

# ELECTRICITY SECTOR OF EL SALVADOR



ORGANISMO PROMOTOR DE EXPORTACIONES  
E INVERSIONES DE EL SALVADOR



Consejo Nacional de Energía



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**EL SALVADOR**  
IS AN EXCELLENT BUSINESS  
OPPORTUNITY FOR  
INVESTMENTS  
IN THE ELECTRICITY SECTOR,  
THANKS TO **CLEAR RULES**  
AND TRANSPARENT PROCESSES THAT  
ALLOW STABILITY  
IN ELECTRICITY RATES,  
WHAT MAKES IT ONE OF THE TOP  
COMPETITORS IN THE REGIONAL  
ELECTRICITY SECTOR.

# EL SALVADOR

**CAPITAL**  
**SAN SALVADOR**

**CURRENCY:**  
**UNITED STATES DOLLAR (US\$)**

**OFFICIAL LANGUAGE: SPANISH**  
**CLIMATE: TROPICAL**  
**RAINY SEASON: MAY TO OCTOBER**  
**DRY SEASON: NOVEMBER TO APRIL**



*TOTAL POPULATION*

**6,401,200 INHAB.\***



*TOTAL AREA*

**21,040.79 KM2.\***



*POPULATION DENSITY*

**304 INHAB./KM2.\***

The infrastructure of ports, airports, roads and telecommunications that the country has is as follows:

## HIGHWAY NETWORK

The country has a modern and efficient highway network infrastructure that makes possible the interconnection among main cities and gives an easy and fast access to the rest of the region. Thanks to this road infrastructure, the World Economic Forum has given El Salvador an special special recognition as the country of the region with the best quality highway network.

## MAJOR PORTS

Acajutla and La Union ports.  
(All located in the Pacific Ocean)

## INTERNATIONAL AIRPORT

«Monseñor Oscar Arnulfo Romero y Galdámez»

\* Economics indicators 2010 - 2014 – Central Reserve Bank of El Salvador

## SUSTAINABLE COUNTRY FOR FUTURE GENERATIONS



El Salvador is located in Central America, with a projected population of 6,401,200 inhabitants according to the 2007 Census. Due to its land extension, El Salvador has the highest population density of America. It has a free market economy, export-oriented, with a gross income of US \$ 25,652.00 million and an average income per inhabitant of US \$ 4,008 per year by 2015. \*

In late 2014, in order to obtain the amount of US \$277 millions, El Salvador signed an agreement with the Millennium Challenge Corporation (MCC) - an agency of the US government aimed to stimulate economic growth, reduce poverty and improve productivity and competitiveness in international markets.

\*Estimates from IMF-2015

# EL SALVADOR, AN ATTRACTIVE DESTINATION FOR INVESTMENT:

## WHY IS EL SALVADOR AN INVESTMENT OPPORTUNITY IN POWER GENERATION?

The Salvadoran electricity sector counts with a public-private agenda aimed towards a world class sector, which supplies an ever growing electricity demand in a national and regional low risk market with transparent and clear rules. It also counts with a short, middle and long term energy planning which accomplishes the success for any investment.

“ EL SALVADOR HAS A REGULATORY FRAMEWORK THAT PROMOTES INVESTMENT IN NON-CONVENTIONAL RENEWABLE ENERGY SOURCES TO DIVERSIFY THE ENERGY MATRIX. ”



**PROESA**  
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## INTRODUCCION

### 1 MONETARY STABILITY

### 2 STRATEGIC GEOGRAPHICAL POSITION

### 3 PREFERENTIAL ACCESS TO INTERNATIONAL MARKETS

### 4 ATTRACTIVE TAX INCENTIVES

### 5 COMPETITIVE COSTS

### 6 AVAILABILITY OF COMPETENT HUMAN RESOURCES

### 7 COMPETITIVE INFRASTRUCTURE

The electricity sector in El Salvador is characterized by an electricity market where public and private investors can compete with clear and transparent rules.

The Salvadoran market has a regulatory framework that enables all participants to freely operate in the generation, transmission and distribution activities.

This regulatory framework ensures the legal certainty required for investments in the electricity sector. The enforcement mechanisms and constitutional basis cannot be modified without the support of all participants. The operation of the Transmission System and the Wholesale Market is based on production costs with a marginal economic model that rewards efficiency and allows investors to have guaranteed profits, while end users get affordable rates.

The salvadoran electricity market requires that most of the generation to be contracted under Power Purchase Agreement scheme, having the goal of a non-dependent on a single generation source, diversified energy matrix. In that sense, investment in non-conventional renewable sources is a priority for the coming years, but the investment in other technologies such as natural gas and coal is not limited.

This document shows our competitive advantages, our achievements over the years, and the experience of those who are already developing investments in our country.

