 40% of the TEC was from crude oil and its products, which lowered their participation in the TEC from an average of 45% between 2005 and 2008 and 50% between 1999 and 2002. Biofuels represented 32% of the TEC, two points above its 2005-2008 average. The fastest growing source of TEC was geothermal, which increased from 16.5% between 1999 and 2002 to almost 25% in 2009 thanks to the increase in installed electricity capacity of this energy source in 2007 of 53 MW.

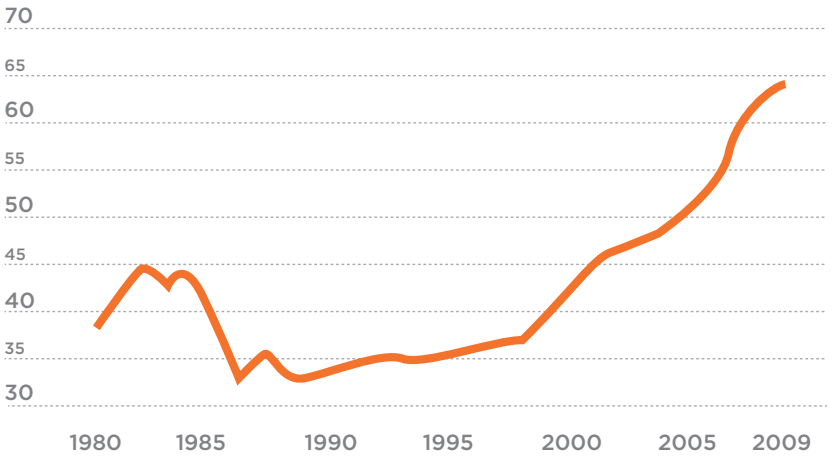
Production, trade balance and primary energy supply

Production

In 2009, primary energy production (PEP) in El Salvador totaled 63.5 kboe/day, 15% higher than its 2005-2008 total. El Salvador exploited three basic primary energy sources: biomass, geothermal and hydraulic. The first, with 54% of the total thanks to 34.6 kboe/day, remained constant in its contribution to the production of primary energy in comparison to its average between 2005-2008, when it also reached 54%. This energy source kept the same relative composition of three quarters firewood, and the rest came from cane products.

EL SALVADOR: PRIMARY ENERGY PRODUCTION

Thousand barrels of oil equivalent per day (kboe/day)



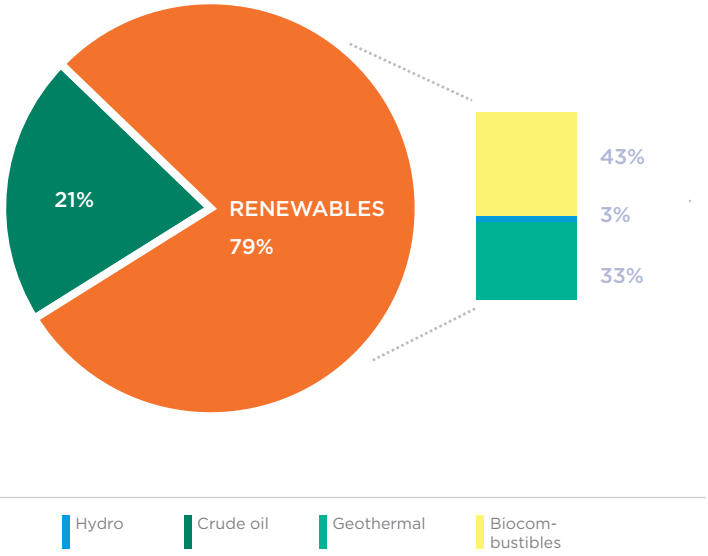
Source: Own Calculations based on IEA Energy World Balances

Geothermal energy in El Salvador is exploited by the joint stock company LaGeo in two geothermal facilities: Ahuachapán, inaugurated in 1975 and Berlin in 1999. These geothermal plants provided close to 41% of the PEP in 2009 with 26.3 kboe/day, which maintains their participation in the PEP at the average between 2005-2008. The small contribution made by hydropower to the PEP reached 4% from 2.6 kboe/day, which is less than the average total between 2005 and 2008, which was 3.2 kboe/day and 6% of the PEP. Virtually all of the hydropower is controlled by the Salvadoran state via the CEL company, which has four main hydroelectric plants: Cerrón Grande, 5 de Noviembre, 15 de Septiembre and Guayoyo. There are only a few small hydroelectric plants under private ownership.

Secondary Energy Trade Balance

El Salvador, following its historic pattern, does not export primary energy while its import of primary in 2009 was crude oil. These imports totaled 17 thousand barrels per day, slight below the total average between 2005 and 2008, which was 19.3 Kboe/day. This crude oil was processed at the Acajutla Refinery (RASA), which was owned at that time by ExxonMobil and since 2012 has been owned by Puma Energy.

PRIMARY ENERGY SUPPLY



Source: Own Calculations based on IEA Energy World Balances

Domestic supply of primary energy

Primary Energy Supply (OEP) in El Salvador during 2009 was devoted to the transformation of secondary energy sources, final consumption by economic sector and the consumption of the energy sector reached 80.7 kboe/day.

This primary offering made up 79% of the renewable energy sources, composed 43% of biofuels with almost 35 kboe/day, 33% of geothermal with 26 kboe/day and 3% of hydraulic energy with almost 3 kboe/day. The rest of the primary offering, 21% of the total, was made up of imported crude oil.

Electricity

Installed capacity

In 2009, El Salvador had a power generation infrastructure that totaled 1501 MW of installed capacity. The bulk of that capacity, nearly 800 MW, was concentrated in thermoelectric centers, 87% of which were under the control of private companies. The renewable source centers represented slightly less power capacity – geothermal and hydraulic in the case of El Salvador – with around 700 MW of which 472 MW were installed in the CEL hydroelectric plants and just over 200 MW in the geothermal plants at LaGeo.

Installed Capacity (MW)	2000	2005	2009
Total Renewables	602	642	706
Hydroelectric	411	461	472
Non-hydroelectric	191	181	234
Thermoelectric	546	624	795
Total	1148	1266	1501

Source: U.S. EIA

It is important to note the almost 19% growth in installed capacity between 2005 and 2009 that was boosted mainly by the incorporation of privately owned thermoelectric plants. Private thermoelectric plants increased installed capacity 13% in four years. It is also important to note that the installed capacity from geothermic sources – representing a smaller percentage of the total installed capacity in the country – grew from 161 MW in 2005 to 204 MW in 2009. .

Inputs to electricity generation

The consumption of electricity production in these plants totaled 43 kboe/day from renewable sources – hydroelectric and geothermal – and from liquid fuels in thermoelectric plants. This consumption was 20% higher than the total between 2005 and 2008.

The increased use of petroleum derivatives, from 8.9 kboe/day to 11.6 between 2005-2008 and 2009, led this energy source to represent 27% of the input, two points above the average total between 2005 and 2008. Renewable sources became 73% of the input, with almost 32 kboe/day, 5 kboe/day higher than the previous total.

El Salvador	2005-2008		2009	
Inputs to electricity (kboe/day)	**36.2**	**100%**	**43.3**	**100%**
Oil products	8.9	25%	11.6	27%
Renewables	27.3	75%	31.7	73%

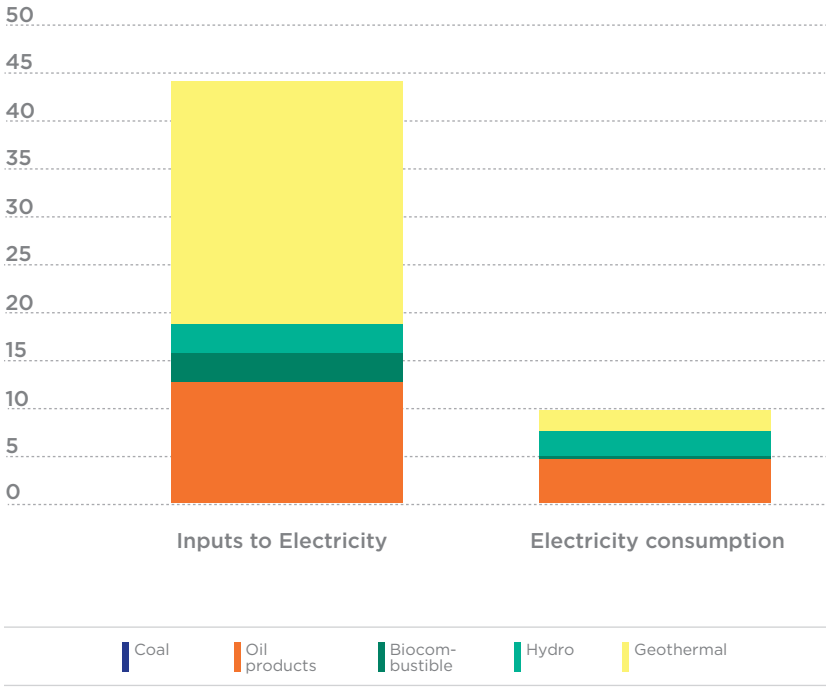
Renewables include hydro, biocombustibles, geothermal, and other renewable sources
Source: Own Calculations based on IEA Energy World Balances

Electricity matrix

Consumption drove the above result in the production of 5,788 GWh in 2009, or 8.5 thousand barrels of oil equivalent per day. This production was created mainly by the consumption of liquid fuels, which contributed 2,527 GWh (44%) to the total. Renewable sources totaled 3,029 GWh, divided almost equally between hydro and geothermal energy production. The latter, as noted above, was the main source of consumer production, but, due to its low level of efficiency, it became the second source of production with a noticeable lag. Biofuels made a small contribution with 232 GWh, 4% of the total.

Electricity consumption in El Salvador in 2009 was 45% distributed in the industrial sector while a third was used for residential consumption. The commercial sector and other sectors of the economy consumed the remaining 22%.

ELECTRICITY MATRIX (KBOE/DAY)



Source: Own Calculations based on IEA Energy World Balances

Secondary balance and consumption

Secondary energy balance

Imports of petroleum products represent an important part of the El Salvadoran matrix given that the country does not have enough refining capacity to meet domestic demand. In 2009, imports of petroleum products totaled 26 thousand barrels per day, which maintained the average level since 2005 and was slightly above the average between 1999-2002. They imported small amounts of electricity totaling 400 barrels of equivalent per day in 2009.

Final consumption by sector

The Salvadoran economy had a total consumption of almost 73 thousand barrels of equivalent per day in 2009, consisting mainly of use in the residential, industrial and transportation sectors. Consumption by the residential sector reached 32 kboe/day, 44% of the total, and was made up of 79% use of biofuels (especially firewood), 13% petroleum products and the 9% remaining was electricity. This high use of biofuels in the residential sector is common in all of Central America given the high percentage of rural population and the low per capita wages in the region.

Industrial use – 20 kboe/day, 27% of the total – was 57% petroleum products, 24% biofuels and 19% electricity. Meanwhile, the transportation sector consumed 24% of the total with 17 kboe/day, and it was 100% from petroleum products. The remaining 5% was consumed by the commercial sector and other sectors. Commercial used depended 46% on electricity and 50% on biofuels, while use in other sectors was 67% electricity and 33% petroleum products.

