ENERGY DOSSIER

01 DOMINICAN REPUBLIC

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,

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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.

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GUIDE TO ACRONYMS

CDE	Dominican Electricity Commission
CDEE	Dominican Consortium of State Electricity Companies
CECCOM	Specialized Body of Fuel Control
CNE	National Energy Commission
DCU	Right to Unit Connection
DIGENOR	Directorate for Standards and Quality Systems
EGEHID	Dominican Hydroelectric Generation Company
ETED	Dominican Electricity Transmission Company
FETE	Fund for Electricity Tariff Stabilization
GWh	Gigawatt Hour
Kboe/day	Thousand barrels of oil equivalent per day
MIC	Ministry of Industry and Commerce
MW	Megawatt
OC	Coordinating Office
OLADE	Organization of Latin American Energy
PARA	Blackout Reduction Program
PDVSA	Venezuelan Petroleum
PEN	National Strategic Plan
PES	Primary Energy Supply
REFIDOMSA	Dominican Petroleum Refinery
SENI	National Interconnected Electricity System
SIE	Superintendency of Electricity
TES	Total Energy Supply
UERS	Rural and Suburban Electrification Unit

Dominican Republic

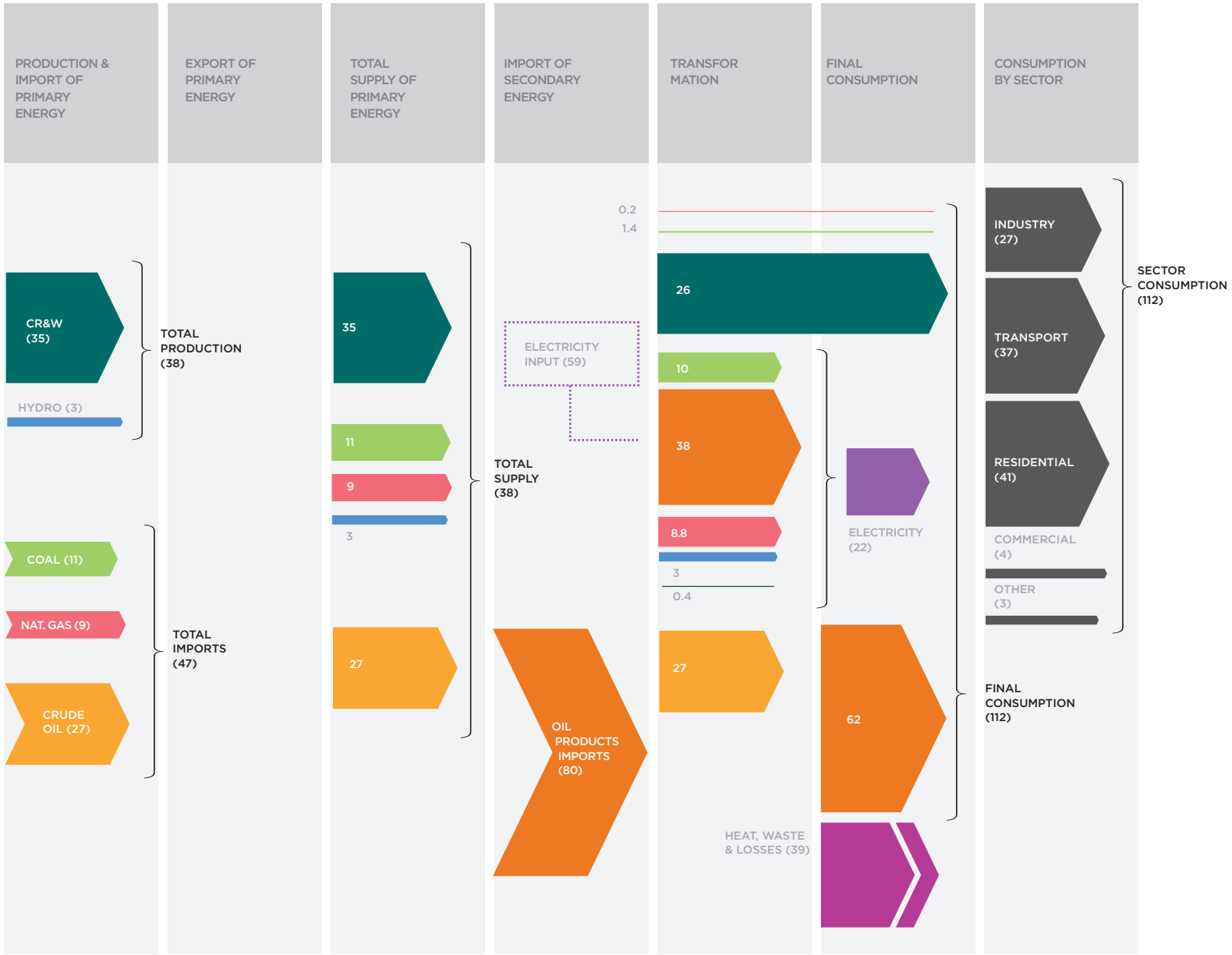
With a gross domestic product of USD 46.6 billion (2009) and an area of 48,442 kilometers squared (Km2), the Dominican Republic is the second economy in Central America and the Caribbean, except for Mexico. Its population in 2009 reached 9.8 million inhabitants, and its GDP per capita is USD 4,756.

In 2008, 50.5% of the population of the Dominican Republic was located under the poverty line and 69% of the inhabitants lived in urban areas. The country was ranked 98 of 169 countries on the human development index. It had 96.2% electricity coverage, ranking it above the Latin American average

Current Energy Sector

The Total Energy Supply (TES) in the Dominican Republic totaled 165,000 barrels of petroleum equivalent per day (kboe/day) in 2009, an increase of almost 1% over the simple average during the period from 2005-2008, which reached 164 kboe/day. This supply is made up mainly of crude oil and liquid fuels, both entirely imported. Other important sources are renewable fuels (basically firewood for rural consumption), imported coal, natural gas and hydropower, in decreasing order of magnitude.

CURRENT Energy Flow

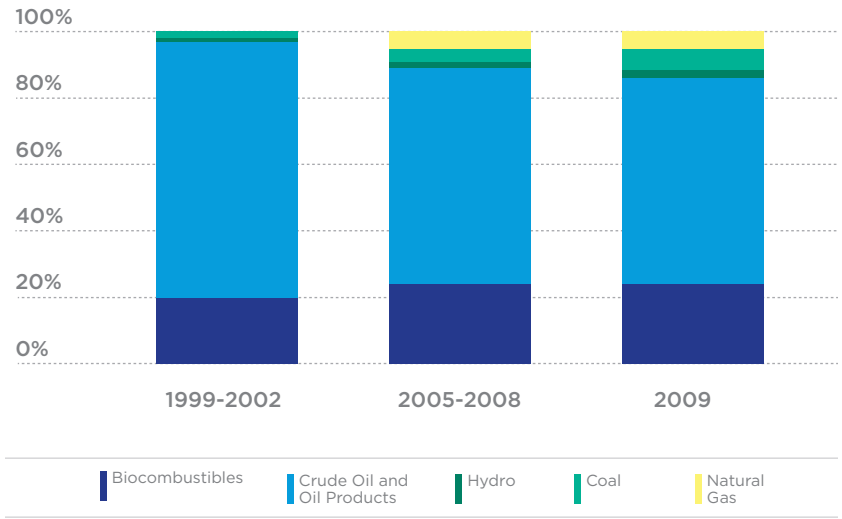


(kboe/day)

Source: Own Calculations based on IEA Energy World Balances

Out of the 165 kboe/day supplied in 2009, 107,000 came from the import of crude and liquid fuels – nearly 65% of the total supply. Between 2005 and 2008, these imports represented 67% of the TES. The next sources in terms of importance, like in the majority of countries that are at the same level of development as the Dominican Republic, were biomass and wastes. These sources totaled 35 kboe/day and represented 21% of the TES, thus maintaining their level of contribution to the TES since 2005.

TOTAL ENERGY SUPPLY



Source: Own Calculations based on IEA Energy World Balances

Coal, natural gas and hydropower are at a third level of importance. Coal contributed 11 kboe/day to the TES (6.6% of the total supply), natural gas 9 kboe/day (5.4%) and hydropower only 3 kboe/day (1.8%). In general, coal and gas increased their share of the TES slightly, representing 5.4% and 4.3% respectively between 2005 and 2008.

Domestic production

In 2009, the Dominican Republic domestically produced 38,000 barrels of petroleum equivalent per day of primary energy – keeping its level of production the same as the production average between 2005 and 2008. Of this primary domestic energy, the majority came from renewable fuels (biomass) and wastes. Production from these totaled 35 kboe/day, more than 92% of primary production, once again the same average level as during the 2005-2008 period.

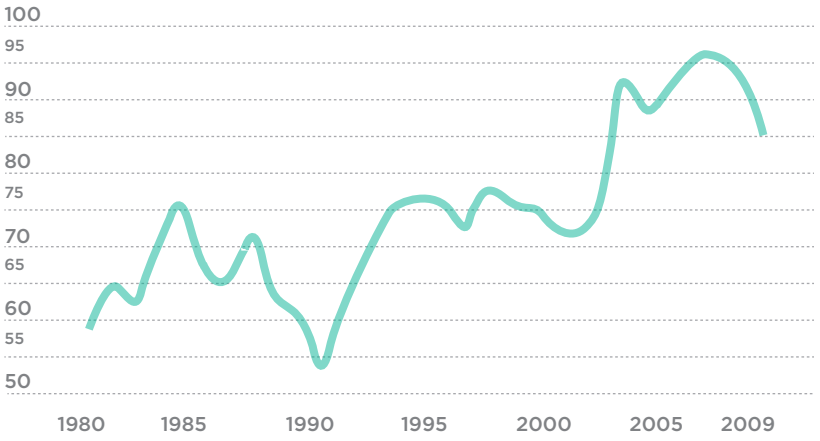
The rest of the primary production came from hydraulic energy with 3 kboe/day, the same level as between 2005 and 2008. Hydropower production was completely controlled by the Dominican Hydroelectric Generation Company (EGEHID). Today there are 15 hydropower plants in the country, which were constructed between 1950 and 2001. The largest plant in the country, Jigüey, has 98 MW of capacity and was opened in 1992.

Commercial balance of primary energy

Crude oil imports reached 27,000 barrels per day and were processed in the only refinery in they country, Refidomsa, 51% property of the

PRIMARY ENERGY PRODUCTION

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



Source: Own Calculations based on IEA Energy World Balances

Dominican state and 49% of PDVSA, the Venezuelan state oil company. This refinery has the capacity to process 35,000 barrels of crude oil per day. These imports represent 57% of the foreign primary purchases and 32% of the total primary supply.

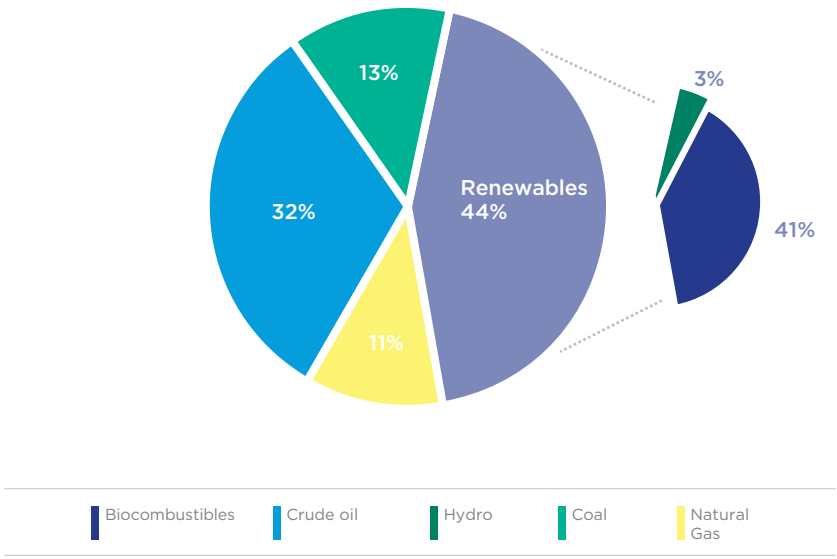
In addition to crude imports, the Dominican Republic bought 11 kboe/day of coal during 2009 on the international market, slightly above the average level between 2005 and 2008 for imports of this source. Thus, coal contributed 23% of primary imports and 13% of the total primary supply in 2009, when between 2005-2008 coal it was 16% of primary imports and 9.6% of Primary Energy Supply (PES).