## HISTORICAL BACKGROUND OF THE ELECTRICITY SECTOR

**40'S** | Since the early 40's the development of the energy sector was in the hands of the state; The first hydropower plants were built; the geothermal subsector was developed by Salvadoran professionals and the operation of thermal power plants was in the hands of the state.

**90'S** | In the early 90's, the National Energy Sector underwent reforms that sought to redefine the role the State played in it.

**2007** | In 2007, the Congress approved the creation law for the National Energy Council (CNE), as the highest authority on energy policy and the coordinating body for the different energy sectors.

**2009** | In August 2009, the National Energy Council began operations with the aim of developing the National Energy Policy, with a comprehensive view of energy issues in the country; as well as developing an energy information system for decision-making and promoting laws and regulations for the sector.

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## NATIONAL ENERGY POLICY

### Principles

Energy is a public interest utility and the State must ensure that all people can make use of it.

National Energy Policy is part of the "sustainable development", which satisfies the present needs without compromising the resources for future generations.

The energy policy is a middle and long term effort that must be jointly developed by the government and private investment.





# STRATEGIC GUIDELINES FOR NATIONAL ENERGY POLICY

The strategic lines of the Energy Policy provide solutions to previously proposed challenges and collect the input of a broad process of consultation among key stockholders in the energy sector. The guidelines have been integrated into six major groups with a strong relationship with each other:



**DIVERSIFICATION OF ENERGY MATRIX AND  
PROMOTION OF RENEWABLE ENERGY RESOURCES**

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**ELECTRICITY SECTOR'S INSTITUTIONAL  
STRENGTHENING AND FINAL USER PROTECTION**

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**PROMOTING A CULTURE OF  
EFFICIENCY AND ENERGY SAVING**

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**INNOVATION AND TECHNOLOGICAL DEVELOPMENT**

---



**REGIONAL ENERGY INTEGRATION**

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**EXPANSION OF COVERAGE  
AND PREFERENTIAL RATES**

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## DESCRIPTION OF THE ELECTRICITY SECTOR

The electricity sector of the country is comprised of different agents who jointly integrate the **wholesale electricity market**. These agents can have private or public characteristics and have specific functions inside a market with well-defined and clear rules.

Among the agents before mentioned, the following are highlighted:

**ELECTRICITY GENERATING COMPANIES**, which transform electric energy to its eventual transmission and further distribution.

**TRANSMISSION AGENT**. This is a unique enterprise with public-private figure inasmuch as in this level competition is not feasible.

**ELECTRICITY DISTRIBUTION COMPANIES**, which transform electricity from a higher voltage to a more adequate one for the final users in their supply grids.

**ELECTRICITY MARKETERS**. These agents perform selling and buying transactions in the regional market to meet the demands of any other agent, including final users. The commercializing agents are also subject to the Regional Electricity Market Regulation and to the National Regulation at the same time.

In addition, for coordination between the agents to exist, there is a **MARKET AND SYSTEM OPERATOR**, which executes the needed actions and performs the economic balances that result from the transactions among the agents.

Likewise, there is a **REGULATORY ENTITY** that has the functions of creating and establishing clear rules and regulations for the well-functioning of the market.

# STRUCTURE OF THE ELECTRICITY MARKET

## NATIONAL ELECTRICITY MARKET



## NATIONAL ELECTRICITY MARKET



### NATIONAL ENERGY COUNCIL (CNE)

National Energy Council: The National Energy Council (CNE) is the rector and normative authority in terms of the energy policy. It has the attribution to establish the energy policy and the strategies that promote the efficient development of the electricity sector.



### TRANSACTIONS UNIT (UT)

The UT is a private corporation created under the General Electricity Law (LGE) which purpose is the operation of the transmission system and the operation of the wholesale electricity market.

## REGIONAL ELECTRICITY MARKET



### DEAN COUNCIL OF THE REGIONAL ELECTRICITY MARKET (CD-MER)

This organization is responsible for facilitating the relationship of among participants which integrate the Regional Electricity Market (MER). It is comprised of the ministers of Energy of the Central American countries.

In El Salvador the entity responsible to represent the country inside the CD-MER is the CNE through its Executive Secretary.



### REGIONAL COMMISSION FOR ELECTRIC INTERCONNECTION (CRIE)

CRIE is the regulating organism of the MER which is in charge of the approval and the ruling of the normative, the establishment of sanctions and other attributions.



### GENERAL ELECTRICITY AND TELECOMMUNICATION SUPERINTENDENCE (SIGET)

SIGET is the competent authority for the application of laws and regulations that govern the electricity sector.

### MARKET PARTICIPANTS (PM)

The market participants are the following: The national and Private electricity generators, the transmission company, the electricity distributors, electricity marketers agents and the large-scale users.



### REGIONAL OPERATING ENTITY (EOR)

EOR is the organism in charge of the administration and the operation of the MER.