Institutional Organization of the Energy Sector

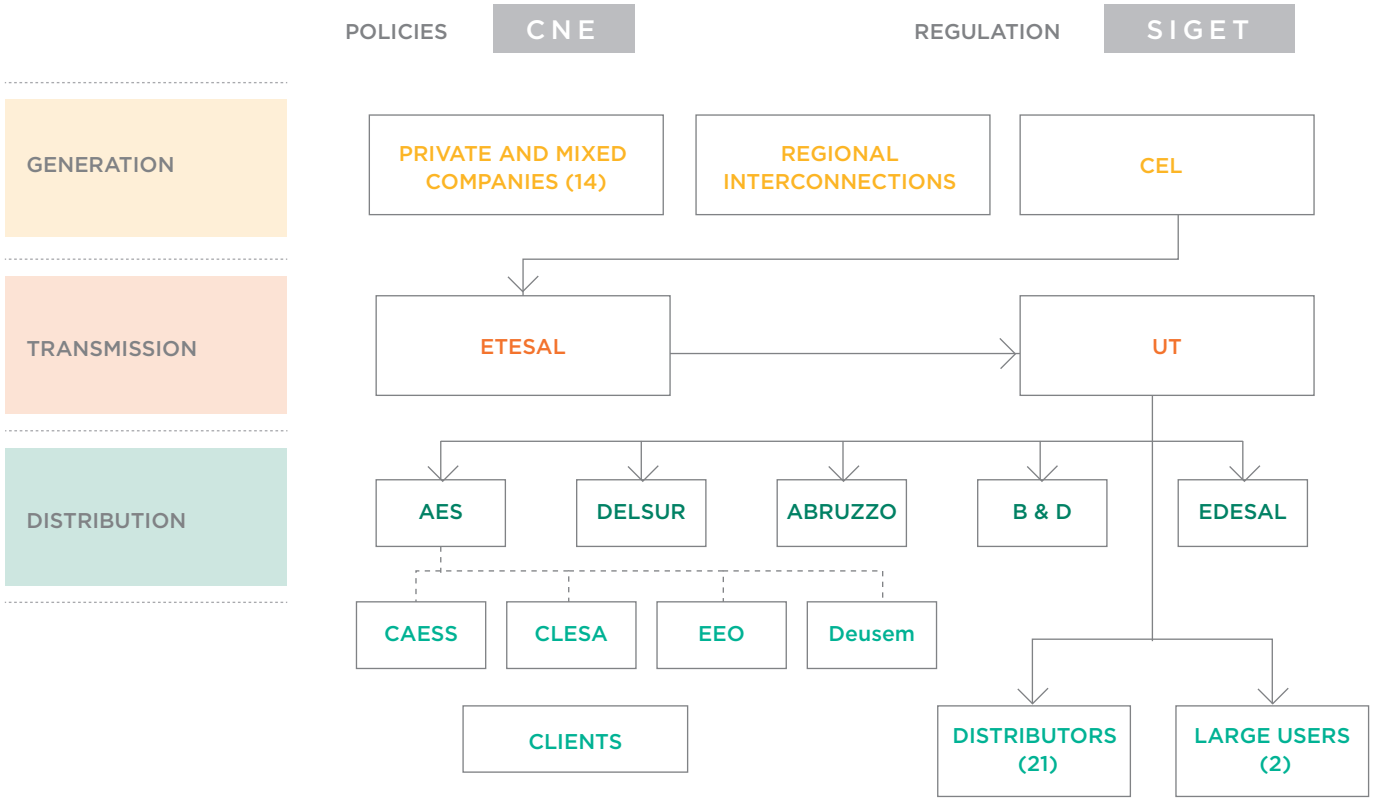
Institutional Structure

In the energy sector in El Salvador there is a significant presence of private companies, and the state limits itself to hydraulic generation, policies and regulation. The main public company in the energy sector is CEL, which controls hydraulic generation. The agency responsible for sector policies is the National Energy Council (CNE), which can intervene in both subsectors.

The regulatory agency in the electricity subsector is the Superintendency of Electricity and Telecommunications, SIGET. Currently it allows private participation in all activities related to the provision of electricity. Final consumer tariffs are regulated by the SIGET.

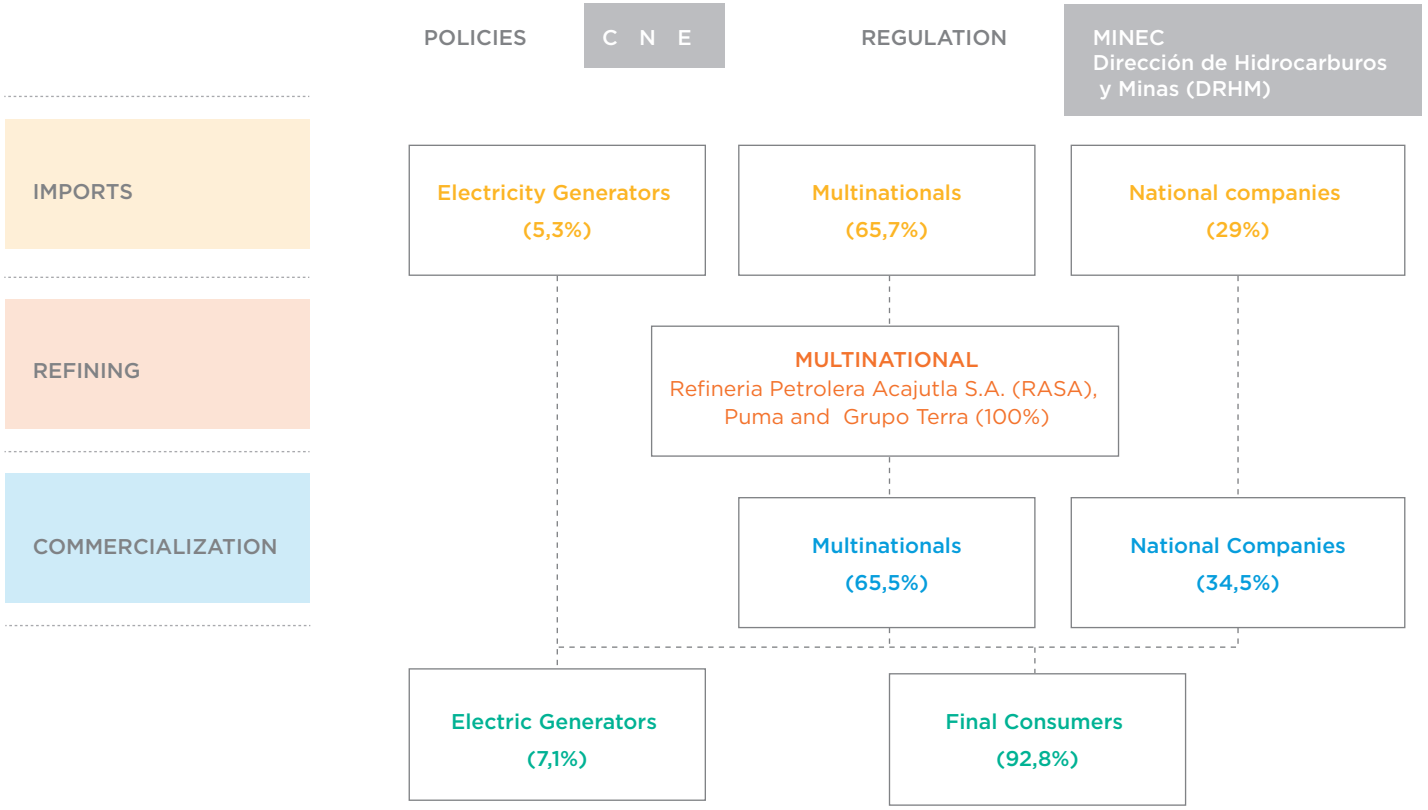
In the Hydrocarbon market, the regulatory agency is the Ministry of Economy (MINEC) via the National Office of Hydrocarbons and Mines (DNHM). Currently it allows the participation of private companies in the marketing and importing of by-products. However, the infrastructure and handling of transportation is under the control of the MINEC. The regulator fixes GNL prices and the final prices of by-products are free. However, the MINEC established a reference price for all products.

Electricity Sub-Sector Structure, 2011



Source: Author's work based on information from SIGET, CNE, CEL, UT and current legislation

Hydrocarbon Sub-Sector Structure, 2011



Source: Author's work based on information from SIGET, CNE, CEL, UT and current legislation.

Policy making in the energy sector

The National Energy Council (CNE) is the organization responsible for developing, coordinating and implementing energy policies in El Salvador. It was created in 2007 by Legislative Decree No. 404 and its regulations passed in 2008, which means that it started operating mid-2009. During the early years of activity, the institution shared some support functions with its predecessors: the Office of Electric Power (DEE) and the Regulatory Office of Hydrocarbons and Mines (DRHM), both under the Ministry of Economy (MINEC)[1]. Recently, however, the MINEC transferred its responsibilities in energy sector policy management and creation to the CNE.[2]

According to the law of creation of the CNE, the institution has the following objectives[3]:

- To develop a plan and design the energy policy for the country.
- To advance the existence of regulatory frameworks that promote investment and competitive development in the energy sector.
- To promote the rational use of energy.
- To promote the development and expansion of renewable energy resources.
- To promote the integration of regional energy markets.

The CNE board consists of six members; the Minister of Economy, the technical secretary of the Presidency, the Minister of Finance, the Minister of Public Works, the Minister of Environment and Natural Resources and the president of the consumer advocate.

Based on the above objectives, the CNE board has the following powers and responsibilities:

- To develop policies, strategies and exact plans for the development of the sector.
- To promote the adoption of laws and regulations.
- Promover la aprobación de leyes y reglamentos.
- To develop the policies of the subsidy system in the energy sector and to propose them for the approval of the Council of Ministers.
- To develop the National Energy Balance.
- To support the competent authority in the signing of Conventions and International Agreements.
- To establish strategies to satisfy the demand of electric power and fuels in various regions and social sectors.
- To promote technology development in the sector.

1 The DEE was divested from the MINEC in 2010 and the Regulatory Office of Hydrocarbons and Mines (still attached) performs tasks mainly related to regulation and control.
2 The MINEC still has a support unit called "Energy Unit" and the Regulatory Office of Hydrocarbons and Mines (DRHM).
3 The law creating the National Energy Board. Legislative Decree No. 404.

To fulfill its functions, the CNE has five divisions:

- **Electricity Market Division:** The coordinating body that is responsible for the creation of electricity market policies.
- **Rural Electrification Division:** Responsible for the creation of policies to reach the goal of universal coverage.
- **Fuel Division:** Responsible for the policies and strategies related to hydrocarbon and non-conventional fuels (including biofuels and biomass).
- **Energy Efficiency Division:** Responsible for policies related to the "rational use of energy" and the protection of the environment.
- **Renewable Energy Division:** Responsible for policies to promote the use of clean energy (hydraulic, geothermic, solar, biomass and wind).

Regulator

Electricity subsector

The agency responsible for regulating the electricity sector in El Salvador is the Superintendency of Electricity and Telecommunications, SIGET. This organization, created by Legislative Decree No. 808 on September 12, 1996, was created in anticipation of the approval of the General Electricity Law (LGE) that occurred a month later.

The SIGET is a non-profit autonomous administrative entity that raises revenue through product charges for its regulatory activity and from the national budget[4]. Its board (Board of Directors) is composed of three members appointed for seven years in phases by the President of the Republic, the Supreme Court and the Private Trade Association.

Its powers include[5]:

- To monitor the development of the electricity market.
- To approve the rates for the final user.
- To regulate charges for the use of transmission and distribution systems.
- To resolve disputes between operators in the sector.
- To regulate administrative charges in the wholesale market.
- To grant concessions for the construction of hydroelectric and geothermal plants.
- To publish sector information statistics.
- To establish quality standards for distribution systems and commercial service.[6]

The highest governing body of the SIGET is the board and it should count on the following branches:

- Management of Electricity.
- Telecommunications Management.
- Financial Administration.
- Registration of Electricity and Telecommunications.