Finally, the Dominican Republic imported natural gas at levels similar to coal, With 9,000 barrels per day, natural gas contributed almost 20% of imported primary energy and 11% of the primary energy supply that year. Imports of natural gas took place in Punta Caucedo, in Andrés de Boca Chica, in the east of Santo Domingo where the U.S. company AES built an import and storage terminal in 2003. Those 9 kboe/day represented an increase of 28.5% over the average of the previous period. Domestic primary energy supply

Combining domestic production of renewable energy with fuels and hydropower with imports of crude oil, natural gas and coal, the Primary Energy Supply (PES) in the Dominican Republic reached 85 kboe/day during 2009, which is 4.4% less than the primary domestic supply average between 2005 and 2008. This drop is mainly explained by the reduction in the quantity of imported crude, which moved from an average of 39,000 barrels per day between 2005 and 2008 to 27,000 barrels per day in 2009. The rest of the primary energy sources, as we have seen, maintained or slightly increased their supply.

At that time, there was a well-defined division in primary supply between hydrocarbons and renewable energy. The first represented 44% of the PES, with crude contributing 32% and natural gas another 11%. It is important to note the significant fall in hydrocarbons within the primary supply given that between 2005 and 2008 they contributed an average of 59%. Again, the reduction in crude imports explains this change.

PRIMARY ENERGY SUPPLY



Source: Own Calculations based on IEA Energy World Balances

Meanwhile, renewable sources represented another 44% of the primary supply, increasing their relative importance from the 41% they represented between 2005 and 2008. Maintaining production at the same average level as between 2005 and 2008, the increase in the relative importance of renewable energy was due almost entirely to the drop in crude in the primary energy supply. Among the renewables it is important to highlight the role of biomass, which, with 35,000 barrels of petroleum equivalent per day is the largest primary source in the country. According to OLADE, two thirds of this production is from the use of firewood as an energy source and the remaining third is from products derived from sugarcane.

The coal supply lags in importance within the primary energy supply and only reaches 13%. This is an increase of almost 4 points above the average level between 2005 and 2008 in its participation in the PES. It is also explained by the fall in crude imports between 2005-2008 and 2009.

Electricity

Installed capacity

According to OLADE, at the end of 2009, the Dominican Republic had 2,992 MW of installed capacity for electricity generation. This generation capacity came mainly from thermoelectric generation, which represented 82.5% of the installed total with 2,469.23 MW. The rest was made up of hydroelectric generation, which totaled 523.15 MW at the end of 2009.

Installed Capacity (%)	2000	2005	2009
Total Renewabels	14.7	14.9	17.5
Hydroelectric	14.7	14.9	17.5
Non-hydroelectric	0.0	0.0	0.0
Thermoelectric	85.3	85.1	82.5
Total	100	100	100

Source: OLADE

As the table shows, the participation of installed capacity from thermoelectric generation has fallen slightly since 2000, dropping 2.8 percentage points. Although there was an increase of 6% in thermoelectric capacity, the increase of almost 30% in hydroelectricity explains the change in the composition of installed capacity in the country. Thanks to this significant increase – rising from 400.5 MW in 2000 to 523.13 MW in 2009 – the hydroelectric source increased its participation in installed capacity from 14.7% to 17.5%.

Input to electricity generation

Of the 59 kboe/day intended for electricity generation, a little more than 38,000 came from liquid fuels, which represented 64% of the total. During 2009, other important sources of electricity generation were coal, with almost 10 kboe/day and natural gas with 8.7 kboe/day. These two sources thus represented 16% and 15% respectively of input to electricity generation. All the hydraulic energy produced in 2009 was intended for electricity generation, 3 kboe/day. Finally, 400 bepd from renewable fuels and wastes were used to generate electricity.

Dominican Republic	2005-2008		2009	
Inputs to electricity (kboe/day)	**61.6**	**100%**	**59.3**	**100%**
Oil products	43.3	70%	38.1	64%
Coal	8.3	13%	9.6	16%
Natural gas	6.6	11%	8.7	15%
Renewables	3.4	6%	2.9	5%

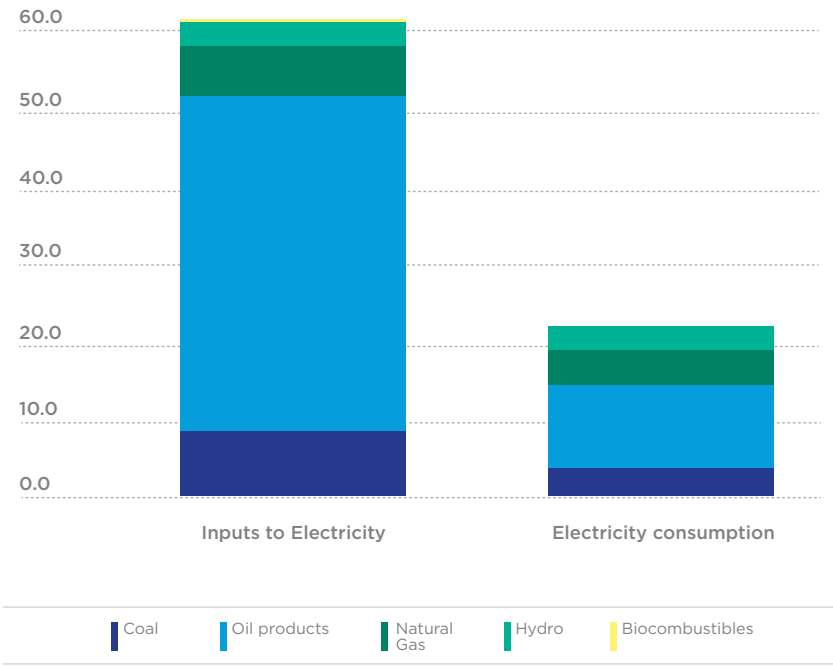
Source: Own Calculations based on IEA Energy World Balances

It should be noted that coal and natural gas significantly increased their contribution to electricity generation. Coal moved from 13% of input to 16% while natural gas increased 4 points from its average of 11% between 2005 and 2008. However, the most important change was the reduction in the contribution of liquid fuels to electricity generation. These dropped from an average of 43.3 kboe/day between 2005-2008 to the 38.1 kboe/day described above. Along with an increase in inputs from other sources, this reduction results in a decrease in the relative importance of liquid fuels within electricity inputs, dropping 6 points from the average of 70% between 2005 and 2008.

Electricity matrix

Electricity production in 2009 reached 14,982 GWh, which contributed 90% of the total. This contribution was divided between three main energy sources: liquid fuels with 9,533 GWh and 64% of the total; coal with 13% and 1,939 GWh generated; and natural gas with 2.17 GWh generated and 13% of the total. Hydropower contributed the remaining 10% with 1,464 GWh.

ELECTRICITY MATRIX (KBOE/DAY)



Source: Own Calculations based on IEA Energy World Balances

This generated electricity was distributed 40.7% in the industrial sector during 2009, with close to 33% going to residential consumption. These patterns of distribution for industrial and residential consumption have generally stayed the same since 2005. It is important to mention the reduction in electricity distributed to the commercial sector, which moved from 19.4% between 2005 and 2008 to 15.3% in 2009. Another change that should be highlighted is the increase in electricity distributed to other sectors, passing from 6% between 2005-2008 to 11% during 2009.

Electricity Generation (GWh) 2009	14,982	100%
Coal	1,939	13%
Oil products	9,533	64%
Natural gas	2,017	13%
Hydro	1,464	10%
Biocombustibles	29	0.002%

Source: Own Calculations based on IEA Energy World Balances

Secondary balance and consumption

Secondary energy balance

The Dominican Republic doesn't have sufficient refining capacity to supply the derivatives demand of its economy given that Refidomsa only contributes around 25% of the liquid fuel needs in the country. This obligates the country to import large amounts of derivative products, which in 2009 reached 80 kboe/day, 13% higher than the average between 2005 and 2008.

Final consumption by sector

Energy consumption in 2009 totaled 112 kboe/day, the same level that it averaged between 2005 and 2008. This use was divided almost equally in three sectors of the Dominican economy: residential, transportation and industrial. The first used 41 kboe/day (36.6% of the total), mainly as biomass (44% of its total), petroleum derivative products (38.2%) and electricity (17.8) and didn't experience changes in consumption since the average between 2005-2008.

Dominican industry consumed 24% of the total with 27 kboe/day, thus registering a slight increase of 1 kboe/day since 2005-2008. Of these, 33.7% were as electricity, 30.6% as renewable fuels, 29.6% as liquid fuels with 5.4% from coal and only 1% from natural gas. The commercial sector, with 4,000 bep consumed per day and representing only 3.5% of final consumption, depended 77% on electricity and 23% on derivative products for its energy necessities. Other sectors, totaling 3 kboe/day of consumption, used 84% electricity and 16% liquid fuels. Commercial activity thus shows a slight decrease in final energy consumption from the 2005-2008 average while other sectors stay the same during this period.

Institutional Organization of the Energy Sector

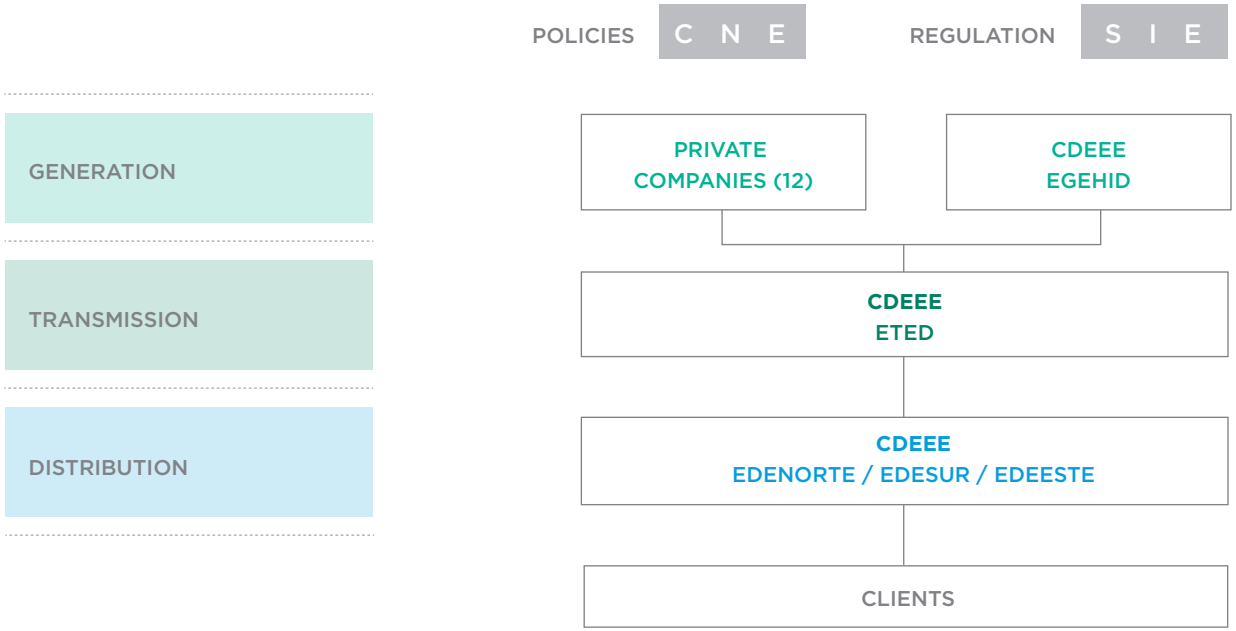
Institutional Structure

The National Energy Commission (CNE) is responsible for designing policies and is the main public agency involved in the Dominican energy sector. In the hydrocarbon subsector, regulation is the responsibility of the Ministry of Industry and Commerce (MIC). In the electricity subsector, the regulatory body is the Superintendency of Electricity (SIE).