### ENTERPRISE OWNER OF THE ELECTRIC GRID (EPR)

The EPR is a private enterprise composed of the public entities of each country in the region, which are stockholders of the SIEPAC electric lines, with the aim of developing, designing, funding, building and operating such lines.

# GENERATORS

Data from the Salvadoran Electricity Sector:

### HYDROPOWER

	MW	%
GUAJOYO	19.8	1.2%
CERRÓN GRANDE	172.8	10.4%
5 DE NOVIEMBRE	100.0	6.0%
15 DE SEPTIEMBRE	180.0	10.8%
<b>TOTAL</b>	<b>472.6</b>	<b>28.5%</b>

### BIOMASS

	MW	%
CASSA	107.5	6.5%
CENTRAL IZALCO	45.0	2.7%
CHAPARRASTIQUE	62.5	3.8%
EL ANGEL	97.5	5.9%
LA CABAÑA	21.0	1.3%
<b>TOTAL</b>	<b>226.0</b>	<b>13.6%</b>

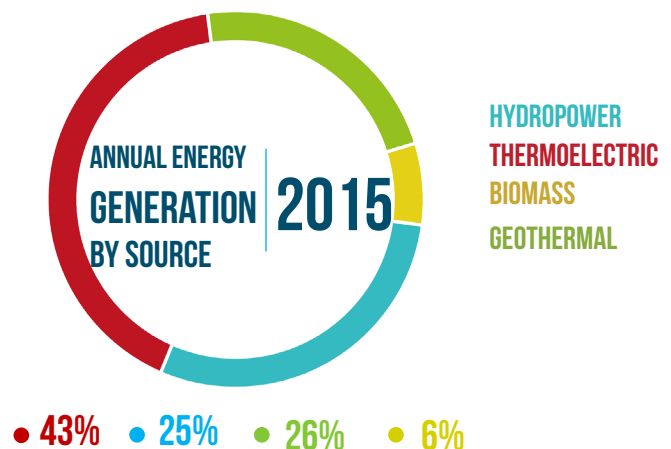
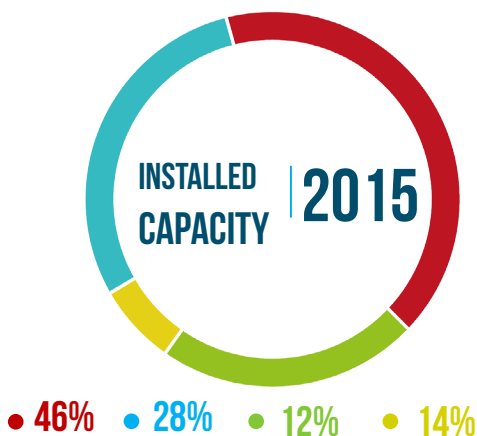
### GEOHERMAL

	MW	%
AHUACHAPÁN	95.0	5.7%
BERLÍN	109.4	6.6%
<b>TOTAL</b>	<b>204.4</b>	<b>12.3%</b>

### THERMOELECTRIC

	MW	%
DUKE ENERGY	338.3	20.4%
ACAJUTLA (VAPOR)	63.0	3.8%
ACAJUTLA (GAS U-5)	82.1	4.9%
ACAJUTLA (FIAT U-4)	27.0	1.6%
ACAJUTLA (MOTORES)	150.0	9.0%
SOYAPANGO	16.2	1.0%
NEJAPA POWER	144.0	8.7%
CESSA	25.9	1.6%
INE	100.2	6.0%
TEXTUFIL	42.5	2.6%
GECSA	11.6	0.7%
ENERGÍA BOREALIS	13.6	0.8%
HILCASA	6.8	0.4%
TERMOPUERTO	73.7	4.4%
<b>TOTAL</b>	<b>756.6</b>	<b>45.6%</b>

**TOTAL CAPACITY** | **1,659.6 MW**



Source: CNE according to the foreseen investments in Biomass projects.

# ELECTRICITY TRANSMISSION

## ETESAL

The owner and responsible for the maintenance and expansion of the transmission system is the Transmission Company of El Salvador (ETESAL). The whole Salvadoran transmission network, including interconnections with Guatemala and Honduras, are property of ETESAL.

- The Salvadoran Transmission System comprises of 40 -115 KV- transmission lines with a total length of 667 mi (1,073.82 km) and four 230 kV lines, two of them interconnecting the transmission system of El Salvador with Guatemala and Honduras and two extra lines for internal reinforcement. The length of the lines to Guatemala and Honduras is 9.07 mi (14.6 Km) and 57.73 mi (92.9 km) respectively.
- In 2015 the San Matias Transmission Substation was installed which has a 115 KV area comprising a middle interrupter configuration and two collector busses as well as two bays for the interconnection of two transmission lines which meet at this Substation. San Matias Substation is equipped with a 100 MVA power transformer in a Delta – Star connection ( $\Delta$  Primary –Y Secondary) with an On Load Tap Changer (OLTC), and the 46 KV area is based on a main transfer bus with total capacity for 7 distribution bays.