4 See General Electricity Law Art. 7 Chapt. 4 of the Law of Creation of the SIGET.
5 See the Law of the Creation of the SIGET (Decree 808 of 1996).
6 Article 67 bis paragraph (a) of the law of the creation of the SIGET establishes that all distributors are obligated to pay their users regulated compensation that corresponds to deficiencies in the quality of service as established by the SIGET.

The work of electricity management includes [7]:

- To comply with and make others comply with the General Electricity Law and the regulations that form part of the regulatory framework of the El Salvadoran electricity market.
- To participate in defining and setting up sanctions for infractions of the system standards of quality and reliability.
- To establish rules that all operator accounting systems should comply with and to develop activities for transmission and distribution, as well as the Transactions Unit (UT).
- To develop technical rules and standards for production, transmission and marketing.

Additionally, SIGET works with the Supervision of Competition to protect electricity sector activities subject to competition systems.

Hydrocarbons Subsector

The hydrocarbon subsector is supervised by the Regulatory Directorate of Hydrocarbons and Mines (DRHM). This agency is part of the Ministry of Economy and its main goals are to ensure the sustainable development of the hydrocarbon subsector and the mining sector via the implementation of policies, rules and measures of a technical and administrative nature. In addition, it should apply current legal frameworks. Its director is hierarchically subordinate to the Deputy Minister of Trade and Industry.

The powers of the DRHM, defined in the internal regulations of the MINEC[8], are:

- To establish appropriate regulation, supervision and control mechanisms for the hydrocarbon, natural gas and mining resources markets, to guarantee economic development, protect the environment and provide more transparency.
- To establish, update and comply with legal, technical and administrative Rules and Regulations related to petroleum products, natural gas and the mining sector.
- To promote measures to encourage competition in the marketing of hydrocarbons in the local market in order to improve the final consumer price.

7 SIGET's institutional page.

8 See MINEC's internal rules. Agreement No. 667 on June 23, 2010. D.O 177, Volume 388, on September 23, 2010.

Electricity Sector Institutional Matrix

Generation

	Installed Capacity
Hydroelectric	32.8%
Solar & Wind	n.a.
Thermoelectric	53.4%
Geothermal	13.8%
Main State-Owned Company	CEL (31.9%)
Private Participation	Allowed
Requirements	Minimal
Registrations	17 companies
Vertical integration	Allowed
Fiscal Incentives	Only renewable energy sources
Import of fuel equipment	Capacity under 20 MW n.a.
Small generators	Income tax exemption for capacity under 20 MW
Pricing politics	Only renewable energy sources
Contracts market	Free pricing between parties
Spot market	Based on generation costs by plant and schedule

Transmission

Company	ETESAL
Ownership	State
Market	Monopoly
Functions	Maintain the national integrated system (SIN) Create expansion plan
Pricing policy	Toll for use of SIN

Wholesale Market

Tasked Unit	UT
Tasks	Administer the wholesale electricity market Operate the SIN
Retailers	21
Grandes Usuarios	2

Distribution

Companies	CAESS (36%) CLESA (21%) EEO (16%) DEUSEM (4%) DELSUR (22%) EDESAL, otros (1%)
Market	
National coverage	86%
State company	n.a.
Private participation?	Allowed
Concessions	Permanent
Subsidized users	Bidding (20-25 years) 87% of the difference between the tariff and a reference price
Pricing policy	Regulated

Regulator	Superintendencia General de Electricidad y Telecomunicaciones (SIGET)
Members of the board	3
Appointment by the President of the Republic	1
Financing	Charge for regulation service + funds out of the national Budget

Source: SIGET, CNE, CEL, UT and current legislation

Electricity subsector

The current regulatory framework does not prohibit the integration of any company in the various activities of the electricity subsector. However, the state transmission office Etesal is excluded from this permit.

All the participants conduct their operations through the wholesale energy market run by the Transactions Unit (UT). They must be registered by the generator laws used by high voltage transmission systems, marketing companies, distributors and large users[9].

The market operates in two ways. The first is the contract market, with offices agreed upon independently by operators (bilateral), but cleared by the UT. The parties have to report the final prices and the distributors have to have contracted at least 50% of their long-term demand through this type of plan. The remainder of the energy is sold in the Market Regulator System (or the secondary market), in the short term, and it balances the supply and demand with a price based on the marginal cost structures of the generators, fixed by the UT and regulated by the SIGET.

According to article 69 of the LGE regulations: *"The prices and conditions of the energy supply contracts between operators will be limited only by the willingness of the parties and by the Law, and its perfection will not require the intervention of third parties."*

The signing of mandatory long-term supply contracts aims to facilitate the creation of new projects, to stabilize prices and rates and to mitigate the market power of companies in the secondary market. There are two types of contracts: those with a term of less than five years that seek to stabilize prices and the contracts between five and fifteen years that seek to encourage the incorporation of new generation projects that should be bid upon three years before the beginning of the supply of energy. While the agreed upon price in the market is not fixed among interested parties, the majority of those contracts are indexed at a fixed price observed in the MRS[10].

According to article 67-I of the regulation of the LGE: *"The price of energy transaction in the System Market Regulator will be established just as the marginal cost of system operation in the interval of the respective market, plus the transmission charges, system operation, ancillary services and all charges established by the General Electricity Law; which will be defined in the Regulation of Transmission System Operation and the Wholesale Market based on Production Costs. Marginal cost means the cost of operating one more Kilowatt-hour of demand in that range.*

Managing the wholesale electricity market and assuring the quality of supply is the responsibility of the Transactions Unit (UT), whose shareholders are the generators, transmitters, distributors, retailers and final users. The operating costs of the UT are covered by the charge for system operation.

9 In summary, market participants that have a direct connection to the transmission system and are enrolled in the UT.

10 As will be discussed, the AES group handles about 77% of the customers nationwide and has the power of monopsony.

The UT took responsibility for managing the System Operations Center (COS) that belongs to the Lempa River Executive Hydroelectric Commission (CEL) that existed before the 1996 LGE. The UT has the role of market administrator, which is why it has the ability to buy and sell exchanged energy directly in the System Market Regulator (MRS) and it has the responsibility for technical control functions.

In accordance with article 67 of the LGE: *"The Transactions Unit should plan and coordinate the dispatch of generating units and the operation of the installation of the system of transmission with the goal of meeting the minimum cost demand of operation and of rationing, subject to compliance with the rules of quality and security of service established in the Regulation of Transmission System Operation and the Wholesale Market based on the Costs of Production."*

The UT should also manage the wholesale electricity market and be responsible for managing and administering international energy transactions.

According to the LGE, the UT is an anonymous corporation established by a series of shareholders, all wholesale market operators, and its administration is realized via a board of directors, owners of each group. The Government participates with votes in the UT via a representative, but it is not a shareholder.

The series of shareholders correspond to the following market participants: generators, distributors, final users, transmitters and marketers. The latter incorporated in 2004 according to a reform to the LGE made during the same year.

The current board consists of nine members and nine alternate owners. Each participant in the market has two representatives, except the transmission sector, which only has one.

The CEL continues to be the main public institution in the generation sector given that it is the owner of four hydroelectric plants in the country[11]. The companies that today form part of the electricity sector are distributed in the following way[12] , Generation: CEL, Duke Energy, Nejapa Power, LaGeo (Salvadoran Geothermal) and other small generation centers; Transmission: Etesal (El Salvador Electricity Transmission Company); Distribution: CAESS, Delsur, Deusem, EEO and AES-CLESA; and Commercialization: many companies that are in charge of serving low voltage consumers directly and engaged in the import and export of energy to and from Guatemala and Honduras[13].

Generation

In the generation sector there are currently 17 companies total that operate (generators and co-generators) managed mostly by the private sector. The main state company, the Lempa River Executive Hydroelectric Commission (CEL), manages the hydroelectric generation plants

11 The four existing hydroelectric plants in El Salvador are: Guajoyo, 5 de Noviembre, 15 de Septiembre and Cerrón Grande.
12 SIGET's institutional page.
13 SIGET's institutional page.

and has majority participation[14] of the joint venture company LaGeo, which operates the only two active geothermal plants.

Therefore, the State manages 45.7% of the installed generation capacity in the country. The private sector, in the generation sector, manages 54.3% of the installed capacity at a national level, with control of the thermal generation sources.

Table 1 illustrates the distribution of power plants in El Salvador, divided by the type of source and the sector to which they belong.

Table 1. Power plant distribution by source and sector

Sources	Public	Private	Total
Primary			
Hydro	31.9%	0.9%	32.8%
Geothermal	13.8%	n.a.	13.8%
Wind	n.a.	n.a.	
Secondary			
Thermal	n.a.	53.4%	53.4%
Total	**45.7%**	**54.3%**	**100%**

Source: ECLAC and own calculations

14 At the time of the publication of this report, the CEL and Enel (the private company that owns a portion of the shares of LaGeo) are in a legal dispute over control of the geothermal generation company.

Table 2. Wholesale market installed capacity, 2010

PLANT	BY JUNE 2011	
	(MW)	(%)
Hydro	**472.5**	**32.0**
Guajoyo	19.8	1.3
Cerrón Grande	172.8	11.7
5 de Noviembre	99.4	6.7
15 de Septiembre	180.0	12.2
Geothermal	**204.4**	**13.8**
Ahuachapán	95.0	6.4
Berlín	109.4	7.4
Thermal	**800.7**	**54.2**
Duke Energy	338.3	22.9
Nejapa Power	144.0	9.7
Cemento de El Salvador	32.6	2.2
Inversiones Energéticas	100.2	6.8
Textufil	44.1	3.0
GECSA	11.6	0.8
Energía Borealis	13.6	0.9
Hilcasa Energy	6.8	0.5
CASSA	66.0	4.5
Ingenio El Ángel	22.5	1.5
Ingenio La Cabaña	21.0	1.4
Total	**1477.2**	**100.0**

Source: SIGET

Transmission

The LGE does not exclude the participation of private companies in the transmission sector. The wording of the law and its regulations leaves open the potential for the participation of companies in that sector without specifying any requirements as to ownership.

Although it leaves this open, the magnitude of investments necessary to install transmission lines on a national level and vague legislation about the type of contract necessary to encourage private sector participation have prevented another company, aside from the state run company, from managing the high voltage networks in the country. The El Salvador Electricity Transmission Company (Etesal), created from the dissolution of the monopoly of the CEL and its property, is responsible for the maintenance and expansion of the national transmission system. As for the remuneration received by the State for the use of networks, legislation establishes that the value of the toll should be fixed by the regulatory agency, the SIGET.

In 2011, the transmission system consisted of 38 lines of 115kV with a total length of 1,072.5 km, two lines of 230 kV that permit the interconnection of Guatemala and Honduras and 23 power substations.

Distribution

The last sector of the electricity business, the distribution of energy to final users, has been managed exclusively by private capital since 1998. Currently there are eight parties registered in the Transactions Unit (UT) as distributors; CAESS, Clessa, EEO, Deusem, Del Sur, Abruzzo, B&D and Edesal. The first four companies on the list belong to the AES group which manages 77% of the country's clients; the distributor Del Sur manages 22% and the remaining companies (Abruzzo, B&D, Edesal) manage 1%.