The most important participant in the electricity subsector is the Dominican Consortium of State Electricity Companies (CDEEE), which includes the only transmission company, the three distribution companies, the monopoly on hydropower (with an installed capacity of 525.5 MW) and the only completely public thermal generation company (1.9 MW). The rest of installed capacity (thermal generation) is distributed among 12 private and mixed companies (the State has a 49% share) that have an installed capacity of 2,434.2 MW, which represents 82.3% of the total in the National Interconnected Electricity System (SENI). Electricity rates to final consumers are fixed monthly by the superintendence.

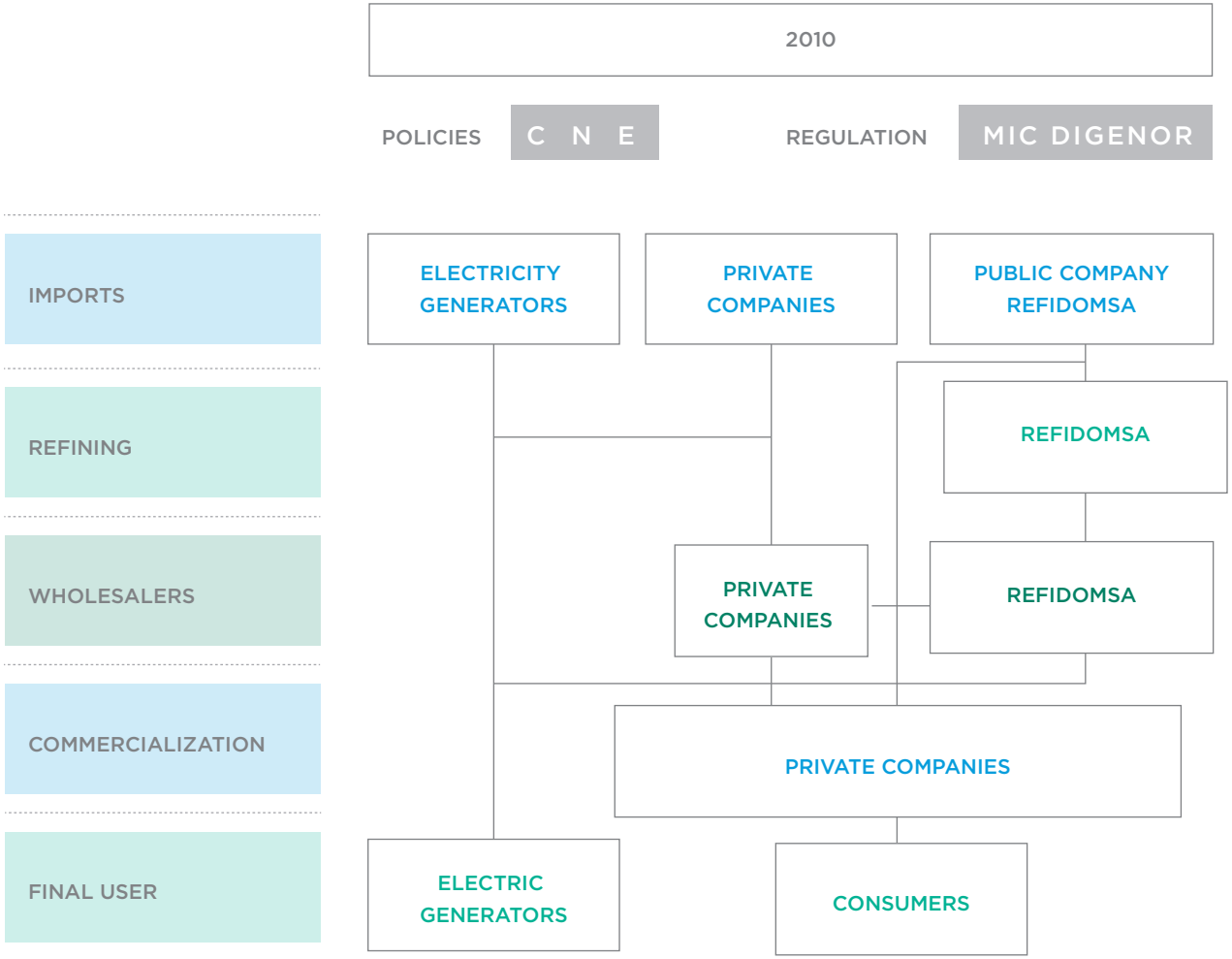
In the hydrocarbon subsector, the State participates in 51% of the only refinery in the country REFIDOMSA, which has a capacity of 35,000 bbl/day and supplies approximately 25% of the local fuel demand. Private companies control transport and marketing. Fuel sale prices are fixed weekly by the MIC.

Electricity Sub-Sector Structure in Dominican Republic, 2010



Source: Author's work based on information from ECLAC, SIE, CDEEE, OLADE and IDB

Hydrocarbon Sub-Sector Structure in Dominican Republic, 2010



Source: Author's work based on information from ECLAC, SIE, CDEEE, OLADE and IDB

Formulation of policies in the energy sector

Energy sector policies are currently defined by the National Energy Commission (CNE), created in 2001 by the General Electricity Law. The commission is headed by the Secretary of Industry and Commerce and includes several secretaries of State such as Finance, Agriculture, Environment, the governor of the Central Bank and the director of the Dominican Institute of Telecommunications.

The CNE is responsible for developing and coordinating projects of legal and regulatory rules, proposing and adopting policies and standards, preparing indicative plans, proposing them to the Executive and ensuring compliance, promoting investment decisions in coordination with those plans and advising the Executive.

Following the guidelines of the General Electricity Law, in 2004 the CNE presented the National Energy Plan (PEN) 2004-2015. The PEN defines energy policies in the country until 2015. The main objectives are: 1. To ensure the security and efficiency of the supply; 2. To promote efficient management of demand and rational energy use; 3. To develop national energy resources; 4. To reduce energy system vulnerability and external supply; 5. To increase coverage and improve the quality of energy service in rural and semi-rural communities; 6. To provide an appropriated institutional, legal and regulatory framework.

Regulator

In the Dominican Republic there is no agency dedicated to regulating the whole energy sector. The Superintendency of Electricity (SIE) was created to regulate the energy subsector (General Electricity Law). In the hydrocarbon subsector, the main agency in charge of regulation is the Ministry of Industry and Commerce (MIC), which controls the Hydrocarbon Directorate, the Directorate of Rules and Systems Quality (DIGENOR), the Specialized Body of Fuel Control (CECCOM) and the General Directorate of Mining. In this subsector, however, other State institutions participate in regulation like the Ministry of Finance, the SIE and the Ministry of Environment and Natural Resources, among others.

The Superintendency of Electricity (SIE), like the CNE, was created by the General Electricity Law in 2001. Its creation includes an autonomous body with its own assets that has a directory whose members are nominated by the CNE and must be ratified by the National Congress. Among the main functions of the SIE are to:

- Set fees and tools subject to regulation and to regulate the rate levels of companies.
- Monitor and supervise all activities related to the electricity market. In particular, to verify compliance with quality and continuity of supply, environmental protection, facility security and other conditions of efficiency of services for users.
- Monitor electricity market behavior with the goal of avoiding monopoly practices in subsector companies that operate in a competitive environment.

- Apply fines, penalties and give warnings to licensees.
- Analyze, process and send the recommendation to the CNE about requests for definitive concessions to install electricity generation, transmission and distribution projects.
- Supervise the installation of electricity generation, transmission and distribution projects.
- Gather technical, economic and statistical information about electricity companies, from auto-producers, co-generators and their operating organizations.
- Arbitrate the resolution of conflicts between participants in the electricity subsector.
- Provide the Commission and its executive director the information requested and required in order to fulfill its duties properly.
- Authorize all licenses to practice local electricity service such as monitoring its performance.
- Preside over the Coordinating Agency (OC) with the right to cast a vote in the case of a tie.
- Oversee the operation of the Coordinating Agency.

The Ministry of Industry and Commerce (MIC) through the Directorate of Hydrocarbons is partially responsible for regulating the hydrocarbon subsector in the country. Its main functions include establishing weekly fuel prices and monitoring the implementation of policies and regulations that govern the hydrocarbon market. In addition, under the MIC is the Directorate General of Rules and Systems Quality (DIGENOR), which is responsible for controlling fuel quality and the Specialized Body of Fuel Control (CECCOM), which was created to enforce regulations related to security and control in the process of fuel distribution and marketing.

Other State institutions also have some regulatory activities in the hydrocarbon subsector. Among those are: (i) the Ministry of Finance and its Directorate of Customs and the Department of Fuel Control; (ii) Ministry of Environment and Natural Resources; (iii) Dominican Oil Refinery; (iv) Central Bank, in the sub-department of importing petroleum and its derivatives; (v) the Dominican Electricity Corporation; and (iv) the Superintendency of Electricity.

Generation

	Installed Capacity
Hydroelectric	17.7%
Solar & Wind	n.a.
Thermoelectric	82.4%
Geothermal	n.a.
Main State-Owned Company	CDEEE 17.7%
Private Participation	Allowed
Requirements	Minimal
Registrations	12 companies
Vertical integration	Partially permitted[a]
Fiscal Incentives	
(a) Equipment	Only for renewable energy sources
(b) Fuels	Zero taxes on transactions[b]
(c) Small generators	Concession free
Pricing politics	
Contracts market	Open pricing via bidding
Spot market	Price = Marginal Cost (regulated)

Transmission

Company	ETED
Ownership	State
Market	Monopoly
Functions	Operation of the SENI is tasked to the Coordinating Organism (OC)
Pricing policy	Partially regulated
Private participation?	No
Retailers	n.a.
Large consumers	n.a.

Distribution

Companies [c]	EDESUR (33.5%)
	EDENORTE (27.9%)
	EDEESTE (27.8%)
National coverage[d]	96.20%
Market	Regional monopolies
Private participation?	No
Concessions	n.a.
Subsidized users	< 300 Kwh[e]
Pricing policy	Regulated

Regulator	Superintendencia de Electricidad (SIE)
Members of the board	3
Appointment Process	Named by the executive and approved by the National Congress

Source: CEPAL, SIE, CDEEE, OLADE, IDB and own calculations

a. Allowed for generation by distribution companies but only up to 15% of system demand. Only CDEEE has vertical integration
b. According to Law 557-05
c. Electricity withdrawals in 2010
d. According to OLADE figures for 2010
e. Depending on the fuel price levels it is possible to see subsidies in tariff blocks higher than this level.

Description of the electricity subsector

Currently the electricity subsector in the Dominican Republic operates under the legal and institutional structure designed in the General Electricity Law (125-01) and its subsequent modifications and the Law of Renewable Energy Incentives and Special Systems (57-07).

Among the most important provisions of law 125-01, its rules and subsequent reforms are:

- t limits the vertical integration of companies in the electricity sector, with the exception of those that generate electricity using renewable fuels and distribution companies that participate in the capitalization process.[1]
- It allows concessions of up to 40 years for those interested in participating in the business of electricity generation or distribution. Isolated electricity systems with a demand of less than 2 megawatts (MW) won't need concessions.
- Incorporates monetary compensation (toll) for the use of transmission lines.
- Establishes that distribution companies are obligated to supply electricity service to all those who ask in the three days following the request.
- Establishes that the price system for electricity should generally be free and that it will only be subject to electricity rate regulation for regulated users in the concession areas of distribution companies.
- Establishes that electricity sales by contract should not exceed 80% of the demand of the interconnected electricity system, which guarantees that the spot market should be at least 20% of total system consumption.
- Incorporates jail time from 3 days up to 3 years for people that commit "electricity fraud."