# SIEPAC

## Regional Electricity Market and SIEPAC Project

The development of the Regional Electricity Market (MER) allows transactions between countries, harmonizing regional with national regulations for each country, enabling the national dispatch in an economically efficient way, optimizing resources of the region, reaching more competitive costs and allowing the development of regional projects with economies of scale. Under the Framework Treaty for regional Electricity Market in Central America, regional institutions have been created such as: Regional Electricity Interconnection Commission (CRIE) and the Regional Operating Agency (EOR), based in Guatemala and El Salvador, respectively.

In order to make the MER viable, the project "Electric Interconnection System for Central American countries" (SIEPAC) has been developed which has the following objectives:

**1** To support the development and progressive consolidation of the regional electricity market through the creation and the establishment of legal, institutional and technical mechanisms to foster private sector participation in power generation.

**2** To set the electric transmission infrastructure (transmission lines, compensation equipment and substations) that allows the exchange of electric power between the participants of the regional electricity market.



# DISTRIBUTORS

Electricity Distributors are the owning entities and operators of facilities whose purpose is the delivery of electricity in low voltage networks

Due to its characteristics, distribution companies operate under regulated rates and quality constraints; however, based on El Salvador's current regulation competition in distribution level is allowed even in the same geographical area.

## THEIR FUNCTIONS ARE

- 1 To commercialize and distribute electric power through their networks to consumption centers and end user.
- 2 To maintain and expand their distribution grids and allowing the access of their networks to new users and distributed generation.



	CAESS	DELSUR	CLESA	EEO	DEUSEM	EDESAL	B&D	ABRUZZO
AREA SERVED (KM <sup>2</sup> )	4,572	4,286	4,696	6,270	1,580	655	150	1.5
LINE LENGTH (KM)	10,492	6,869	10,417	12,482	2,550	214	15	4
NUMBER OF CLIENTS	567,154	349,638	353,899	276,853	71,673	12,720	559	120
ENERGY CONSUMPTION (GWH)	2,146.12	1,562.15	942.90	604.1	139.54	73.21	30.86	0

\* SIGET Statistical Report 2014.

\*Wholesale Electricity Market



# PERFORMANCE OF THE ELECTRICITY MARKET

## MARKET BASED ON COST PRODUCTION

El Salvador has a competitive market in all the activities of the sector. The **“Transmission System and Wholesale Electricity Market Operation based on Production Cost”** Regulation (ROBCP) allows transparency in its operation, providing clear rules for all participants and fostering the release of information regarding to the Electricity Market.

The Electricity Market comprises of two main business areas: The Long Term Contract Market (CLP) and the spot Market (in El Salvador known as MRS).

The ROBCP sets the generation dispatch based on variable production costs for each generator. This requires that the market Operator verifies the costs of each generator as a result of a Cost Audit which is mandatory. The payments of the market corresponds accordingly to marginal cost.

1

### REGULATORY FRAMEWORK

“Transmission System and Wholesale Electricity Market Operation based on Production Cost and its appendixes , are established in the General Law of Electricity”.

2

### MAIN TYPES OF ELECTRICITY MARKETS

**Spot Market.** (MRS).

**The Long Term Contract Market** (in El Salvador this contracts have the same figure as the PPA).

Bilateral contracts.

3

### DISPATCH MODEL

Marginal Production Costs Model.

# TYPES OF MARKET

## LONG TERM CONTRACTS (CLP)

Since August 1st 2011 the figure of Long Term Contracts (CLP) was activated and mandatory subscribed by the Distribution Companies through free-competition bidding processes under the supervision of the regulatory entity SIGET.

### ADVANTAGES:

These Contracts stabilize the Energy Prices for the Final User.

Guarantee the Energy Supply on the Demand's side.

This contracts are financial and are subscribed between generation and distribution companies.

A guaranteed income independently of the actual energy production.

## SPOT MARKET (MRS) (SYSTEM'S REGULATING MARKET)

The production costs-based MRS arises at the same time that the contract market but with distinctive characteristics. It allows commercializing the energy to variable prices which depend on the sector own factors such as national demand, unavailability rates, and maximum powers for each plant among others.

### CHARACTERISTICS:

The price of this energy is defined by the marginal unit each hour, based on variable costs associated with fuel costs and compensation for the available power.

All generating units are paid at marginal cost according to its hourly production.

The price of the energy market spot varies hour by hour.