The fee charged to end users is regulated and it is made up of three different fees: the marketing charge, the distribution charge and the energy charge. The first of these components is defined by a period of five years and is adjusted annually in line with inflation. The second component is reviewed every fiver years and undergoes annual adjustments based on inflation and the exchange rate against the dollar. The third component, the energy charge, is the mechanism to transfer the power and energy costs to final users and has quarterly adjustments. It is specified in the terms of the contracts signed by the distributor and the average price of energy compared to the Market Regulator System (MRS) during the previous quarter[15, 16].

On the other hand, the State subsidizes users with a monthly consumption of less thank 99 kWh, covering 87% of the difference between the terms of the fee and the reference price established between SIGET and CNE. This subsidy benefits approximately 60% of residential consumers.

In article 8 the LGE enables the vertical integration of industry players for generation, transmission, distribution and commercialization activities, as long as these entities establish separate accounting systems for each activity and are registered as such in the SIGET. Furthermore, the article establishes that agents that develop generation, distribution and commercialization activities cannot be Etesal shareholders.

15 The MRS is where excess energy demand is emptied at a price based on the marginal system cost.
16 Additionally, a fund was created to settle and compensate the accumulated value of the difference between the daily prices in the MRS and the semester average.

Hydrocarbon Sector Institutional Matrix, 2011

Import		Transformation/Refining		Commercialization	
Main State Company	n.a.	Company	RASA	**Total gas stations**	395
Private participation	Allowed	Ownership	Private	Companies	Chevron-Texaco (20.3%) Grupo Terra (16.5%)
		Owner	Puma (65%) Grupo Terra (35%)	(% of total gas stations)	Puma (23.6%) Uno (5.3%) Alba (1%) Independent (33.4%)
Importers by product					
Crude oil	Puma	**Products produced (2011)**	Fuel Oil (50%) Diesel Oil (21,7%) Regular gasoline (12,5%) LPG (1,7%) Turbo Fuel (8%) Asphalts (5%) Special gasoline (0.7%)	Pricing policy	Regulated
Gasoline and diesel	Puma (34.2%) Terra (14.65) Chevron-Texaco (30.9%) Large national companies (8.4%) Small national companies (11.9%)			Subsidies	LPG
LPG	Elf (8.4%) Puma (3.6%) Large national companies (76.1%) Small national companies (10.4%)				
Regulator		Regulatory Bureau for Hydrocarbons and Mines (DRHM), Ministry of the Economy (MINEC)			
Appointment process		Open appointment by the President of the Republic			
Financing		Nation's ordinary budget			

Source: SIGET, CNE, CEL, UT, OLADE and current legislation

Hydrocarbon subsector

The hydrocarbon subsector in El Salvador is governed by the Hydrocarbon Law, approved in Decree No. 626 on March 17, 1981 and published in the Diario Oficial No. 52, volume 270 on the same date and by the Law of the Regulation of the Deposit, Transportation and Distribution of Petroleum Products, approved by Legislative Decree No. 169 on November 19, 1970 and published in the Diario Oficial No. 233, volume No. 229 on December 23 of the same year.

The first has the goal of "regulating the promotion, development and control of the exploitation and exploration of hydrocarbon deposits" and the second "regulates and monitors the import and export, deposit, transport, distribution and marketing of petroleum products, such as the construction and operation of reservoirs and tanks for private use and other related activities." According to a statement made by the CNE, related activities include product quality control and fines for the breach of quality and safety standards.

Production of petroleum and its derivatives

El Salvador does not have petroleum production, but it has a private refinery with a processing capacity of 10,000 barrels a day, the Acajutla Petroleum Refinery S.A (RASA). This refinery is owned by Puma Energy and Grupo Terra, and has atmospheric distillation processes, vacuum distillation, catalytic reform and hydrotreating. It supplies around 28% of the hydrocarbon market in the country[17]. The remaining 72% was imported mainly from Venezuela, Mexico, Colombia and Ecuador.

17 CNE. Statistical fuel Bulletin. June 2012.

Importing hydrocarbons

All of the petroleum refined in El Salvador is imported. Because the production of the RASA is not sufficient to supply the market, it is necessary to import petroleum products to accompany what is refined in the country. The structure of the subsector in 2010 was organized in the following manner[18]:

- 65.7% managed by subsidiaries of multinational companies (Puma 35%, Shell/Terra 15%, and Chevron-Texaco 15,7%).
- 23.4% operated by large local companies.
- 10.9% operated by small local companies.

Infrastructure of the hydrocarbon subsector

El Salvador has two commercial ports: Acajutla and La Unión. Hydrocarbons are imported through the port of Acajutla where there are also some storage facilities.

The pipeline network of El Salvador does not exceed 4 km and is used to transport hydrocarbons from the docks to the refinery and storage areas.

In 2010 394 stations were reported under operation, (81 owned by Shell, 81 by ChevronTexaco, 67 by Esso, 29 by Puma and 136 by other distributors)[19]. Distribution to service stations is via tankers.

18 Gonzalez 2009.

19 Office of Hydrocarbons and Mines/ Ministry of Economy .

Historic Development of the Energy Sector

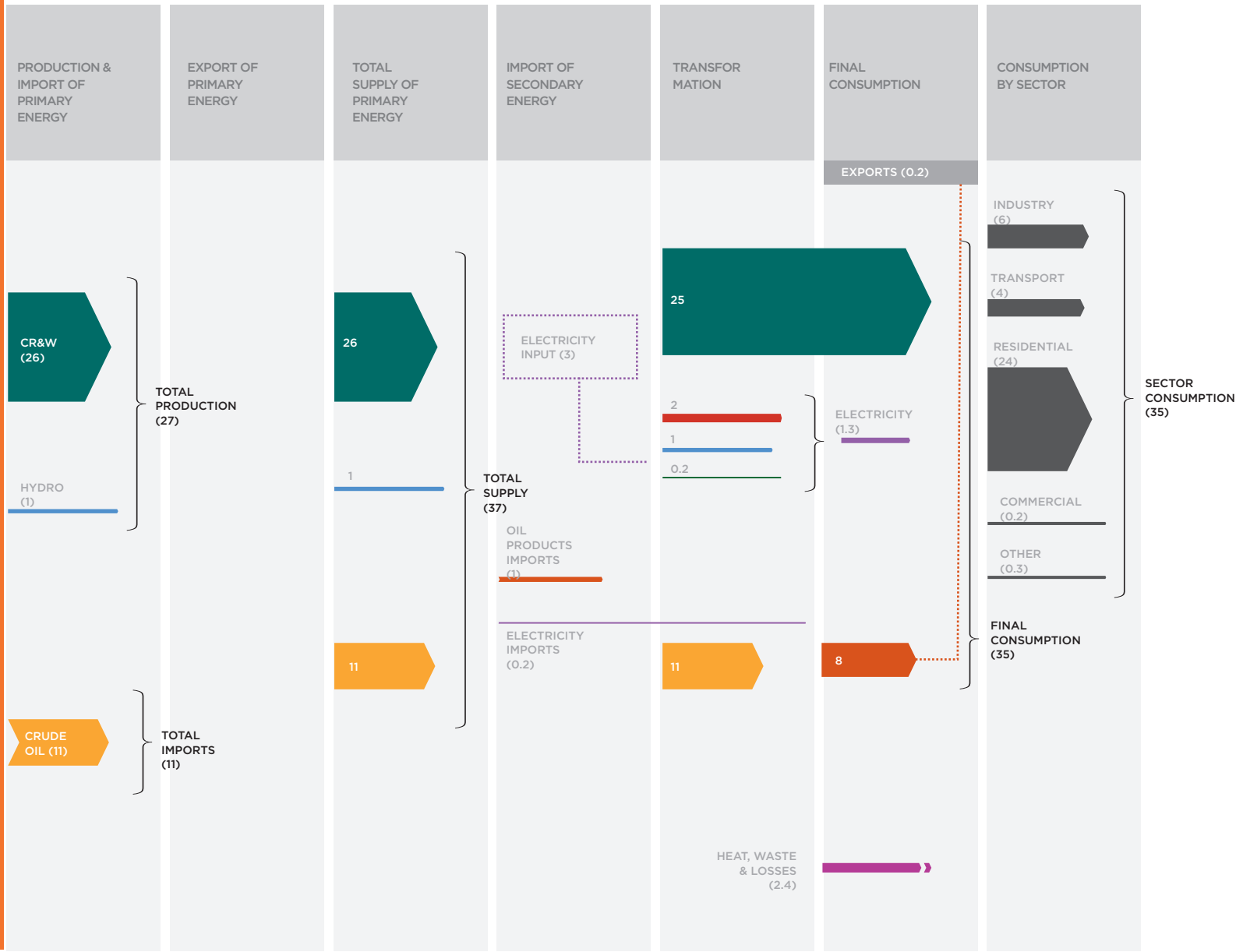
Evolution of the Energy Matrix 1971 - 2008

1971–1974

At the beginning of the 1970s, El Salvador had an energy matrix almost entirely dependent on biomass and crude oil imports. The use of firewood in rural zones, given the low level of urbanization in El Salvador at that time, together with the use of cane husks for electricity generation, explains why renewable fuels represented two thirds of the energy consumed in the country during that period.

1971–1974

Energy Flow



(kboe/day)

Source: Own Calculations based on IEA Energy World Balances

Total Energy Consumption

In this early period we note that El Salvador consumed a total of 39 thousand barrels of oil equivalent per day. Of these, 25.6 kboe/day were consumed from renewable sources and wastes, composed mostly of firewood. In a distant second place was crude oil, all imported, averaging 11 thousand barrels a day to cover 29% of consumption. Petroleum entered the country through the port of Acajutla and was processed in a refinery of the same name built by the oil company Shell in the 60s. The only other source of primary energy consumed during this period was hydraulic. At that time, the hydroelectric plans in operation were Guayoyo and 5 de Noviembre. The production from these plants was reflected in the matrix by the contribution of hydraulic energy, averaging 0.9 kboe/day, which represents 2% of total consumption. Finally, note that imports of derivative products during this period averaged 0.8 kboe/day, 2% of the total energy consumption during the period studied.

Electricity

Consumption of electricity generation during this period depended mainly on oil derivatives, which contributed 1.96 of the 2.97 thousand barrels of equivalent per day transformed into electricity, more than 65%. Hydraulic energy added 0.87 kboe/day, around 5% of the total. Generation from these inputs reached 1.26 kboe/day, which is equivalent to 869.5 GWh. Of the electricity consumed, hydropower represented 58% thanks to its high level of efficiency, while liquid fuels totaled 39%.

Source	Inputs (kboe/day)	%	Electricity consumption (GWh)	Electricity consumption (kboe/day)	%
Oil products	1.96	65.83%	339.5	0.49	39%
Hydro	0.87	29.32%	504.5	0.73	58%
Biocombustibles	0.14	4.85%	25.5	0.04	3%
Total	2.97	100%	869.5	1.26	100%

Source: Own Calculations based on IEA Energy World Balances

Final consumption by sector

Residential consumption reached 24.2 kboe/day, which represented 70% of the total consumption – 34.6 kboe/day. This sector received 94% of its energy from renewable fuels and consumed more than double the total consumption in the industrial and transportation sectors. Industrial use, 47% biofeuls, 43% liquid fuels and 10% electricity, was only 16% of the final consumption in the country during this period. The transportation sector, 12% of the total, only used energy as liquid fuels. The commercial sector and others combined to provide the remaining 2% of final Salvadoran consumption during the early 70s.