Among the most important provisions of the Law on Renewable Energy and Special Systems 57-07 are:

- Give priority to renewable energy generation companies in the order of withdrawing electricity.
- Exempts renewable energy electricity companies from the obligation of offering their generation to the wholesale market, but they don't have the right to sell production volume at the marginal prices of electricity production.
- Allows the CNE to establish a mandatory fee for the total electricity market and/or fuels for energy from renewable sources or biofuels.
- Establishes tax incentives for all energy production and sales projects using renewable sources, including the producers of biofuels, as follows:
  - 100% exemption from import taxes on all types of equipment.

1 The companies that participate in distribution can be owners of generation facilities as long as the capacity doesn't exceed 15% of the demand.

- Exemption from income tax (for 10 years no past 2020) to all income related to the activity.

- Reduce external financing by half, from 10% to 5%.
- Introduce a tax credit for self-producers that will be equal to 75% of the cost of the investments made.
- Create a financing mechanism with CNE funds at low interests rates for community projects where renewable energy sources are developed.
- Made it possible for companies engaged in activities related to renewable energy to negotiate with certified parties to reduce pollution emissions according to the "Kyoto Protocol."

National Interconnected Electricity System

According to article 2 of the General Energy Law, the National Interconnected Electricity System (SENI) "is the set of installations of electricity generation units, transmission lines, electricity substations and interconnected distribution lines together, which allows electricity generation, transport and distribution under the operations programming of the Coordinating Body."

The Coordinating Agency (OC) is an independent organization that plans and coordinates the operation of the National Interconnected Electricity System of the Dominican Republic and determines the economic transactions among agents. The administrative authority of the OC is the Coordinating Council, formed by five members, four of whom represent companies and institutions of the state, such as the SIE, who presides over the council. In addition, there is a representative from EGEHID, one from ETED, one from a group of distribution companies and one from the private electricity generation companies.

The main functions of the OC are: (i) to plan and coordinate the operation of the agents of the SENI; (ii) to ensure the sale of stable power from System generation units; (iii) to calculate and evaluate energy transfers produced by this organization; (iv) to facilitate the exercise of the right of way on transmission lines; and (v) to create reports for the SIE and the CNE.

The most important participant in the SENI is the Dominican Corporation of State Electricity Companies (CDEEE). In December 2010, this conglomerate of state companies controlled 17% (525.1 MW) of installed generation capacity, 100% of transmission and 100% of distribution. Private or mixed companies participated exclusively in generation where they accumulated 82.3% (2,434.5 MW) of installed capacity.[2]

Table 1: Distribution of electricity generation capacity, 2010

Sources	Public	Private	Mixed	Total
Primary				
Hydro	17.7%	n.a.	n.a.	17.7%
Secondary				
Thermal	0.1%	55.1%	27.2%	82.3%
Total	**17.7%**	**55.1%**	**27.2%**	**100%**

Source: Coordinating Organism and own calculations

2 Figures provided by the 2010 Annual Report of the Coordinating Agency.

The CDEEE is made up of five companies and a functional entity. In terms of generation, it relies on EGEHID, which is responsible for hydropower generation; in transmission it has the ETED which controls the transmission monopoly; in distribution, there are three companies: EDESUR, EDENORTE and EDEESTE that distribute to the majority of the final users in the system. In addition, under the control of the CDEEE is the Rural and Suburban Electrification Unit (UERS), which coordinates the initiatives to provide access in rural and suburban areas.

Generation

In the Dominican electricity system there are currently 12 private or mixed companies dedicated exclusively to generation. All of them produce electricity from thermoelectric plants. Table 2 shows the distribution of technologies and the fuel used by the private sector for generation. They Hydrocarbon Law does not establish import taxes for hydrocarbons used in electricity generation.

Table 2. Distribution of installed capacity according to technologies and fuels in the private generation plants, 2010. (MW)

	Fuel Oil No. 6	Fuel Oil No. 2	Natural gas	Coal	Total
Combined cycle		485.0	319.0		**804.0**
Diesel engines	691.4				**691.4**
Gas turbines		100.0	236		**336.0**
Steam turbines	289.5				**603.2**
Total	**980.9**	**585.0**	**555.0**	**313.6**	**2,434.5**

Source: Coordinating Organism and own calculations

According to current legislation, prices in the wholesale electricity market should be determined freely among parties. Law 112-00 stipulates that the spot market should supply at least 20% of the energy and power demand, while long-term contracts should supply no more than 80%.

The price paid on the spot market should be equal to the marginal short-term cost[3] of generation and the marginal cost of power.[4] In cases where there is electricity rationing, the price paid should be equal to the cost of shortage or the highest short-term marginal energy cost,[5] which is determined annually by the SIE using a formula. Prices on the contract market should be determined by public bidding, which is regulated by the SIE.

In practice, electricity prices paid by distribution companies are determined mainly by long-term contracts that were signed in 2011 under the "Madrid Agreement," most of which are valid until 2016. A study contracted by the SIE[6] calculates that in August 2010, 91.3% of electricity purchases were made under these contracts. The remainder (8.7%) were purchased on the spot market at a price averaging 27% higher than the price stipulated in the contracts. This price, however, was mainly determined by the SIE by setting the cost of shortages.

3 This is the variable cost needed to produce an additional unit of energy taking into account the demand and the generation park available.

4 It is the unit cost of increasing the installed generation capacity of Peak Power.

5 The cost incurred by customers when energy is not available and they have to obtain it from alternative sources; the economic loss arising from the lack of production and/or sale of goods and services and the loss of well being due to decreased life quality, as in the case of the residential sector.

6 INECON. Determination and adjustment of tariffs for electricity supply to regulated clients (technical tariff) and design of a progressive implementation scheme. March 2011.

During certain hours it is not possible to satisfy the demand given that some generation companies aren't willing to produce energy at costs set by the SIE. However, the regulatory body has the power to force some of them to operate. Generators that have variable costs higher than the highest values set by the SIE are compensated with a figure for the "compensation for forced operation." This basically compensates the generation units for the difference in costs.

Transmission

Electricity transmission in the Dominican Republic is a state monopoly run by the Dominican Electricity Transmission Company (ETED). In 2010, ETED had 435 high voltage lines (69 Kv and 138 Kv) with a total extension of 3,634 km and 254 substations. The cost of operating the lines and the substations used for transmission are charged to the generators based on a transmission fee.

The payment that each generator makes monthly to the ETED is the product of multiplying the Right of Unit Connection (DCU)[7] by the Firm Power of the agent. This value is calculated based on several parameters such as the Toll Unit (Unit Value of the Transmission Toll), Rights of Use and peak power. The main parameter for calculating the payment from SENI agents to the ETED is the Unit Value of Transmission Toll, a figure that was established as 0.006 USD/KWh by the SIE in 2001. Thereafter this value has been indexed annually for the inflation (CPI) of the United States as long as this index doesn't exceed 2%. By September 2011, the indexed value of this parameter stood at 0.0068 USD/KWh. The Rights of Use consist of Rights of Power Use and Rights of Energy Use that are calculatWed from the energy balances of the SENI during a given period.

Distribution

As has been explained previously, three state companies are responsible for the distribution of electricity to final users. These three companies are EDESUR, which until December 2010 withdrew 33.5% (4.018,9 GWh) of the energy produced in the SENI and had 27.81% (523.136) of the clients in the interconnected system; EDENORTE, which withdrew 27.9% (3.354,2 Gwh) and served 38.83% (730,337) of users; and EDEESTE, which during the same period withdrew 27.8% (3.337,7 Gwh) of the energy produced and supplied 33.4% (627.546) of the total number of consumers. The executive appoints its administrative authorities.

The SIE determines the monthly tariffs applied and indexed; the difference between the two tariffs equals the amount of the subsidy paid to distributors by the FETE. Although the legislation only includes a subsidy for residential consumers in the tariff category BTS1, by September 2011 all the tariffs charged to final users had a subsidy that ranged from 10.4% for users with average voltage supply (MTD1) to 59.3% for users with a low tension connection and monthly consumption below 300 KWh (BTS1). In this same month, the amount paid by FETE to distributors as a consequence of the subsidy was approximately USD 23.5 million.

In 2009 a program of electricity subsidies called Bonoluz was introduced. This program, which is run by the Office for the Coordination of Social Policies, subsidizes up to 100 KWh for users that meet the requirements established in the System of Beneficiaries. This subsidy is paid through the solidarity Card.[8]

7 DCU formula for calculation = [(Unit Fee x total energy withdrawals) Right of Use] / Peak Power. In September 2011 the DCU paid by agents of the SENI was 3.17 US$/Kwh.

8 Electricity Sector Plan of Action 2010-2015. Government of the Dominican Republic. December 2009.

Hydrocarbon Sector Institutional Matrix, 2011

Import		Transformation/Refining		Commercialization	
Main State Company	Refidomsa	Company	Refidomsa	**Oil products**	
Ownership	51% Dominican Republic.	Ownership	Public	Electricity generation (40.7%)	Private electricity generators
Private Share	49% PDVSA	Owner	51% Dominican Republic PDVSA 49%	Total gas stations (59.3%)	640
				Companies	Propagas Puma Sunix - GB Group Sol Group
Importers by product		**Crude Oil**		**LPG**	
Crude oil	Refidomsa (100%) Falcondo[f] / Xstrata	Refining capacity	34,400 b/d	Total bottlers	850
Oil products	Refidomsa EGE Haina Grupo Propagas Other private generators	Market share (2011)[g]	25%	Consumption in tanks	Homes
		Oil products:[h]	Regular gasoline (22,1%) Diesel Oil (26,6%) Jet fuel (17%) Fuel Oil (30,8%) LPG (3,5%)	Transport	Public and private transport
Natural Gas	AES	**Natural gas**		**Natural gas**	
LPG	Grupo Propagas EGE Haina	Company	AES Dominicana	Electricity generation	AES Falcondo / Xstrata
		Ownership	Private	Transport (CNG and LNG)	Public and private transport
		Infrastructure	Regasification terminal	Pricing policy	Regulated
		Capacity	160.000 m^3	Subsidies:	LPG
		Market share	100%	Fiscal incentives	
				Fuel tax exemptions by Law 112-00	LPG and fuels for electricity generation and construction

Regulator	Ministry of Industry and Commerce (MIC) – Hydrocarbons Bureau, Quality Systems and Regulation Bureau (DIGENOR), Specialized Control Body for Fuels (CECCOM) and the General Bureau of Mining
Appointment process	Open appointment by the President of the Republic
Financing	Nation's ordinary budget

Source: MIC, CNE and current legislation

f. Falcondo is a mining company with a crude oil refinery that supplied its energy requirements. It does not import crude oil since 2008
g. Figures from IEA. Own calculations.
h. Source: ATLAS Marine Caribbean, Inc, Hydrocarbon Trade in Dominican Republic, March-April 2009.

Description of the hydrocarbon subsector

The Constitution approved on April 26th of 2010 stipulated that non-renewable natural resources are the nation's heritage, but it allowed particular individuals to participate in exploration and exploitation activities of those resources.

The Dominican Republic is not a country that produces hydrocarbons; all the fuels used in its territory are imported. The Dominican State is a 51% partner of the only refinery in the country (REFIDOMSA), while the other 49% is controlled by the PDVSA, the Venezuelan State oil company. The refinery has an installed capacity of 35,000 bbl/day,[9] which represents approximately 25% of the country's fuel needs. The rest of the fuels are imported by the private sector.

The fuel sales price is determined weekly by the MIC based on international hydrocarbon prices and the type of official change set by the Central Bank. As has been referenced previously, fuels used for electricity generation are exempt from paying taxes.

Six private, foreign capital operators control the marketing of oil derivative products. The transport of fuels to wholesale areas is controlled by transportation units that are grouped by the Union of Drivers and Association of Owners of Tanker Trucks. The number of tanks is regulated by the MIC.