# FIRM CAPACITY REMUNERATION

## THE NATIONAL ELECTRICITY MARKET REMUNERATES THE AVAILABLE ELECTRIC POWER TO INVESTORS IN GENERATION.

Firm Capacity remuneration allows the recovery of the investment. The payment rate is set at US \$7.8/kW-Month, which is based on an ideal gas turbine. This rate is revised annually.

The calculation procedures for the Firm Capacity and the Maximum Injectable Power to the System are defined on the Appendix 15 of the ROBCP, which also determines the Initial, Provisory and Definitive Firm Capacity.

### **INSTALLED CAPACITY**

---

Power that the machine is capable of delivering at maximum load according to the manufacturer.

### **AVAILABLE CAPACITY**

---

Power that generating units are able to deliver based on constraints such as maximum demand, fuel availability, forced outages rates among others.

### **FIRM CAPACITY**

---

Power that the units are able to deliver with a high probability of occurrence in a period of time.

## AVAILABILITY

For units recently incorporated to the system, the availability applied in the first year of operation will be initially defined by the owner of the plant. Thereafter the availability will be calculated each year using real data for the whole period in which the machine is on service until it reaches the five year-mark, when a mobile five year-period will be taken into account.

## INITIAL FIRM CAPACITY

According to the previously described, the initial firm capacity is calculated as follows:

### THERMAL AND GEOTHERMAL GENERATORS

It is calculated based on its maximum Power and its unavailability rates.

### HYDROELECTRIC GENERATORS

It is determined as a function of the driest hydrology registered.

### AUTO-PRODUCERS AND CO-GENERATORS

It is calculated based on the surpluses that the plant is able to inject. These plants are represented as thermal units with a maximum net power which equals the maximum surplus.

### NON-CONVENTIONAL GENERATORS

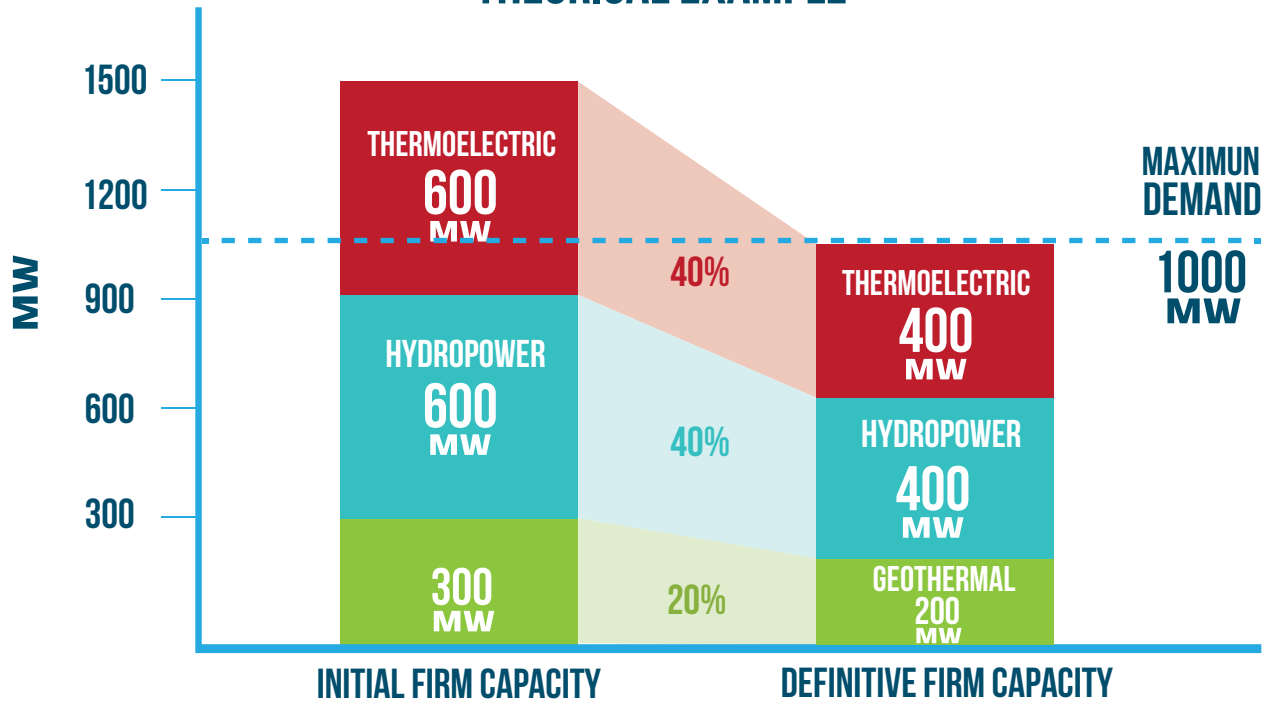
On these technologies are included: Solar, Eolic, Biomass and Tidal. The initial Firm Capacity will be determined with the energy that can be generated in the year of lowest input availability. It requires the presentation of a study to SIGET that shows the annual mean power corresponding to the lowest input availability.