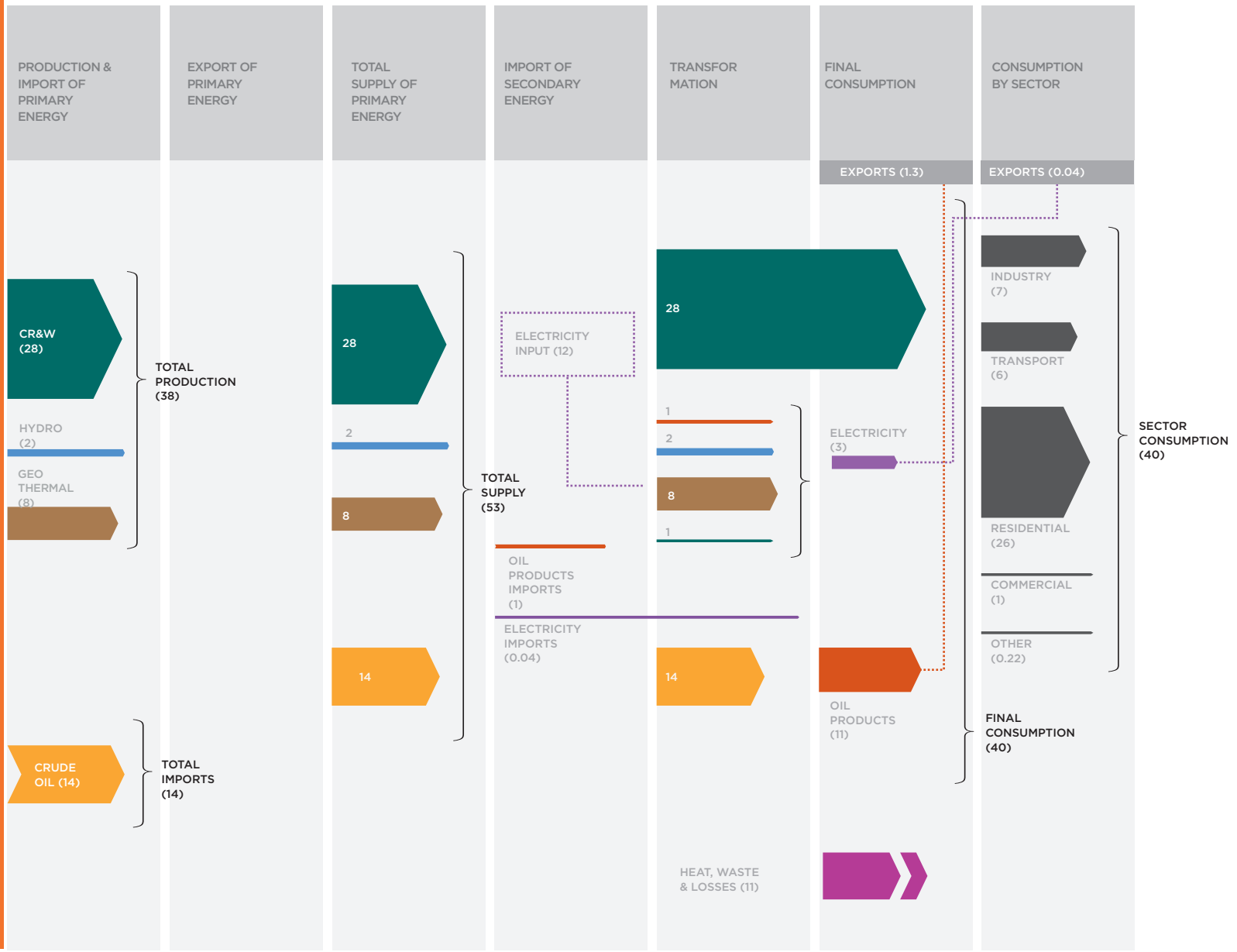
Consumption by sectors	Industry	Transport	Residential	Commercial	Others
Oil products	42.9	100	3.6	0	100
Biocombustibles	46.7	0	94.3	0	0
Electricity	10.3	0	2.1	100	0
Total	100%	100%	100%	100%	100%

Source: Own Calculations based on IEA Energy World Balances

1984–1987

In the ten years between the first two periods analyzed, the energy matrix in El Salvador changed because of the emergence of energy production from geothermal sources. The country still relies heavily on biofuels and imported crude oil grows in the mid-eighties.

Energy Flow 1984-1987



(kboe/day)

Source: Own Calculations based on IEA Energy World Balances

Total Energy Consumption

With the addition of the Ahuachapán plant in 1975, El Salvador went on to produce 8.24 kboe/day of geothermal energy, representing 16% of total energy consumption, that in that moment totaled 53 kboe/day, a growth of 37% above the previous period. The hydraulic supply also grew during this period because the Cerrón Grande plant went into operation at the end of the 70s and the plant 15 de Septiembre was inaugurated in 1983. Between 1984 and 1987, about 4% of total consumption was hydraulic energy, doubling the average of the previous period. Renewable fuels continued to be the most important energy source, totaling almost 53% of consumption with 28 kboe/day. Crude oil imports grew from 11 to 14 thousand barrels a day to represent 26% of total consumption. Finally, imports of oil derivatives fell 18% from 0.8 to 0.66 to represent only 1% of total energy consumption.

Electricity

When Cerrón Grande joined the energy matrix, the consumption of electricity changed radically. During this period, geothermal was the most important source for the production of electricity, contributing 8 of the 12 thousand barrels of equivalent per day used for this purpose. Hydrogeneration continued to contribute 2 thousand barrels of equivalent per day while derivative products fell from 2 thousand to 1 thousand barrels per day for electricity generation. Renewable fuels quintupled their share, passing from 200 to 1,000 kboe/day. The electricity, which generated 1,750.75 GWh, came 63% from hydrogeneration and 27% from geothermal, revealing the different efficiencies of the two main sources for generating electricity.

Source	Inputs (kboe/day)	%	Electricity consumption (GWh)	Electricity consumption (kboe/day)	%
Oil products	0.99	8%	148.25	0.22	8%
Hydro	1.90	16%	1,101.25	1.60	63%
Geothermal	8.24	68%	477.5	0.69	27%
Biocombustibles	0.99	8%	23.75	0.03	1%
Total	12.12	100%	1,750.75	2.54	100%

Source: Own Calculations based on IEA Energy World Balances

Final Consumption by Sector

Residential consumption, 93% of renewable fuels, grew 6% from the previous period, although its share of final consumption fell from 70 to 65%. Transportation and industry represent 16% of final consumption each. The first continued using only derivatives and the second decreased its use of renewables by 50% and increased liquid fuels to almost 37% of the total, with the rest coming from electricity. The other sectors of the economy, including the commercial sector, made up only 3% of the total and only used liquid fuels and electricity.

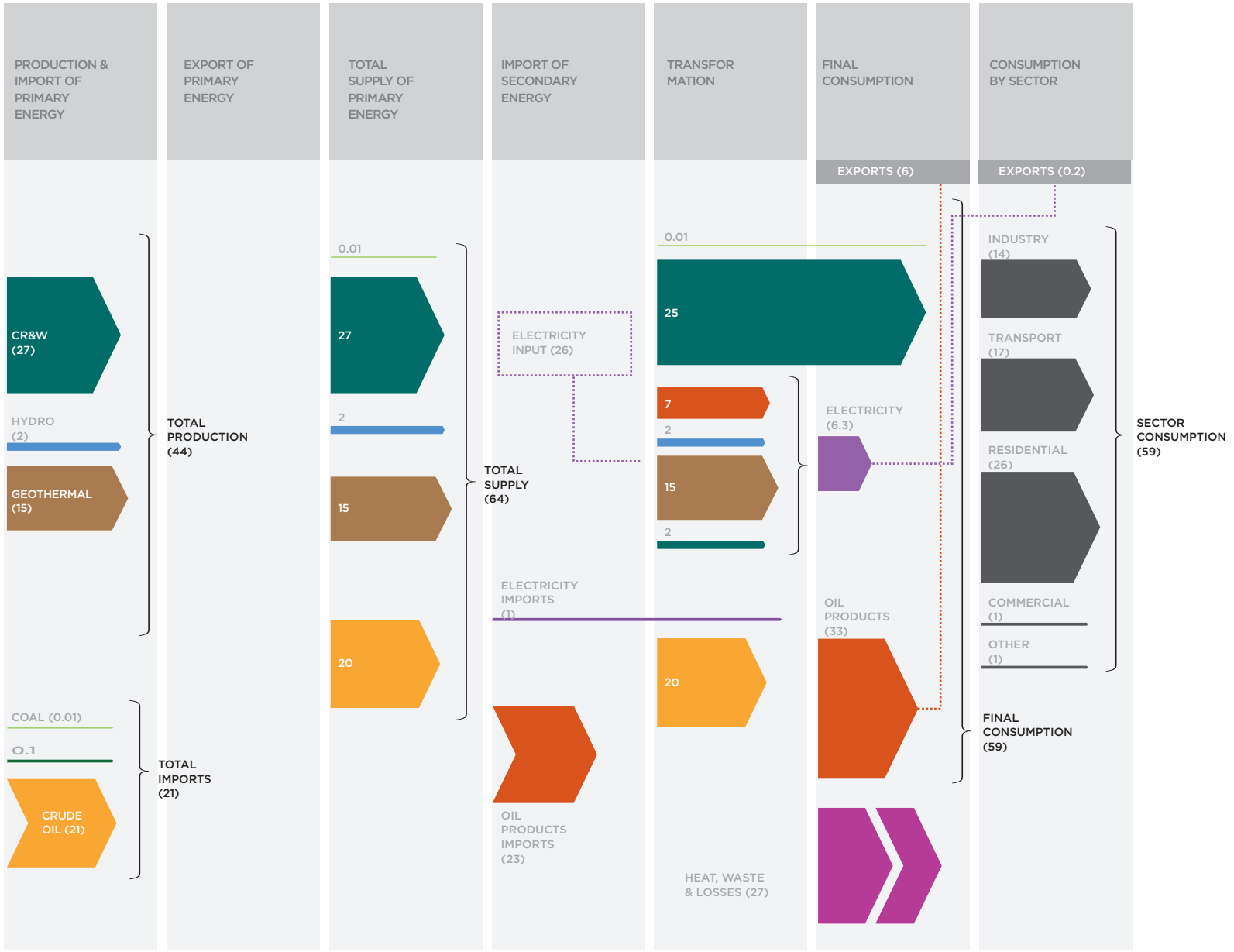
Consumption by sectors	Industry	Transport	Residential	Commercial	Others
Oil products	36.8	100	4.0	0	100
Biocombustibles	50.2	0	92.7	0.0	0
Electricity	12.9	0	3.4	100	0
Total	100%	100%	100%	100%	100%

Source: Own Calculations based on IEA Energy World Balances

1999–2002

At the end of the decade, the economy of El Salvador continued to depend on biofuels, liquid fuels and geothermal sources to supply the majority of its energy needs, but it shows an important shift in patterns of consumption from the past decade. While the residential sector maintained its place as the greatest consumer of energy, industry and transportation increased their demand significantly.

Energy Flow 1999–2002



(kboe/day)

Source: Own Calculations based on IEA Energy World Balances

Total Energy Consumption

Averaging 87 kboe/day, consumption during this period grew 64% in comparison with 1984-1987. The most significant change in consumption patterns is the large increase in imports of derivative products, which grew from 0.66 kboe/day at the end of the 80s to almost 23 thousand barrels per day during this analytical period, ranking it as the second energy source in the country with 26% of final consumption. This was a result of the physical integration of the country, the increase in per capita income and also the growth in automobile plants. This increase in the importation of petroleum product derivatives is mainly used to feed the growing energy consumption of Salvadoran industry as well as the huge leap in use in the transportation sector. Biofuels continued to represent the most important component of total consumption with 31% - for the first time less than half – followed by imported crude with 23%. When the geothermal plant Berlin began to operate, production from that source almost doubled, going from 8 to 15 kboe/day and reaching 17% of consumption. Hydraulic energy grew 19% from the previous period, reaching 2.26 kboe/day and 3%. During this period, El Salvador made small coal and renewable fuels imports that averaged 10 and 100 barrels of equivalent per day respectively.