9 CNE. National Energy Plan 2004-2015. July 2004.

Energy Sector Evolution

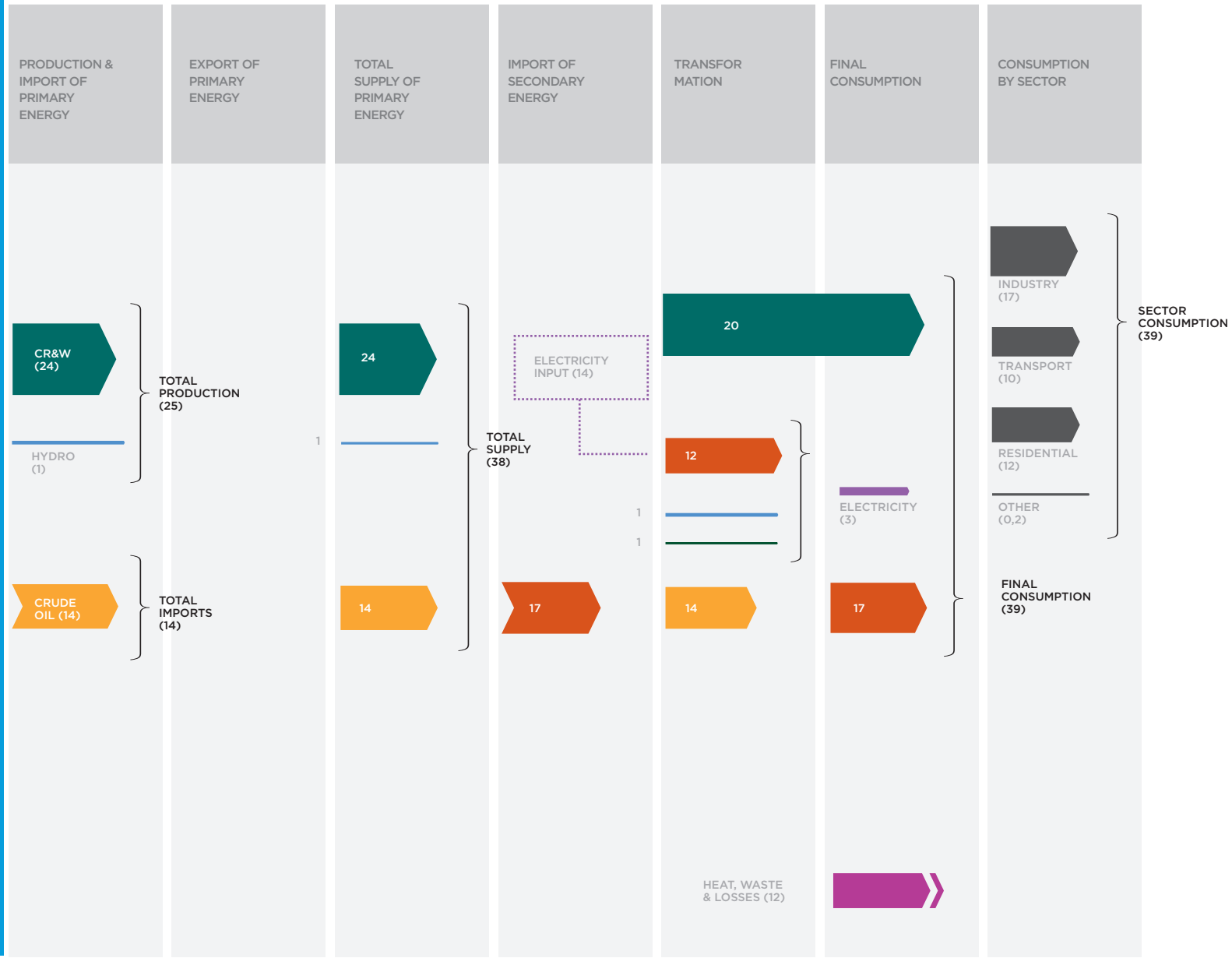
Evolution of the Energy Matrix 1971 - 2008

1971–1974

At the beginning of this historic analysis, it was clear that 40 years ago, the energy matrix of the Dominican Republic relied essentially on two energy sources: hydrocarbons and biofuels, with very slight participation from hydropower.

Energy Flow 1971–1974

(kboe/day)



Source: Own Calculations based on IEA Energy World Balances

Total energy consumption

Between 1971 and 1974, total energy consumption totaled 56,000 barrels of petroleum equivalent per day (kboe/day), of which 55% were crude imports and derivative products. The Dominican Petroleum Refinery, S.A. (Refidomsa), which opened in 1973, controlled the 14 kboe/day of crude imports. Behind that are renewable fuels with 24 kboe/day and 43%. According to OLADE, 54% of this total is firewood. The small contribution of hydropower, 1 kboe/day, came from the following plants: Jimenoa with 8.4 MW of capacity, Las Damas with 7.5 MW and Tavera with 96 MW, all opened in 1973.

Electricity

Between 1971 and 1974 13.4 kboe/day were consumed to generate electricity. Liquid fuels represented 87% with 12 mbd, hydropower contributed 7% and renewable fuels another 6%. The losses from electricity production and transmission were massive given that final electricity consumption (2.7 kboe/day) equaled 21% of input (14 kboe/day), which represented a significant loss of 79% in generation.

During this period, 1,791.75 GWh of electricity were generated. This came from 67% liquid fuels. Hydropower contributed 536 GWh, which is 30% of total generation. Finally, the use of liquid fuels contributed the remaining 3% with 59 GWh.

Source	Inputs (kboe/day)	%	Electricity consumption (GWh)	Electricity consumption (kboe/day)	%
Oil products	11.6	87	1,196.75	1.83	67
Hydro	0.9	7	536.00	0.82	30
Biofuels	0.8	6	59.00	0.08	3
Total	13.4	100	1,791.75	2.73	100

Source: Own Calculations based on IEA Energy World Balances

Final Consumption by Sector

By sector, final consumption was mainly industrial, with 17 kboe/day, 44% of the total. Industrial use was based 64% on renewable fuels with liquid fuels contributing 30% and electricity 6%. In residential use, 31% of final consumption depended 76.1% on renewable fuels and wastes. 14.4% of consumption came from electricity, and the remaining 9.5% came from petroleum derivative products. The transport sector, which represented 25% of final consumption, used only liquid fuels.

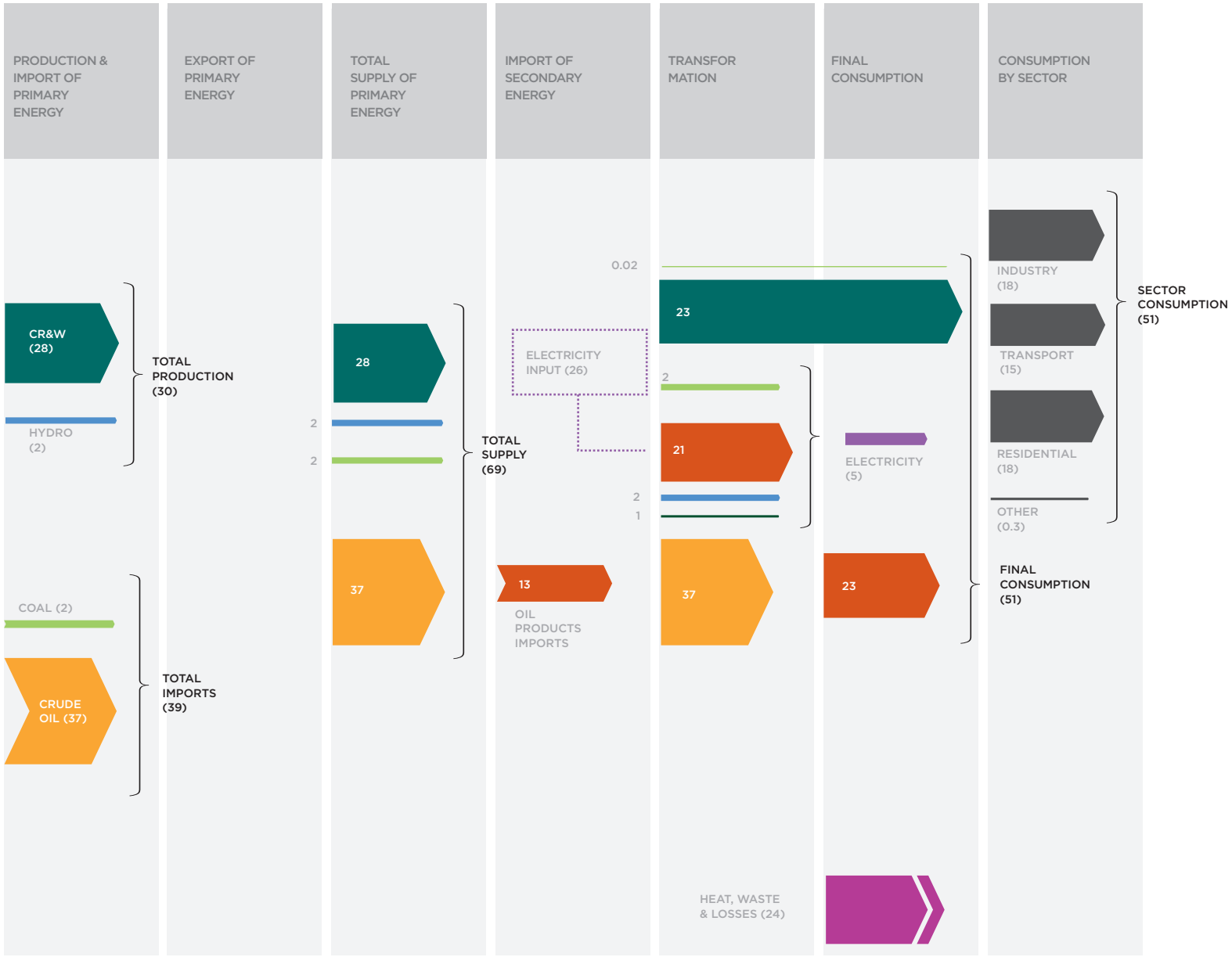
Consumption by sectors	Industry	Transport	Residential	Commercial	Others
Oil products	30.4%	100%	9.5%	N/A	100.0%
Biocombustibles	63.6%	0%	76.1%	N/A	0%
Electricity	5.9%	0%	14.4%	N/A	0.0%
Total	100%	100%	100%	N/A	100%

Source: Own Calculations based on IEA Energy World Balances

1984–1987

In this second period, after 13 years, the energy matrix of the Dominican Republic continued to consist essentially of biofuels and hydrocarbon as primary energy sources. However, the process of urbanization and electrification, together with the increase in per capita consumption of the population, created a relative decrease in biofuels, particularly in firewood.

Energy Flow 1984-1987



Source: Own Calculations based on IEA Energy World Balances

Total Energy Consumption

Energy consumption grew 46%, reaching 82 kboe/day between 1984 and 1987. It was composed of 50 kboe/day hydrocarbons, 28 of biofuels, 2 of coal and 2 of hydraulic resources, in proportions 61, 33, 2 and 2%. This growth is explained by the 164% increase in crude imports thanks to the incorporation of Refidomsa, which had a 40 mbd capacity. Import of products remained at 13 mbd, practically unaltered. The incorporation of coal allowed that source to reach 2 kboe/day.

While biofuels reached 28 kboe/day, of which 64% were firewood, hydropower moved from 1 to 2.25 kboe/day. This jump can be explained by the incorporation between 1974 and 1987 of Valdesia, which had 54 MW of installed capacity (1975), Rincón with 10.1 MW (1978), Sabana Yegua with 13 MW (1979), Sabaneta with 6.4 MW (1981), Hatillo with 8 MW (1984) and Lopez-Angostura with 18 MW (1987).