Once the Initial Firm Capacity is defined, the Transactions Unit (UT) will determine the Provisory Firm Capacity adjusting this one to the demand.

## THE SYSTEM DOES NOT REMUNERATE A HIGHER POWER THAN THE ASSOCIATED TO THE MAXIMUM DEMAND.

- 1 Adjusting the generator unavailability rates including the last year historical data.
- 2 For the hydroelectric generator case, the firm power is again calculated according to the previous procedure.
- 3 The maximum registered real demand during the dry season will be used.

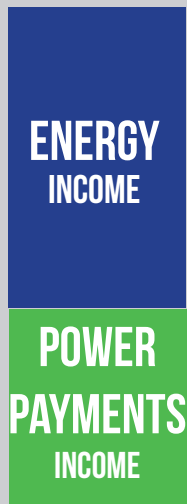
# FIRM CAPACITY CALCULATION THEORETICAL EXAMPLE



THE SYSTEM DOES NOT REMUNERATE A HIGHER POWER THAN THE ASSOCIATED TO THE MAXIMUM DEMAND.

The adjustments for the Firm Capacity remuneration are presented in the “**Economic Transactions Document**” (DTE) of the month in which the adjustment is made by the Market Administrator.

## EL SALVADOR’S ELECTRICITY MARKET ADMINISTRATOR AND OPERATOR COORDINATES THE PAYMENTS TO THE GENERATORS THROUGH TWO WAYS:



It is an income that comes from the energy generated and injected to the electric system.

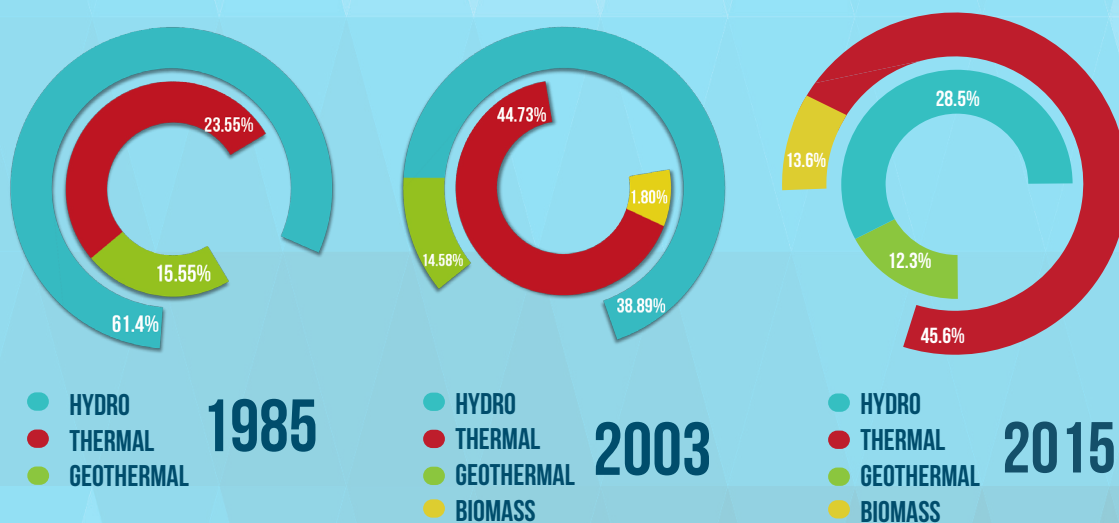
It is a payment valued to a fixed price which is equal for all generators and it is periodically established by the regulator SIGET.

## EVOLUTION OF THE ELECTRICITY GENERATION

In El Salvador, the main available generation source to satisfy the demand in the last decade has been fossil Fuels associated to thermal plants. As the time goes by the electricity production of hydroelectric, geothermal and biomass resources has increased.

The hydroelectric participation was majority at the end of the 80's, although this sector was losing weight due to the increase in the thermal technology.