Electricity

Consumption of electricity generation increased markedly from 12 to 26 thousand barrels of equivalent per day from the previous period. Of these, geothermal contributed 15 thousand, by far the most important source of generation of consumption. Derivative products totaled 7 kboe/day while hydroelectric and renewable fuels contributed to almost 2 thousand barrels per day each. For the first time, liquid fuels were the most important source of generation with 45% of the 3913 GWh of electricity consumed during the period. It was followed by hydrogeneration with 34% and geothermal with 21%.

Source	Inputs (kboe/day)	%	Electricity consumption (GWh)	Electricity consumption (kboe/day)	%
Oil products	7.27	28%	1,744.00	2.85	45%
Hydro	2.26	9%	1,311.25	2.14	34%
Geothermal	14.43	55%	835.75	1.37	21%
Biocombustibles	2.17	8%	22	0.04	1%
Total	26.14	100%	3,913.00	6.40	100%

Source: Own Calculations based on IEA Energy World Balances

Final Consumption by Sector

During this period, residential use did not consume the majority of the energy produced in El Salvador, but it kept its place as the largest consumer in the country with 45%, of which 80% were biomass. Transportation rose to second place, doubling its consumption and representing 29% of the total – entirely dependent on derivatives. Industry also doubled its consumption, but fell to third place with 23% of final consumption and a 51% dependence on oil derivatives.

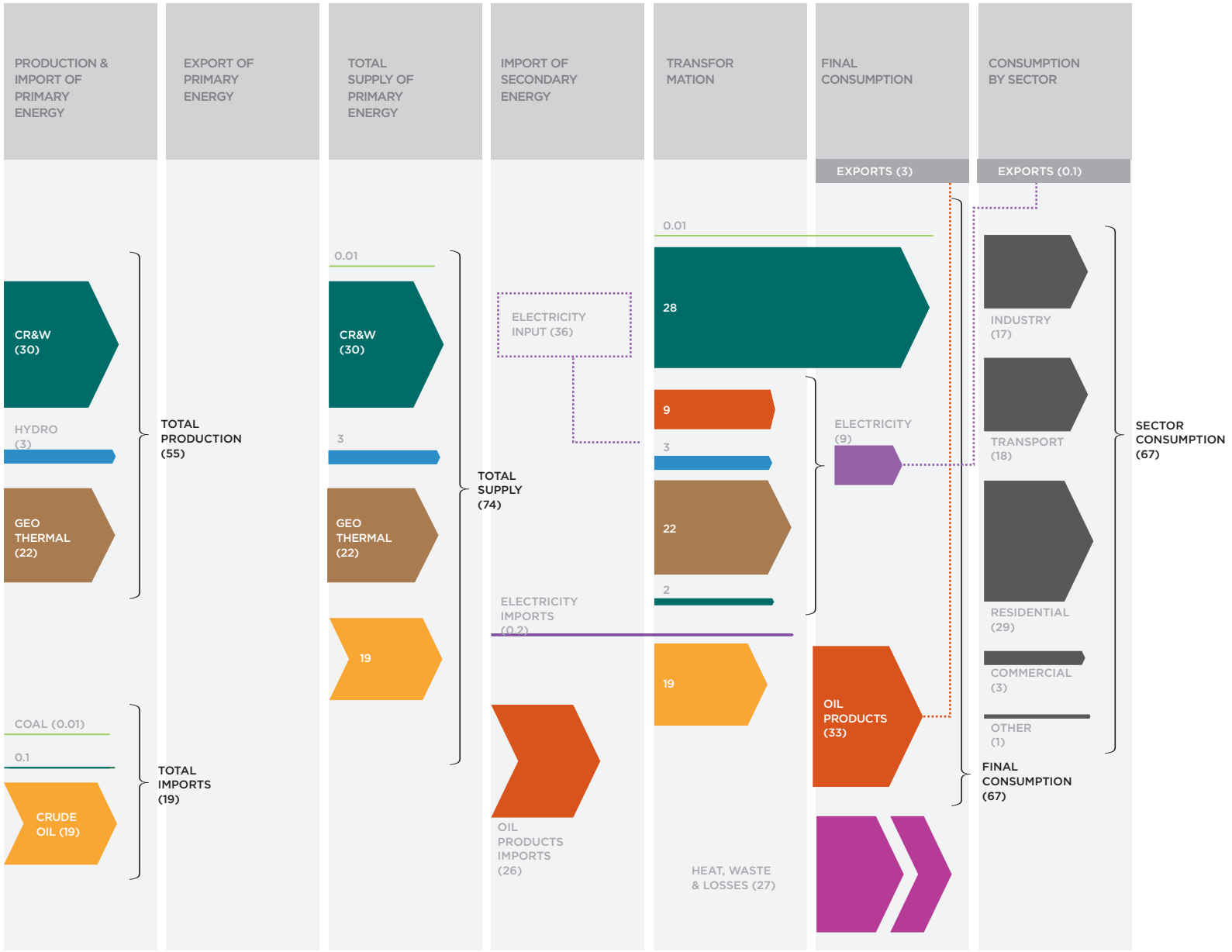
Consumption by sectors	Industry	Transport	Residential	Commercial	Others
Oil products	50.9	100	12.0	2.3	87.0
Biocombustibles	27.5	0	79.2	22.2	0
Electricity	21.6	0	8.9	75.5	13.0
Total	100%	100%	100%	100%	100%

Source: Own Calculations based on IEA Energy World Balances

2005–2008

In general, the matrix between the beginning and end of the previous decade didn't experience major changes beyond the increase in geothermal energy and hydraulic energy production. The patterns of consumption for each sector remained stable.

Energy Flow 2005-2008



(kboe/day)

Source: Own Calculations based on IEA Energy World Balances

Total Energy Consumption

This period shows a 15% increase in total consumption, moving to 100.25 kboe/day. This increase is mainly explained by an expansion of 52% in geothermal energy production, which rose from 15 to 22 kboe/day and represented 22% of total consumption. Meanwhile, renewable fuels grew 10%, reaching 30 kboe/day and remaining the main source of energy for Salvadoran consumption with 30% of the total. Imports of derivative products increased 13% to 26 kboe/day, leaving this source in second place in terms of consumption, with 26%. Meanwhile, crude oil imports fell from 20 to 19 thousand barrels per day and thus were 19% of total consumption. The hydraulic sector, with 3% of total consumption also grew significantly: 42%, moving from 2.26 to 3.2 kboe/day. Finally, coal and renewable fuel exports remained at the same level with 10 and 100 barrel equivalents per day each. .

Electricity

Maintaining the trend of the previous period, the consumption of electricity generation continued to grow, passing from 26 to 36 kboe/day. Of this total, 61% came from geothermal sources. Derivative products continued to be the second most important source, providing 9 kboe/day. As noted above, hydraulic production totaled 3 thousand barrels of equivalent per day – all for the consumption of electricity generation – while renewable fuels added 2 kboe/day. This consumption generator produced 5,533.25 GWh, of which 42% were the product of thermal processes, 33% from hydrogeneration and 23% from geothermal.

Source	Inputs (kboe/day)	%	Electricity consumption (GWh)	Electricity consumption (kboe/day)	%
Oil products	8.94	25%	2,343.75	3.61	42%
Hydro	3.20	9%	1,852.00	2.85	33%
Geothermal	21.98	61%	1273	1.96	23%
Biocombustibles	2.05	6%	64.5	0.10	1%
Total	36.17	100	5,533.25	8.53	100

Source: Own Calculations based on IEA Energy World Balances

Final Consumption by Sector

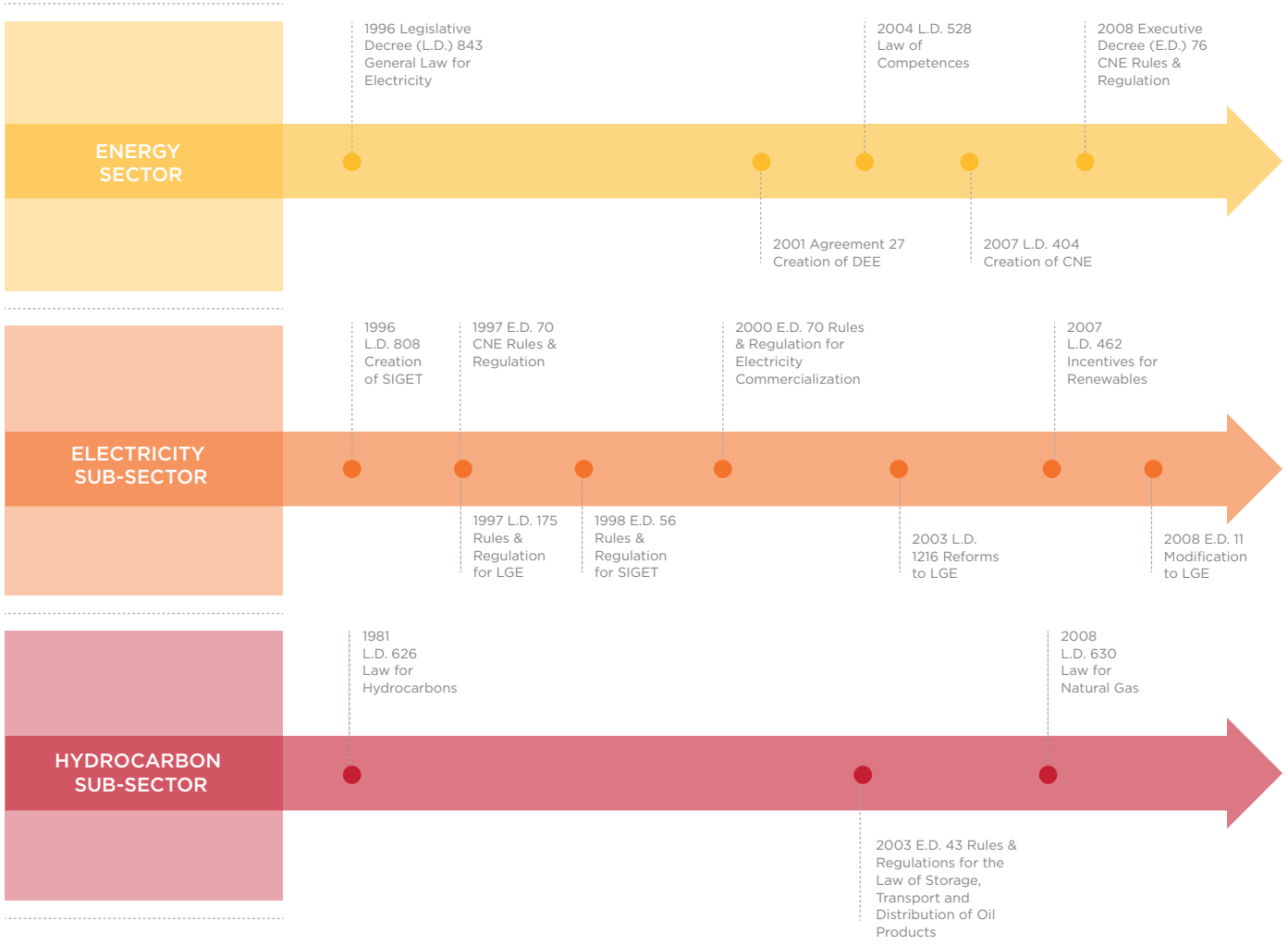
By the end of the decade, consumption patterns remained in the same order: residential (44%), transport (27%), industry (25%), commercial (4%) and others (1%). Residential users used biofuels (76.5%), derivative products (14%) and electricity (10%). The industrial sector used energy mainly as derivative products (48.7%), renewable fuels (28.7%) and electricity (22.6%). The transportation sector only used derivative products. Finally, the commercial sector consumed energy 72% in the form of electricity, 26% biomass and 2% petroleum products.