Electricity

Electricity generation consumed 85% more energy, reaching 26 kboe/day. This consumption was composed mostly of liquid fuels, which lowered their participation from 87% to 82%. The other sources for electricity generation were coal with 6% of the total, hydropower with 9% and renewable fuels with 4%. From this consumption, the Dominican Republic generated a total of 4,233 GWh per year, almost 2.4 times the total average from the 1971-1974 period. This pattern of composition was maintained relatively without changes and thus the massive losses from production and distribution of around 80% of energy consumed in electricity generation were maintained as well.

Source	Inputs (kboe/day)	%	Electricity consumption (GWh)	Electricity consumption (kboe/day)	%
Coal	1.50	5.7	303.5	0.36	7
Oil products	21.40	81.7	2552.0	3.12	60
Hydro	2.25	8.6	1304.5	1.61	31
Biocombustibles	1.0	3.8	73.5	0.10	2
Total	26.20	100	4,233.5	5.20	100

Source: Own Calculations based on IEA Energy World Balances

Final Consumption by Sector

During the 1984-1987 period, the industrial sector fell from 44 to 35% of final consumption, with 60% of its use coming from liquid fuels and 13% from electricity – double the previous average. Industry was no longer the sector with the most consumption and now shared the position with the residential sector. Each one totaled 18 kboe/day. This sector decreased its firewood and sugar cane consumption from 76% to 70% and increased its use of derivative products from 9.5% to 15%. Residential consumption increased 4% due to the process of urbanization. Transport also rebounded reaching 29% from the previously held 26%.

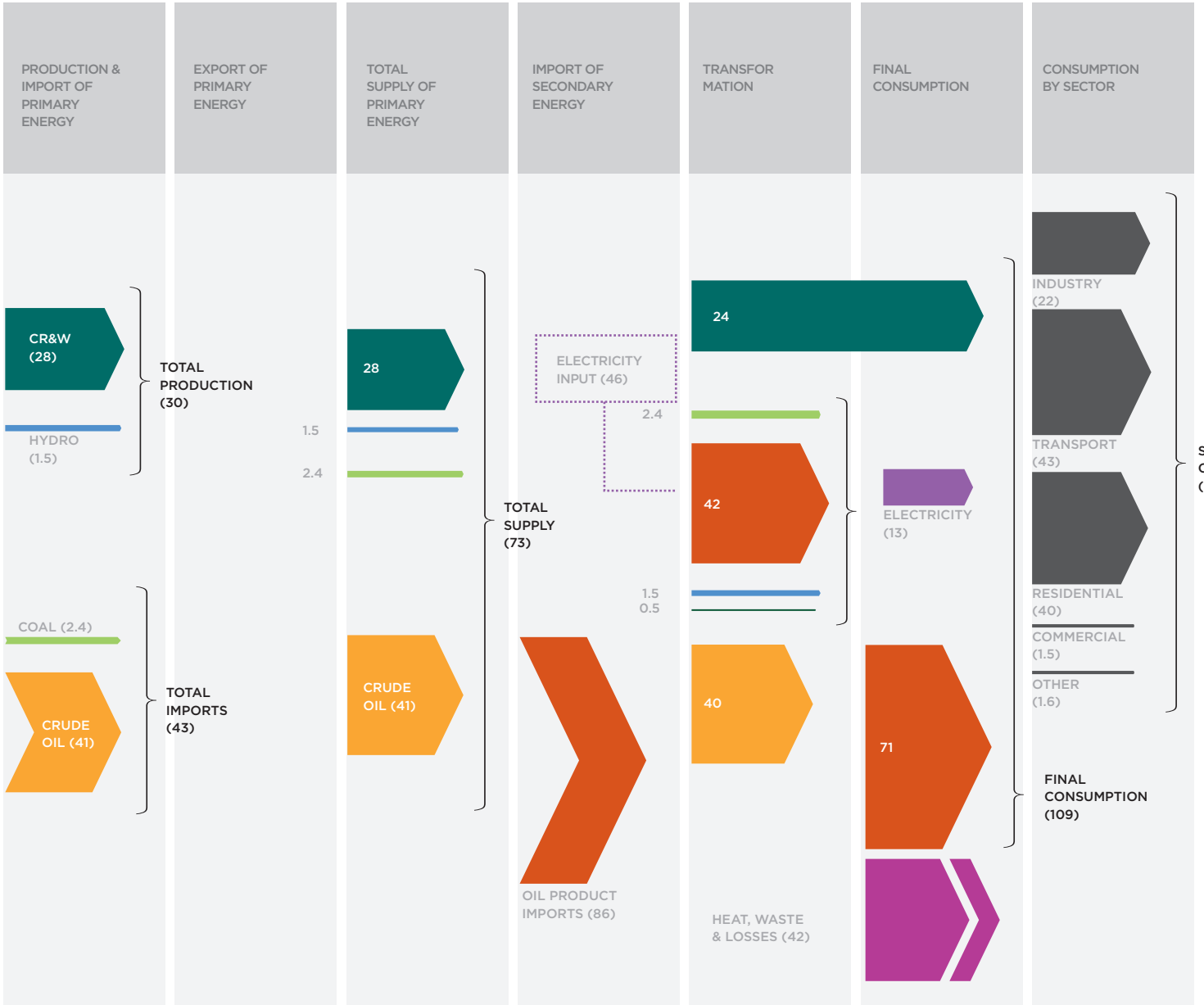
Consumption by sectors	Industry	Transport	Residential	Commercial	Others
Coal	0.1%	0%	0%	N/A	0.0%
Oil products	27.7%	100%	14.5%	N/A	100.0%
Biocombustibles	58.8%	0%	70.0%	N/A	0%
Electricity	13.3%	0%	15.5%	N/A	0.0%
Total	100%	100%	100%	N/A	100%

Source: Own Calculations based on IEA Energy World Balances

1999–2002

The energy matrix in the Dominican Republic during the third period almost doubles and becomes even more dependent on imported petroleum, crude for domestic processing and products for final consumption. In fact, the energy source that grows the most is fuels for transportation, which are mostly imported. The energy offerings of other sources practically don't increase at all. This reflects the continuous process of urbanization and modernization in the country.

Energy Flow 1999–2002



(kboe/day)

Source: Own Calculations based on IEA Energy World Balances

Total Energy Consumption

Between 1984-1987 and 1999-2002, total energy consumption almost doubles, reaching 159 kboe/day. This increase is due to the growth in liquid fuel imports, which moved from 13 to 86 kboe/day. The rest of the sources, including imported crude, remained stable. The proportion of hydrocarbon, biomass, coal and hydraulic consumption is 80, 18, 1 and 1% respectively. It is worth mentioning that the fall in hydropower from 2.25 to 1.5 kboe/day is because of a drought that began in the early 90s. The 1992 opening of the plants Jiguey with 98 MW and Aguacate with 52 MW did not manage to counter its effects.

Electricity

During this period there is an increase of 77% in consumption for electricity generation, reaching 46 kboe/day. Liquid fuels increased from 21 to 42 kboe/day, and continued to the most important source with 91% of this consumption. Other sources were coal (5% of the total), renewable fuels (1.2%) and hydropower (3.2%). Coal grew 57%, hydropower contributed 0.75 kboe/day less than before and biofuels dropped from 1 to 0.48 kboe/day. The electricity generated between 1999-2002 was 9,758.25 GWh, more than double the previous total. Of this generation, 86% came from liquid fuels while only 9% came from hydropower, a 31% drop from the previous figures. Only 5% of generation came from the use of coal.

Source	Inputs (kboe/day)	%	Electricity consumption (GWh)	Electricity consumption (kboe/day)	%
Coal	2.36	5.1	478.25	0.64	5
Oil products	41.95	90.5	8,385.00	11.01	86
Hydro	1.48	3.2	857.00	1.15	9
Biocombustibles	0.54	1.2	38.00	0.05	0.4
Total	46.33	100	9,758.25	12.8	100

Source: Own Calculations based on IEA Energy World Balances

Final Consumption by Sector

Between 1987 and 1999 an important change is produced in the pattern of the sector. Previously, 70% of consumption was divided between the industrial and residential sectors. At the beginning of the century, transport had the largest consumption, with 43 kboe/day and 39% - almost three times its previous total, and it is composed of derivatives. In second place is residential consumption with 37% and 40 kboe/day, more than double its previous consumption and based on liquid fuels (43.4%) and biofuels (41.4%), a growth of the first in detriment to the second. Industry consumption reached 20% of consumption with 22 kboe/day, a growth of only 22% and moving from using more derivatives than biofuels for the first time.

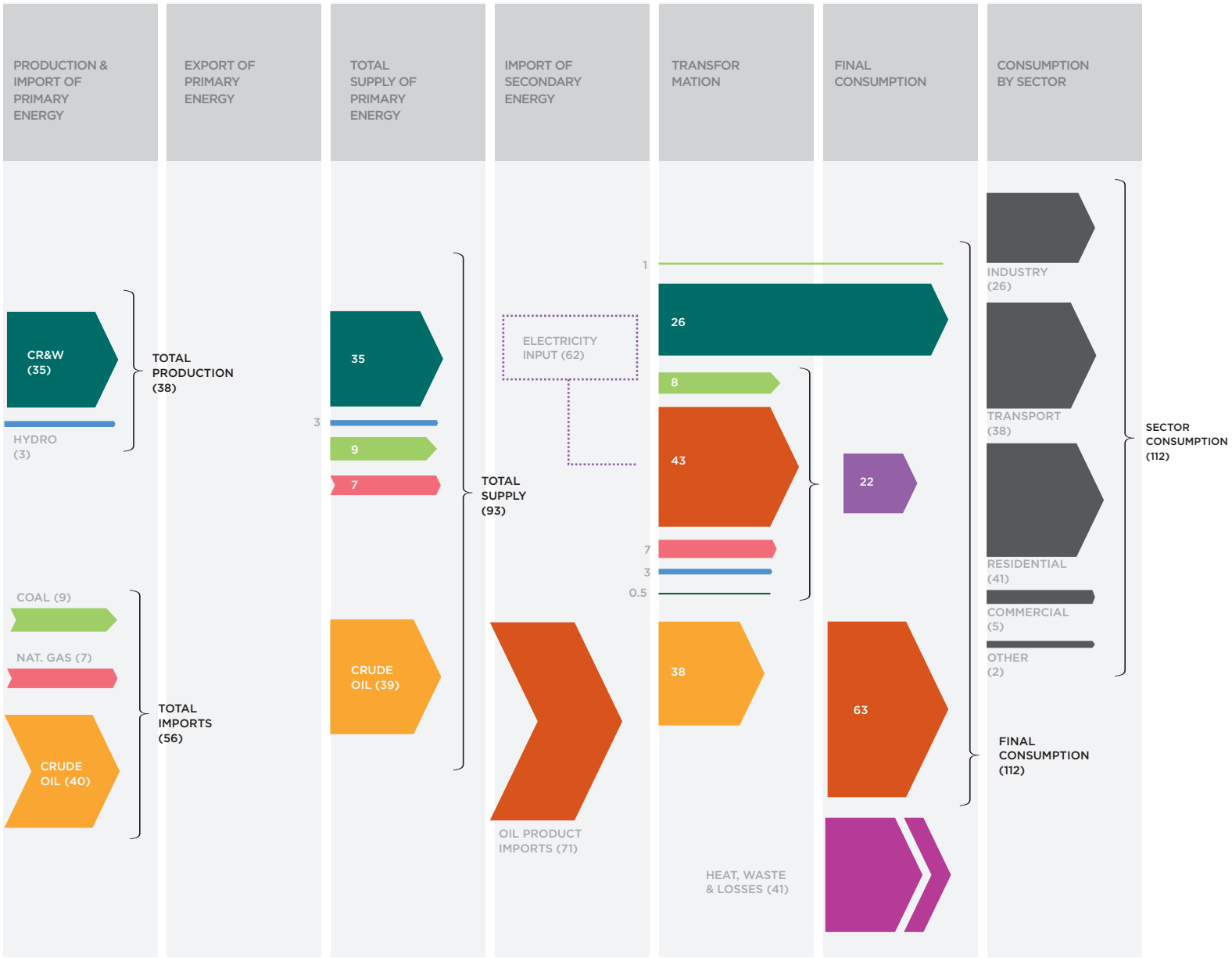
Consumption by sectors	Industry	Transport	Residential	Commercial	Others
Coal	0.0%	0%	0%	0%	0%
Oil products	43.0%	100%	43.4%	0%	100%
Biocombustibles	33.8%	0%	41.4%	0%	0%
Electricity	23.2%	0%	15.2%	100%	0%
Total	100%	100%	100%	100%	100%

Source: Own Calculations based on IEA Energy World Balances

2005-2008

This fourth period, although shorter than the previous, a one-year period rather than three, presents important changes in the energy matrix of the Dominican Republic due to the huge jump in the price of petroleum. The country reduced its absolute and relative petroleum consumption by increasing its efficiency in consumption and substituted petroleum for coal, gas, hydropower and biofuels.