## INSTALLED CAPACITY EVOLUTION (MW)

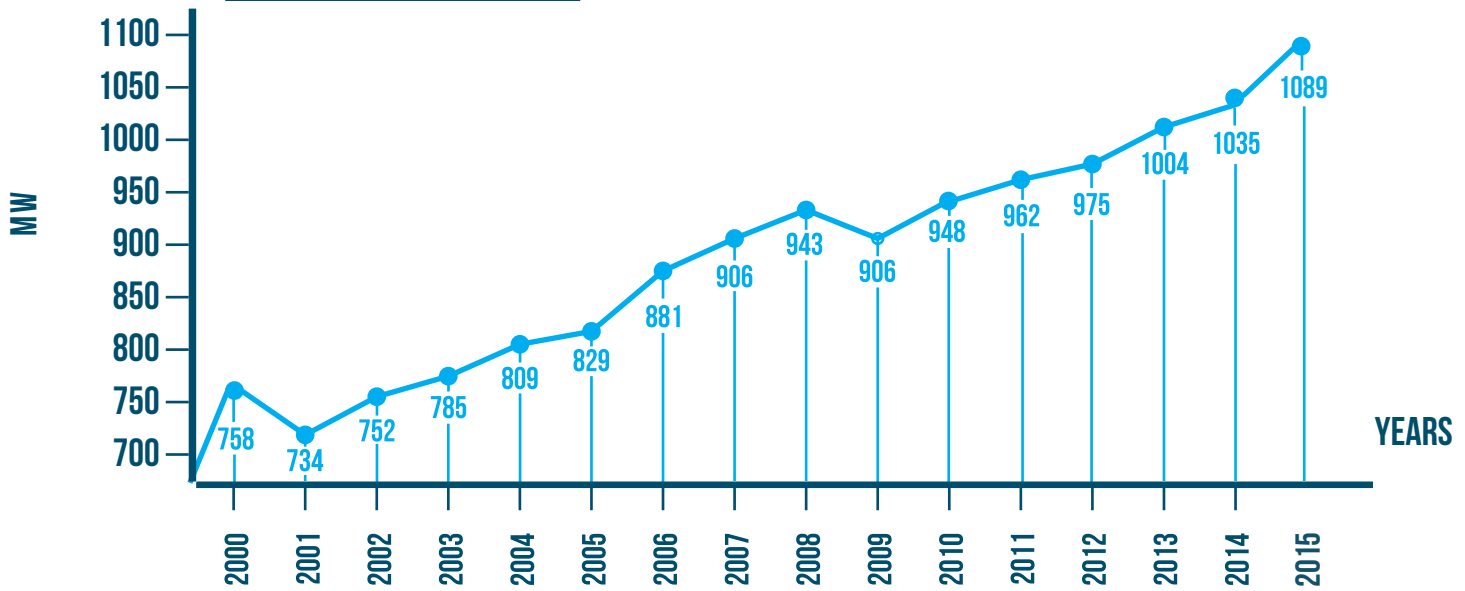


With the fostering of national and international investments in the electricity sector, El Salvador seeks to correct the disproportionate increase in the installed capacity for the thermal plants, which use fossil fuels, situation that was generated after the privatization of the electricity sector. Back then there was no a proper planning by the state and the market was liberated. It was in this context where the thermal developments increased since they were more attractive for having lower investment costs and a much faster installation period than the renewable or different technologies.