Consumption by sectors	Industry	Transport	Residential	Commercial	Others
Oil products	48.7	100	13.9	1.6	88.8
Biocombustibles	28.7	0	76.4	26.3	0
Electricity	22.6	0	9.8	72.1	11.2
Total	100%	100%	100%	100%	100%

Source: Own Calculations based on IEA Energy World Balances

Institutional Organization of the Energy Sector

Evolution of the Regulatory Framework for the Energy Sector, Electricity Sub-Sector and Hydrocarbon Sub-sector



Source: Author's work

Origin

In the beginning, the power sector in El Salvador was composed entirely of privately owned generation plants, of which the San Salvador General Electric Lighting Company (CAESS), an El Salvadoran subsidiary of the Canadian International Power Company of Montreal, was the most important[1].

The oldest hydroelectric unit is from 1908, while the oldest diesel unit is from 1912. In 1949 there were already around 200 mostly steam driven power plants that were used primarily to process food and were run on cane husks, coffee bean husks and firewood for fuel[2]. The expansion of public lighting that took place from 1916 to 1924 brought about the creation of centralized electricity service, initially formed by small hydroelectric plants and later by diesel units[3].

The first law related to the electricity sector in El Salvador was enacted in 1936. The Basic Electricity Service Law[4], Decree No. 177 of the same year, created the National Electricity Commission. Its main roles were to regulate the distribution of electricity and to record production statistics[5].

On October 3, 1945, by executive order, the Lempa River Executive Hydroelectric Commission (CEL) was created with the aim of studying the hydroelectric potential of the Lempa River to meet the power requirements of the country[6]. Three years later, in 1948, the Lempa River Hydroelectric Commission Law[7] was enacted, which gave more autonomy to the commission and expanded its powers.

One of the remarkable provisions of the 1948 law was that it exempted the CEL from complying with the stipulated provisions of the Basic Electricity Service Law of 1936. This empowered the CEL, with the approval of the Ministry of Economy, to set tariffs that would allow them to cover costs and meet obligations to their creditors.

The main law governing relevant hydrocarbon sector activities in El Salvador is called the Regulatory Law of Deposit, Transportation and Distribution of Petroleum Products[8] and it was enacted in 1970. This law empowered the Ministry of Economy through the Hydrocarbon and Mine Agency to regulate and oversee the import/export, deposit, transportation, distribution and marketing activities of petroleum products. Similarly, it has regulations relating to the construction and operation of reservoirs and tanks for hydrocarbons. It should be noted that the activities regulated by this law have been and continue to be performed by private operators.

1 International Bank for Reconstruction and Development 1963
2 International Bank for Reconstruction and Development 1970
3 International Bank for Reconstruction and Development 1949
4 The Basic Electricity Law established the General Inspection of Electricity Service (IGSE) as the first regulatory agency of the Salvadoran electricity sector. Its scope of action was limited to the financial and technical inspection of private sector companies.
5 See the Basic Law of El Salvadoran Electricity Service (D.L. No. 177 on January 8, 1936).
6 Decree of the Creation of the Lempa River Hydroelectricity Law (D.O. No. 139 on October 3, 1945).
7 Decree No. 137 of 1948.
8 Decree No. 169 of 1970.

In 1981 the Hydrocarbon Act was issued[9]. Among other things, the law gave the CEL a monopoly over activities related to the exploration and production of hydrocarbons. However, the law clarifies that these activities can be realized via operation contracts or the provision of services with private companies. In El Salvador, hydrocarbon reserves have not been discovered, which means that this regulation has not had a direct impact on the sector.

Liberalization of the Electricity Sector

Between 1980 and 1992 El Salvador suffered a civil war in which both the armed forces of El Salvador and the Farabundo Martí National Liberation Front (FMLN)[10], participated. This significantly affected the country's economy. In 1989 President Alfredo Félix Cristiani of the Nationalist Republican Alliance (ARENA) was elected, the first time in the history of El Salvador that the government peacefully turned over power to the elected opposition. Cristiani's government began a peace process that involved negotiation with the FMLN.

This peace process, led by the UN since 1990, successfully concluded with the signing of the Peace Accords of Chapultepec on January 16, 1992. Within this peaceful framework, a program for social, political and economic reforms also began. It sought to alleviate poverty and improve living standards in the country. These reforms, framed in the Economic Stabilization and Structural Adjustment Programs, included the liberalization of the exchange rate and the prices of various basic products (it did not include fuel).

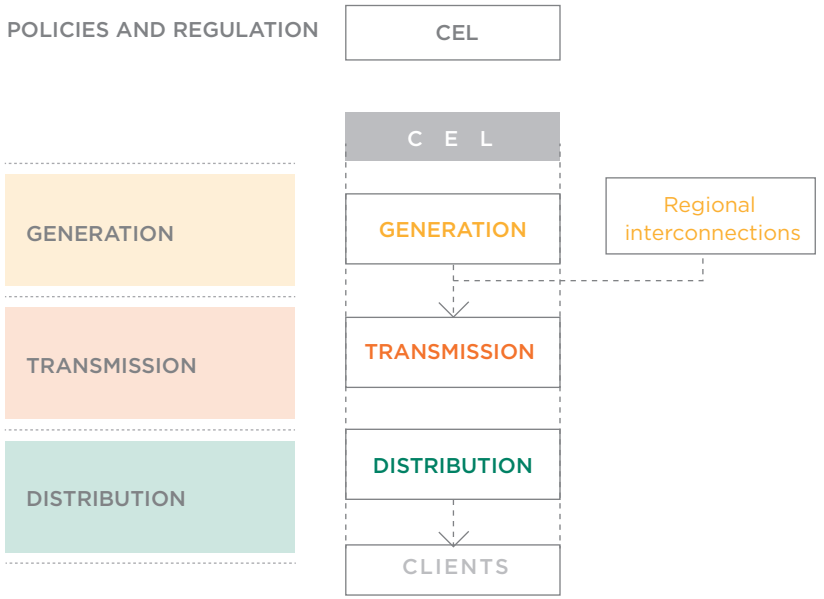
9 DDecree No. 626 of 1981.

10 United Nations Organization. Report of the Commission of Truth for El Salvador. April 1, 1993.

Electricity subsector

In 1990, the electricity subsector, as shown in Figure 1, was vertically integrated and controlled by the State through the CEL. The public company had an installed generation capacity of 650 MW, which represented 98% of the country's total installed capacity (665 MW). Of this installed capacity, 403 MW (61%) corresponds to hydroelectric, 167 MW (25%) to conventional thermal plants and 95 MW (14%) to geothermal.[11] Transmission and distribution were also controlled by the CEL.

Figure 1: Electricity sub-sector structure, 1990



Source: Author's work

11 World Bank. Power Sector Technical Assistance Project. May 31, 1991.

Hydrocarbon Subsector

The hydrocarbon subsector was regulated by the government and was operated by a private monopoly that controlled the only refinery in the country. The prices of both sectors were controlled by the Government and in general did not reflect the economic cost, which caused distortions in the economy and deficits that should have been covered by public resources[12].

During Cristiani's government, the first steps were taken to complete reforms of the energy sector because laws were introduced and some changes were made to the administrative institutions of the State. However, it is the following government, led by Alfredo Calderón Sol that made major changes in the energy sector, especially in the electricity subsector.

Calderón Sol, also a member of ARENA, succeeded Cristiani in 1994 with a legislative minority, which led him to sign a governance agreement with the FMLN. This allowed him to continue stabilization plans and adjustments started by the previous government, including the reforms to the electricity subsector.

Under the new government, via Legislative Decree No. 808 on September 12, 1996, the Superintendency of Electricity and Telecommunications (SIGET) was created as the new regulatory body. Later, with the approval of the General Electricity Law, they were given regulatory powers over the electricity subsector.

12 World Bank 2002.

The Creation of a Competitive Electricity Market

In October of 1996, after many discussions and negotiations between the Government and Congress, the General Electricity Law (LGE) was approved by Legislative Decree No. 843. The objectives of the LGE were part of article 2 and include:

- The development of a competitive market in the activities of generation, transmission, distribution and marketing.
- Free access of generating entities to the system of transmission and distribution.
- Rational and efficient use of resources.
- To deregulate generation prices, and the price of transmission and distribution should be regulated in accordance to established rules.
- Freedom of users to choose their service provider.

One of the main mandates included in the LGE was the restructuring of the CEL. Article 119 included in the transitional provisions indicated that the public company should separate its activities so that the "activities of maintaining the transmission system and the operation of the power system are carried out by independent organizations and that generation be handled by the greatest possible number of operators."[13]

To this end, the LGE determined that the powers of the SIGET, which took regulatory responsibility for the sector and created the figure of the Transaction Unit (UT), would be a private organiza-

13 Article119. Transitory Provisions.

tion responsible for the operation of any interconnected system. Among its roles are: the operation of the transmission system, the maintenance of the security system to ensure the minimum quality of services and supplies and the operation of the wholesale electricity market.[14]

In addition, it regulated the process of privatization of all the distribution companies and allowed the entry of private investors to manage geothermal plants. As a preliminary step, in 1999 the mixed economy company Salvadoran Geothermal (La-Geo) would, from that moment forward, be responsible for all geothermal plants in the country. The company was controlled entirely by the State until 2002, at which time the Italian company Enel Green Power, through a public bidding process, bought 8.9% of the shares of the mixed company.

created with the purpose of administering public funds to extend electricity and telephone services in rural areas. By 1999 the FINET had subsidized 152 million colones of consumption and had only invested 5 million colones in infrastructure[15].

Since May 2001 the FINET has also been responsible for the management of public funds to cover subsidies for electric bills given to low income consumers. Before that date, the CEL was responsible for paying that subsidy.

In 1999 the thermoelectric power plants Ajacutla, Soyapango and San Miguel, which had been previously owned by the CEL, were privatized – through two subsidiaries, Ajacutla y Generasal – to finish its sale to the U.S. company Duke Energy. At that time, those plants had an installed capacity of 305 MW and represented 38% of the country's installed capacity. This sale was made through a competitive bidding process that included eight international companies in its final stage including Exxon, AES and Iberdrola.

The next steps towards a competitive electricity market

The election of Francisco Flores in 1999, the third consecutive president from the ARENA party, signaled the continuity of macroeconomic policies initiated by Cristiani and maintained by Calderón. Flores implemented an economically orthodox program of government named New Alliance that would expand and decentralize health, water, living and educational services and reduce electricity rates and the budget deficit and promote foreign investment. In 2000, Flores announced the dollarization of the Salvadoran colon. The measure went into effect on January 1, 2001.

In 1999, in compliance with the laws of the LGE, the El Salvador Electricity Transmission Company (Etesal) was created as an independent company in charge of the maintenance of the transmission system.

In 2000 via Executive Decree No. 90 on October 21, 2000 [16] the Regulation Applicable to Commercializing Electric Energy Activities was issued with the goal of regulating electricity supply contracts. The important aspects of this regulation are:

14 General Electricity Law. Original version. D.L. No. 843 on October 10, 1996, D.O. No. 201, Volume 333 on October 25, 1996.