Energy Flow 2005-2008



(kboe/day)

Source: Own Calculations based on IEA Energy World Balances

Total Energy Consumption

During this period important changes occurred in consumption that initiated a process of diversification and less dependence on derivative imports. The most important change is the incorporation of imported gas with 7 kboe/day. Since 2003, the country began to import gas after the AES Company converted the thermoelectric plant La Mina to gas and finished an import terminal. The growth in imported coal from 2.4 to 9 kboe/day should also be noted. This was due in part to the rehabilitation of the Itabo generation plants whose port is the only one that receives carbon imports today.

Imports of liquid fuels and petroleum registered drops from 5% to 17% respectively, while biofuels increased 25%. Hydraulic production reached 3 kboe/day due to recovery from the drought and the incorporation of Río Blanco in 1996 with 25MW and Mención in 2001 with 50 MW.

Electricity

Thanks to the introduction of natural gas and the expansion of coal, generation consumption grew 33%. Derivatives maintained a stable contribution while biofuels dropped from 0.52 to 0.45 kboe/day. Hydropower contributed another 3 kboe/day. From this consumption, 13,996.25 GWh were generated, a growth of 43%. Once again, liquid fuels were the main source with 65%, which is a drop from the previous 86%. Derivatives were mainly replaced by natural gas, with 11% of generation, and by coal with 12%. Hydropower rose from 9 to 12%.

Source	Inputs (kboe/day)	%	Electricity consumption (GWh)	Electricity consumption (kboe/day)	%
Coal	8.35	13.6	1,692.00	2.62	12.1
Oil products	43.26	70.2	9,053.50	14.00	64.7
Natural gas	6.62	10.7	1,533.75	2.38	11
Hydro	2.91	4.7	1,685.75	2.60	12
Biocombustibles	0.45	0.7	31.25	0.43	0.2
Total	61.59	100	13,996.25	21.64	100

Source: Own Calculations based on IEA Energy World Balances

Final Consumption by Sector

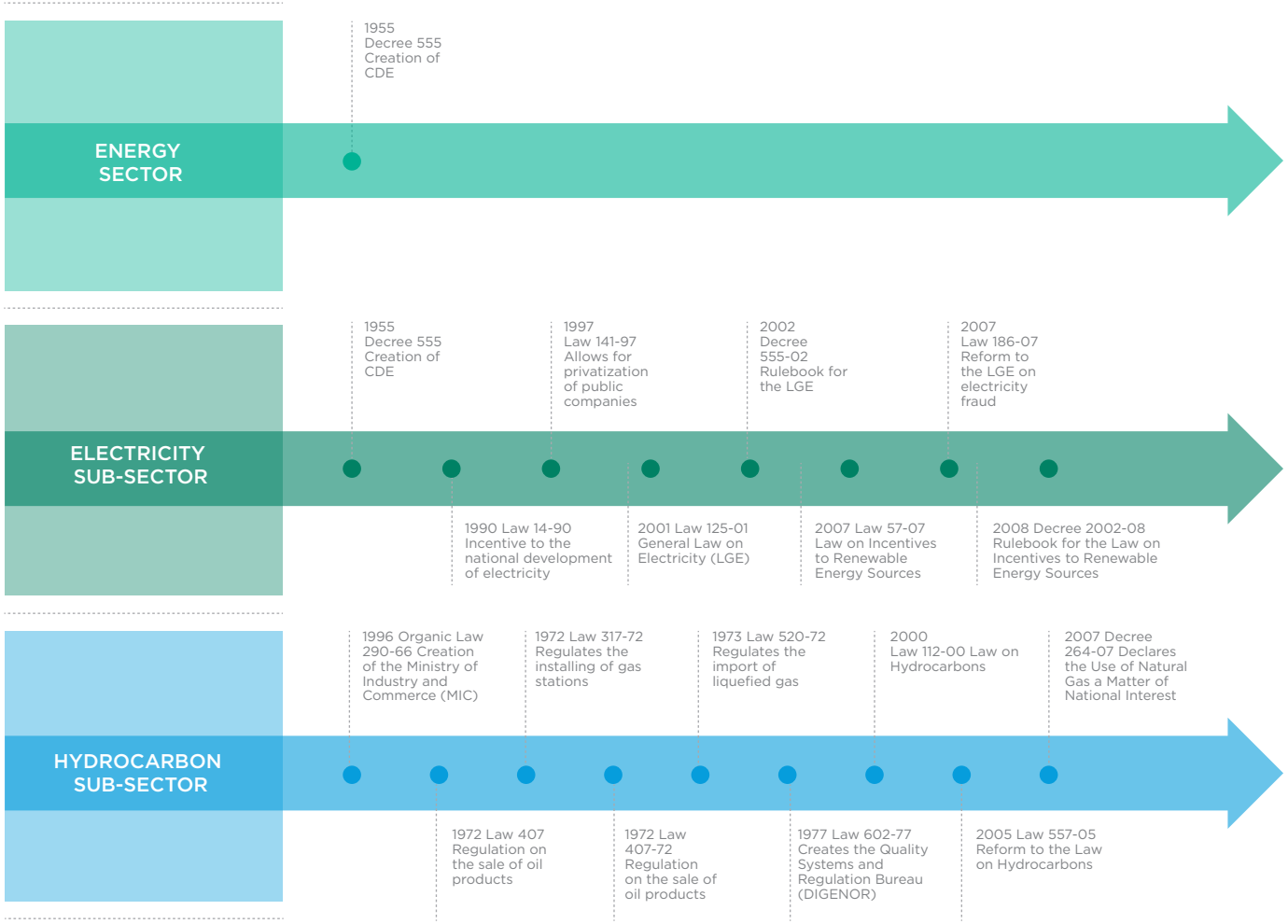
Final consumption totaled 112 kboe/day, a growth of 2.7%. The transportation sector lost its place as the main consumer of energy, moving from 39% to 34%. The residential sector moved into first place with 37% of the total and 41 kboe/day composed of 43% biofuels, 39% liquid fuels and 18% electricity. Industrial use reached 26 kboe/day – 23% of the total. Commercial consumption, composed 85% of electricity and 15% of derivatives is 4% of the total – while the other sectors are only 2%.

Consumption by sectors	Industry	Transport	Residential	Commercial	Others
Coal	4.2%	0%	0%	0%	0%
Oil products	30.0%	100%	38.8%	15.4%	46.3%
Biocombustibles	31.7%	0%	43.2%	0%	0%
Electricity	34.1%	0%	18.0%	84.6%	53.7%
Total	100%	100%	100%	100%	100%

Source: Own Calculations based on IEA Energy World Balances

Institutional Reforms

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



Source: Author's work

Origin

The current configuration of the energy sector in the Dominican Republic reflects the guidelines in the Hydrocarbon Law approved in 2000 and the General Electricity Law signed in 2001 and reformed in 2007. These laws were fundamental pillars of the main structural reform that has occurred in the sector since the creation of the Dominican Electricity Corporation (CDE) in 1995 and the 1956 signing of law 4532-56 about petroleum exploitation.

On May 5, 1955, under the presidency of de Héctor Trujillo, Organic Law No. 4115 is signed, which creates the Dominican Electricity Corporation. This law and some later ones grant the recently created institution a mandate to take monopoly control of the Dominican electricity market in all its phases. The following year, the government also publishes law 4532-56 that declares as public utilities everything related to exploration, refining and transport of petroleum reserves in the country.

In 1996 the Ministry of Industry and Commerce is created to make policies and regulate all hydrocarbon subsector activities. Previously, in 1972 and 1973, the Dominican State advanced a series of legislations[1] that regulated everything related to the import and marketing of domestic petroleum derivative products. Among the laws approved are ones that recognize private participation in the marketing of fossil fuels and their derivatives. In 1973 REFIDOMSA is founded, the only petroleum refinery in the country. It is created as a mixed company with 50% participation of Shell Company and 50% in the hands of the Dominican State.

The first steps towards opening the sector

At the end of the 80s, after decades of state control, the Dominican electricity system showed a series of deficiencies[2] in production, processing and final energy use. The World Bank calculated[3] that in 1989 the electricity deficit was 800 GWh, which represented approximately 20% of electricity demand. USAID[4] also estimated that the constant electricity outages between 1984 and 1988 were annually costing the Dominican economy around 4% of the GDP (USD 218.4 billion).

The government of Joaquín Balaguer, facing the difficulties of the Dominican Electricity Corporation (CDE) in responding to electricity demand, in 1990 signed the Law of Incentives for National Electricity Development (Law No. 14-90). For the first time this legislation recognizes the participation of private companies in the electricity subsector, mainly in generation. Law 14-90, which was repealed two years after the creation of the Tax Code, sought to increase electricity generation through tax incentives such as the tax exemption for the import

1 The laws approved during this period: (i) Law 317-72, approved on April 18 1972, which regulates the installation of service stations and gas stations; (ii) Law 407-72, approved on October 10, 1972 which regulates the sale of gasoline, diesel oil, oils, lubricants and other similar products; (iii) Law 520-73, approved May 25, 1973, which regulates the import of liquefied petroleum gas.

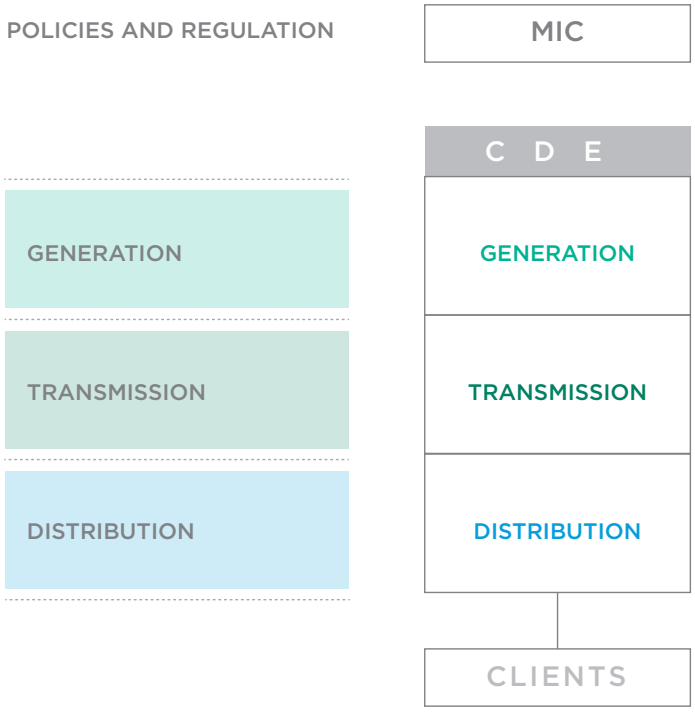
2 Dominican Republic: Issues and options in the Energy Sector Report No. 8234.

3 Idem.

4 Environmental Assessment for the Dominican Republic Power Sector. World Bank.

of equipment and the import and purchase of fuels. It also exempted several economic transactions involving fuels from being taxed. The legislation sought to make self-generation companies increase their sales of surplus electricity to the national grid.