15 Statements made by Miguel Ángel Simán officer responsible for the FINET in 1999 for elsalvador.com.

16 Published in D.O. No. 205 on November 1, 2000.

- To allow free choice of the electricity supply company by the final user.
- To allow the final user to be served by one or more commercial companies at the same time, as long as they have a supply contract with each commercial company.

In 2001 the Electricity Power Office was created as an agency under the Ministry of Economy with the objective of managing the design of polices and strategies related to the electricity sector[17].

During the 2001-2002 period, a bidding process was developed that allowed the entry of the Italian company Enel Green Power into electricity generation. The Italian company worked with the INE to acquire an 8.5% stake in LaGeo. This was an important step in order to promote private investment in electricity generation. However, subsequent efforts by Enel to achieve the majority stake in the joint venture proved a source of controversy.

In 2003, due to the absence of a regulatory framework that would guarantee the existence of healthy competition in the electricity market, the SIGET was assigned the task of ensuring the implementation of transitional rules intended to ensure that market players submitted bids based on marginal production costs. This assignment was made via decree 1216 in May 2003 and it reformed article 3 of the LGE[18].

17 Agreement No. 27 on January 11, 2001.
18 D.L. No. 1216 on April 11, 2003, D.O. No. 83, Volume 359 on May 9, 2003.

The new roles assigned to the regulator were:

a) To ensure the protection of competition on the terms established by the LGE.
b) To order and contract studies of the market and specific consultations about technical aspects needed to investigate cases of anti-competitive practices made by agencies that develop activities referred to in Art. 1 of the LGE[19].
c) To determine the existence of conditions that ensures healthy price competition in the regulatory market system in accordance with Article 112 of the LGE
d) To order the end of anti-competitive practices.[20]
e) To resolve conflicts under its jurisdiction and apply appropriate sanctions that relate to the contents of the LGE.
f) To require the necessary information for the fulfillment of is purpose in accordance with the provisions of the LGE.
g) To report the existence of anti-competitive practices that could be seen as crimes and those arising from the relation to activities referred to in Article 1 of the LGE to the Attorney General's Office[21].

Additionally, Decree 1216 empowered the SIGET to regulate the fees charged for the use of transmission and distribution networks. It also introduced a new procedure, shorter than the previous one, for granting concessions to generation plants with a total nominal capacity of equal or less than 5 MW. Other provisions presented in the Decree are:

19 Repealed by Decree No. 528 of 2004 (Competition Law).
20 Repealed by Decree No. 528 of 2004 (Competition Law).
21 Repealed by Decree No. 528 of 2004 (Competition Law).

- Gives the SIGET the role of controlling anti-competitive practices.
- Creates the figure of the independent marketer.
- Requires authorization to remove plants from the system.
- Provides greater authority to the SIGET to regulate rates, request information, approve regulations and impose penalties for the quality of service.
- Independent marketers participate as shareholders in the UT.
- It includes the power and energy prices in the long-term supply contracts approved by the SIGET in the costs of generation transferable to rates.
- To set the spot market based on generation costs when there are no conditions to ensure competition.

Liberalization of the Hydrocarbon Subsector

There were also changes in the hydrocarbon subsector. In 2003, all the prices in the hydrocarbon chain were freed by Decree 616, with the exception of the GLP for domestic consumption. Since the liberalization of prices, the State's role was limited to conducting a weekly monitoring of the prices in service stations around the country in order to inform the population where the best prices were available.

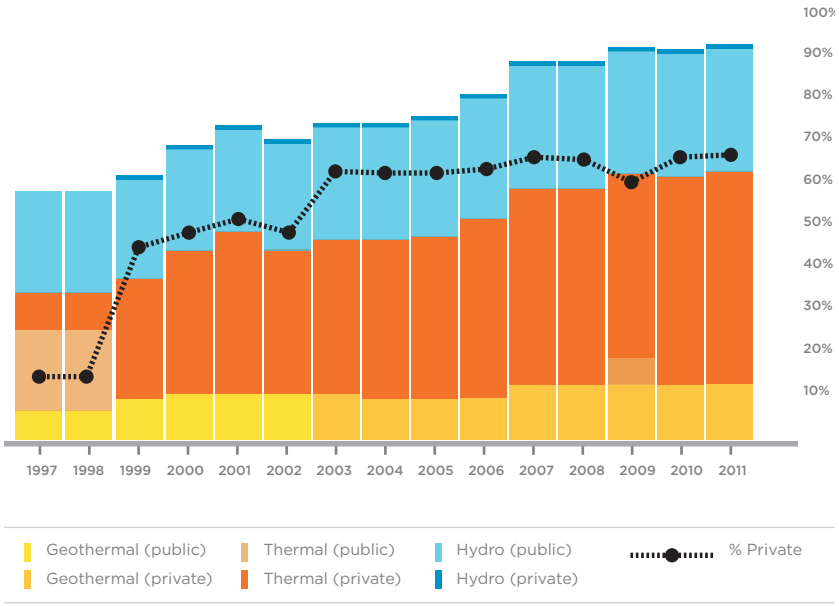
This measure resulted in reduced accumulated margins in all areas of the oil industry, moving from $0.40 to $0.34 dollars per gallon in its first three months in effect[22].

22 CEPAL 2005.

In 2004 the Competition Law was enacted[23]. This law repealed three of the seven literals included in the 2000 reform and took all powers related to the control of anticompetitive practices away from the SIGET.

These powers were transferred to the Superindendency of Competition. The Competition Law, in conjunction with the Regulation of the Commercialization of Electricity, formed the basis governing the competitive structure of the commercialization sector and set limits on market power in the distribution sector.

Graph 1. Evolution of Installed Capacity in El Salvador, 1997-2011



Source: Author's work with information from MINAE, Energy Sector Bureau

23 Decree No. 72 of 2005.

Private Participation in the Electricity Subsector

As was expected given the reforms of the electricity subsector, since 1997 there has been a rapid growth in the participation of the private sector in electricity generation. In 1997 only 15% of installed capacity was controlled by private companies, while 14 years later, in 2011, their participation reached 69% of the national total.

The growth of private participation was mainly due to the privatization of thermal power plants in 1998, the expansion of thermal capacity with private capital and the purchase in 2002 of part of LaGeo by the Italian company Enel.

Institutional strengthening in a liberalized market

The 2004 election of Antonio Saca, leader of the country's trade association, meant a change in government but not in party given that Saca was the fourth consecutively elected member of ARENA to the presidency. The election took place under the promise of continued social and democratic progress. His Government promoted foreign investment and free trade. His energy policy was conditioned by skyrocketing oil prices.

In 2005, Decree No. 232 established a system of parity for the import of GLP as an automatic mechanism for determining maximum prices in the internal market[24].

24 CEPAL 2006.

Electricity subsector

In 2006 the LGE was reformed by Decree 1018. The aim of this reform was to harmonize the work done by the SIGET with the work of the Superintendence of Competition. For this purpose it was established that the conditions of the competitive market would be determined jointly by both organizations using technical indexes to measure competition in electricity markets. However, according to the Competition Law, only the Superintendency of Competition had the power to carry out investigations related to anti-competitive practices.

That same year, in response to the rising hydrocarbon prices at the beginning of the 21st century, the National Energy Commission was created[25]. This institution was created with the aim of developing energy strategies to reduce the impact of changes in oil prices.

2007 the commission becomes permanent, becoming the National Energy Council (CNE)[26]. This organization, independent from the Ministry of Economy, was in charge of designing sector policies with a focus on the concepts of alternative energy and energy efficiency.

That same year, the Law of Fiscal Incentives for the Promotion of Renewable Energy[27], is passed, which offers the following incentives for the construction of new hydroelectric, geothermal, wind, solar and biomass generation plants:

25 Decreto Nº 72 de 2005.
26 Decree No. 404 of 2007.
27 Decree No. 462 of 2007.

- Exemption from Import Duties on machinery during the first 10 years of the project.
- Exemption from the payment of income taxes for a period of five years from the beginning of commercial operation of the project.
- Exemption from all taxes on the sale of certificates in carbon markets.

In addition, the Law of Incentives established that the SIGET, following the instructions for the National Board of Excise and Customs, is the agency responsible for ensuring the application of these provisions.

In 2008, article 52 of the LGE is amended, allowing operators connected to the transmission system, through third parties, as is the case of some marketers, to participate in the programmed market dispatch administered by the UT and to regulate the existence of pure marketers in the country's electricity market. That same year, the regulation of the CNE is decreed and it begins to perform its functions in mid-2009. .

Under the Government of Antonio Saca controversy arises over the previously referenced controlling interest of LaGeo. The minority shareholder, the Italian private company Enel, carried out, between 2002 and 2005, unilateral investments that increased the installed capacity of LaGeo by 40 MW. This allowed it to increase its shareholding[28] in the joint venture from 8.5% to 36.2%.[29] Later it presented the board of LaGeo with an additional investment plan of 127 million dollars. If this investment plan would have been carried out, as was stipulated in the partnership contract, Enel would have had 53% of the joint venture, a controlling share[30].

However, the CEL through its subsidiary company INE – Enel partner in NatGeo – does not allow them to implement their investment plan, considering that the source as a strategic resource should remain in the hands of the State.[31] The matter was brought before an international arbitrator who, in 2011, failed to rule in favor of Enel. The CEL requested the annulment of the decision in 2012 without proposing a solution for when the document was completed. Therefore, LaGeo currently remains a joint venture with Enel as a minority partner.

Hydrocarbon subsector

In addition, in the hydrocarbon subsector, the decree creating the Natural Gas Law[32], is issued, which establishes the legal conditions for the import, storage, regasification, transportation, distribution and marketing of natural gas. And it authorizes the DRHM, under the guidelines of the CNE, to perform market regulation.

28 The partnership agreement signed in 2002 between Enel and INE stipulated that any investment to increase installed capacity made by any of the shareholders would be capitalized automatically, increasing investor participation in LaGeo.

29 http://www.elsalvador.com/mwedh/nota/nota_completa.asp?idCat=47655&idArt=6230679 Statements by Guillermo Sol Bang, president of the CEL during the signing of the agreement CEL-Enel

30 http://m.laprensagrafica.com/2012/03/29/enel-no-logra-mayor-participacion-en-lageo/

31 Statements by Irving Tochez, president of the CEL in 2011 http://www.elsalvador.com/mwedh/nota/nota_completa. asp?idCat=6374&idArt=6043087

32 Decree No. 630 of 2008.

The qualification of liberal policies

The 2009 election of journalist Mauricio Funes as president marked the end of 20 years of ARENA government and was the first time that a member of the FMLN held the highest office in El Salvador. Supported by an FMLN that moved away from its guerilla past with a centrist political platform, Funes obtained 51% of the vote to beat ARENA candidate Rodrigo Ávila, the former director of the Salvadoran national police. During the campaign, the FMLN candidate promised to increase social spending, maintain the war against drug trafficking and to continue under a dollarized monetary system.

In terms of energy policy, the government of Funes made public in 2010, via the National energy Board, the main guidelines that would guide its decisions for the sector. These general objectives include: to promote the state as an actor in the development of the energy sector; to guarantee the energy supply; to reduce sector dependence on petroleum and derivatives and instead favor renewable sources; and to lessen the environmental impact of energy consumption. It also seeks to diversify the energy matrix, protect the consumer, promote energy efficiency and expand electricity coverage.

04 ENERGY DOSSIER
EL SALVADOR

IDB