Figure 1: Electricity sub-sector structure in Dominican Republic, 1990



Source: Author's work

Although law 14-90 was repealed, the intention to promote more private sector participation in the electricity market continued. In 1993, via decree 148-93, the National Energy Council is created, whose main function was to design a comprehensive reform strategy for the energy sector following the suggestions made by multilateral organizations (mainly the IDB and World Bank). In a few months the Council prepared the reform proposal and presented to congress the Proposal of the General Energy Law. However, it was not approved until 2001. In late 1993 the Government approved the construction of the first electricity generation plant financed by private capital.

Capitalization of the Energy Sector: Privatization without Institutional Structure

In 1996 Leonel Fernández became president and he continued to move forward with the process of transforming the energy sector. In 1997 the Law of Reform of Public Companies (141-97) was passed, which allowed the privatization or "capitalization" of state companies in the electricity sector, thus dismantling the vertical integration that had been part of the CDE since 1955.

The articles of law 141-97: (i) limit private participation in companies to up to 50% of the capital; (ii) grant administrative control to new partners; (iii) eliminate vertical integration but allow distribution companies to participate in generation assets up to 15% of the maximum system demand; (iv) allow employees of the private companies to participate

in the process by capitalizing their employment benefits; (v) excludes electricity transmission and hydroelectric generation from the process of capitalizing facilities.

With part of the assets of the CDE, five companies were created to be privatized – three distribution companies according to their zones of operation (EDENORTE, EDESUR and EDEESTE) and two thermal generation companies (Haina and Itabo). The State retained the assets related to electricity transmission and hydraulic generation. The public offering of the companies and the final transfer of assets occurs in late 1999.

In the context of privatization, generation companies (Itabo, Haina and CDE) and distributors signed five-year contracts for the sale of energy. The contracts stipulated that the contracted quantities would be reduced annually until 2003. Initially they would represent 70% of maximum demand during the first year of operation, but they would be reduced until they represented only 19% at the end of the period.[5] The objective was that energy prices would be determined through competitive bidding procedures and on the spot market.

The reforms also included adjustments in the methods for setting rates charged to final consumers. Resolution 237-98 of 1998, issued by the Secretary of Industry and Commerce, established the billing plan to be implemented in the eight years after the signing of the resolution. The plan called for a two-year transition period until arriving at a "technical rate" starting on January 1, 2003. The transition period kept the same rate model as prior to capitalization with cross-subsidies between industrial users (they paid a higher rate than the efficient rate) and residential users with consumption below 300 KWh.[6]The technical rate that would continue after 2003 would transfer all generation, transmission and distribution costs to rates paid by all final users, eliminating subsidies.

The foreign companies that participated in the capitalization of distribution companies were Unión Fenosa (EDENORTE and EDESUR) and AES (EDEESTE), which were granted 40-year concessions. The financial viability of the distribution companies depended on three main components:[7] (i) the substantial reduction of total losses in distribution (ii) the increase in collection rates; and (iii) the application of the current rate system.[8]

Consolidation of institutional structure

In 2000, a Congress dominated by the recently elected party of President Hipólito Mejía approved the Hydrocarbon Law (112-00). Among the main contributions of this law are the:

- Establishment of taxes on fossil fuel transactions.
- Ratification of a direct subsidy to families for the consumption of liquefied petroleum gas.

5 Dussan, Manuel. Dominican Republic. Report on the electricity sector and elements of an IDB strategy. 2003. Page 17.

6 Méndez, Francisco Antonio. Energy: Regulatory Development in Latin America. Chapter 18. ARIAE, 2008

7 Dussan, Manuel. Dominican Republic. Report on the electricity sector and elements of an IDB strategy. 2003. Page 17.

8 The rate system at the moment of capitalization was established in the SEIC resolution No. 237-98 issued in October 1998. The rate structure sought to slowly move the costs of energy to final users. This rate system would remain in force until 2006 and included the transition period that was finalized on December 31, 2002.

- Setting of parameters for the control of imported fuel volume.
- Ratification that sale prices to the public for fossil fuels will be determined by the State.
- Free import of fossil fuels and petroleum derivatives for individuals or companies that have the structure for such purposes.

Subsequently, in July 2001, the General Electricity Law (125-01) is passed with few changes in respect to the proposal presented to Congress in 1993. The legal instrument is focused on promoting private sector participation in the electricity market. This law creates State institutions related to the sector such as the National Energy Commission (CNE), in charge of sector policies; the Superintendency of Electricity (SIE), which regulates electricity market participants; and the Coordinating Agency (OC), created to coordinate the National Interconnected Electricity System (SENI).

Law 112-00 orders the creation of the Dominican Electricity Transmission Company (ETED) which controls 100% of electricity transmission (the company was officially created in 2007) and the Dominican Hydroelectric Generation Company (EGEHID), which controls 100% of hydraulic generation. The main objectives of law 125-01[9] are to:

- Promote and guarantee the electricity supply needed by the country in adequate conditions of quality, security and continuity.
- Stimulate private participation in the development of the electricity subsector.
- Encourage competition in the area of generation, leading to investments and prices that are free
- and determined by the market.
- Regulate transmission and distribution prices based on the economic criteria of efficiency and equity.
- Ensure that the supply of power is made neutrally and without discrimination.
- Ensure the protection of user rights and the fulfillment of their obligations.

Problems in the electricity sector: prices, rates and subsidies

In 1999 when privatization occurs in the electricity sector, oil prices were at their lowest level in decades. However, from that year forward prices increased rapidly. In 2000, energy sector institutions took measures to try to cushion the effect of fuel price growth on electricity rates. In February, the SIE established a cap rate for final users, promising to subsidize the losses to distribution companies. In December, the MIC established a subsidy for the fuels used in electricity generation.[10]The resulting bill for these subsidies continued to increase, generating strong fiscal pressure on the government and financial stress for companies participating in the electricity market.

9 Summary of the General Electricity Law of the Dominican Republic. Pellerano & Herrera.

10 SEIC Resolution 283-00. December 2000.

The accumulation of debt became more and more unsustainable for the State and was a problem for distribution and generation companies. In 2001 the Madrid Accord was signed to renegotiate the terms of initial supply contracts. The renegotiation included:[11] (i) the reduction of capacity charges and the applicable energy charge;[12] (ii) changes in the formula for indexing energy charges;[13]and (iii) the extension of the expiration of contracts until 2016 (originally it was set for 2003), maintaining the levels of capacity contracted for the 1999-2001 period.

In 2001 the government created a decree for the Blackout Reduction Program (PRA) in which distribution companies would also participate. The program consisted of a subsidy for 100% of the energy supplied to marginalized communities, in which the State would pay 75% of the subsidy and distribution companies would pay the rest. The beneficiaries of the subsidy would pay a fixed monthly amount and would be chosen according to the location of their residence. In 2007 the subsidy associated with this program reached USD 118 million, representing the equivalent of 30% of the total subsidy destined for non PRA zones.[14]

Electricity sector problems kept growing. It is calculated that in September 2002, State debt to electricity generators reached USD 179 million, nearly 1% of the country's GDP. In September of that year, the SIE increased existing rates eliminating the direct subsidy and changing the structure of rate blocks. However, in March 2003 the Fund for the Stabilization of the Electricity Rate (FETE) was created through a presidential decree. It sought to compensate residential users with consumption below 300 Kwh-month for rate increases. This subsidy would be paid to distributors for the difference between the applied rate (real rate charged to users) and the indexed rate (the theoretical rate that included the cost structure of the electricity system). According to SIE calculations, in 2008 the total amount transferred from the FETE to distributors was approximately USD 450 million, nearly 40% of the total bill for distribution companies.[15]

Renationalization of distribution companies

In 2003 there was a financial crisis followed by a devaluation of the Dominican peso. The exchange rate in early December reached 43.40 DR$/USD from 17,66 DR$/USD at the beginning of the year. In 2004, total electricity production was 11,795 GWh which represented a drop of 11.08% with respect to the previous year. During 2003 and 2004 the import of fuels fell from 0.94% and 15.51% respectively.[16]

On September 10, 2003, facing the problems that were affecting electricity distribution, the Dominican State through the CDEEE bought 50% of the assets of EDENORTE and EDESUR that were in the hands of Unión Fenosa, thus assuming administrative control. Subsequently, in May 2009, the CDEEE also bought 50% of the shares of EDEESTE

11 Dussan, Manuel. Dominican Republic. Report on the electricity sector and elements of an IDB strategy. 2003. Page 17.
12 The charges for capacity in the supply contracts move from 8.8 US$/kW-month to 6.98 US$/kW-month. The charge for applicable energy in mid-2001 was reduced from approximately 81 US$/MWh to 55 US$/Mwh, except for energy supplied by the CDE and thermal and coal, with a charge of 52 US$/MWh.
13 A weighted index of 70%/30% is applied to the reference price of fuel oil No. 6, 3% sulfur in the Gulf Coast and the Consumer Price Index in the United States. It takes the base price of fuel oil at 17 US$/barrel, the market price when the agreement was made.
14 Méndez, Francisco Antonio. Energy: Regulatory Development in Latin America. Chapter 18. ARIAE, 2008.
15 Méndez, Francisco Antonio. Energy: Regulatory Development in Latin America. Chapter 18. ARIAE, 2008.
16 Source IEA: Word Energy Statistics and own calculations.

that were in private hands, thus returning to monopoly control of the electricity distribution business in the country. The now nationalized companies maintained supply contracts signed in the Madrid Accord with expiration in 2016.

Renewable energy, natural gas and electricity fraud

In 2007, during the second government of Leonel Fernández, four legal instruments were approved related to the energy sector: law 57-07, called the Law for Incentives for Renewable Energy and Special Systems; Law 186-07 that was a reform of General Electricity Law 125-01; decree 264-07 that declared the use of natural gas of national interest and decree 629-07 that created the Dominican Electricity Transmission Company (ETED).

The first law approved that year was Law 57-07 that sought to promote the development of projects that take advantage of renewable energy sources in the country. This law establishes two goals: (1) that 25% of all electricity service needs will be supplied from renewable sources by 2025; and (ii) that by 2015 energy from renewable sources will represent at least 10% of energy bought by energy distributors and marketers. The legislation instructs the CNE to fill these goals. In addition, it creates the Advisory Agency that will support the CNE in technical matters related to renewable energy. Law 57-07 includes the following objectives to:

- Increase energy diversity in the country.
- Reduce dependency on imported fossil fuels.
- Promote private investment projects developed from renewable energy sources.
- Mitigate the negative environmental impact of energy operations with fossil fuels.
- Facilitate community social investment in renewable energy projects.
- Contribute to the decentralization of electricity production and biofuels in order to increase market competition among different energy offerings.

Law 186-07 was the second regulation related to the electricity subsector approved in 2007. This law was known as the electricity fraud law because in its articles it included specific punishments and penalties for activities that were considered “attempts against the security of the national electricity system” or “electricity fraud.” High rates of electricity loss are one of the chronic problems of the electricity sector in the Dominican Republic. In 2008 it was calculated that the State had to designate USD 740 billion to compensate distributors for system losses.26 This law came into effect in 2009.

In May 2007 decree 264-07 was signed which declared the use of natural gas a national interest. This regulation mainly sought to promote the use of natural gas, increasing investment in the conversion or adoption of technologies for transportation and electricity generation used by this type of fuel.

On May 9, 2009 via decree 421-09, the Blackout Reduction Program was eliminated and substituted with a program focusing on subsidies for indigent families, the poor and the middle class. The new program, called Bonoluz, was managed by the Cabinet of Social Policies Coordination, which was presided over by the Vice President of the Republic. The elimination of the PRA reduced some inefficiencies in the subsidy system to electricity given that now the beneficiaries of Bonoluz would be chosen based on their earnings and not on their geographic location.

On March 15, 2011 decree 143-11 was signed declaring it a national emergency to increase electricity generation capacity at a low cost. This decree temporarily suspended the bidding rules with the objective of streamlining all CDEEE contracting related to the increase in electricity generation capacity.

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