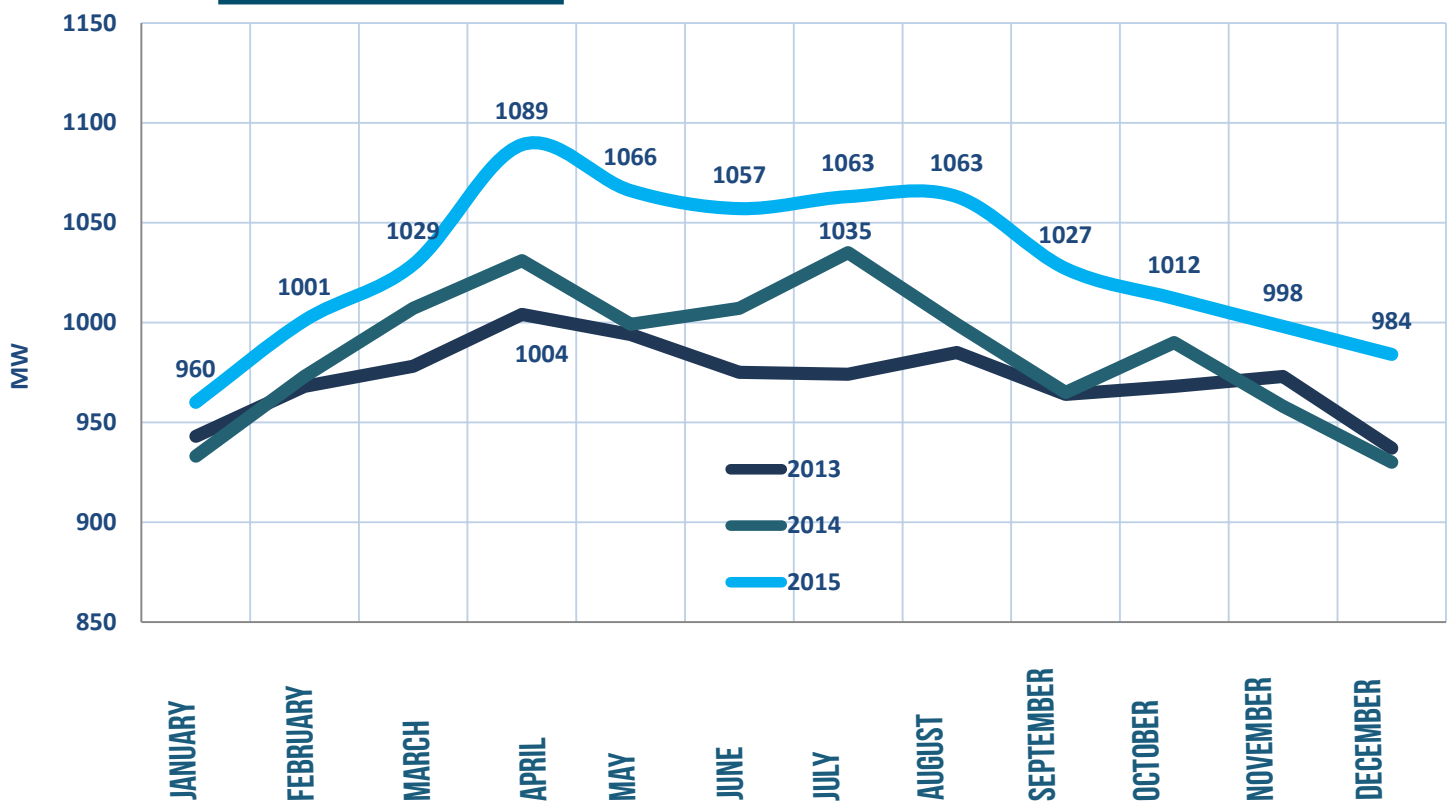
# EVOLUTION OF THE POWER DEMAND

Between January and December 2015, the maximum power demand was reached on April and it peaked the 1089 MW, which represents an increment of 5.2% with respect to the maximum power demand for 2014.

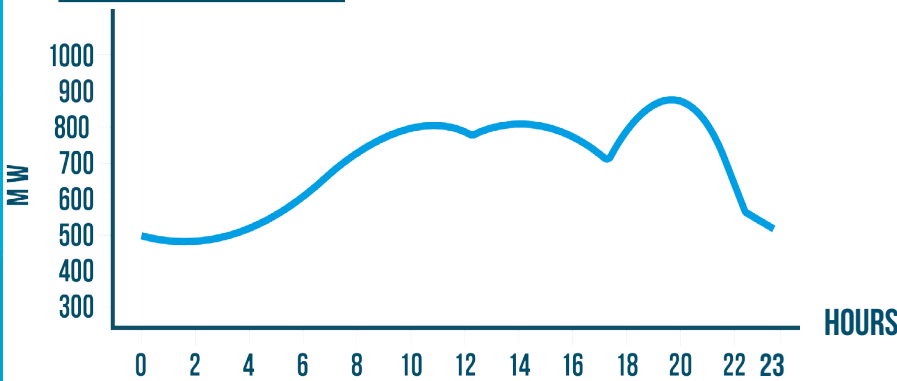
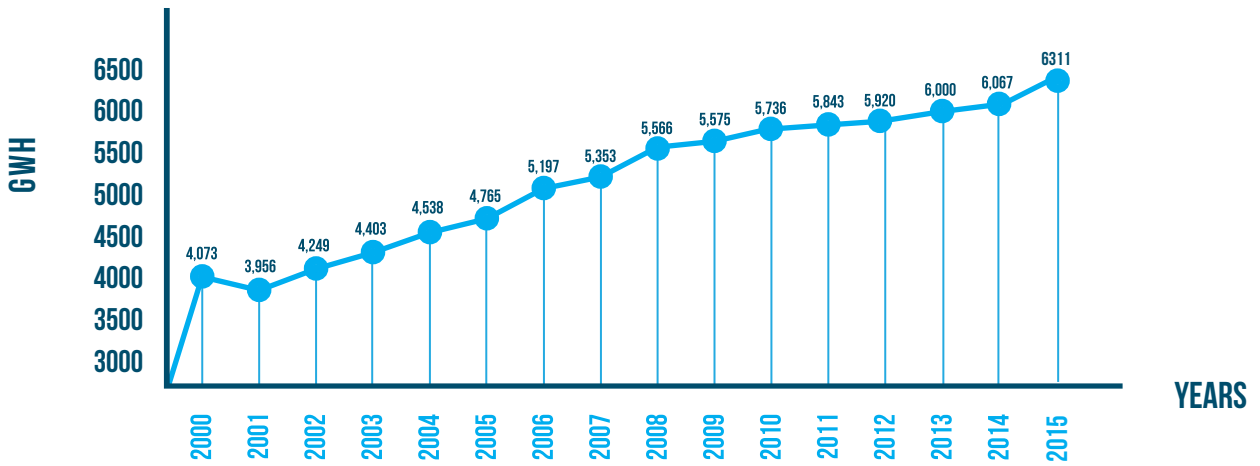
**MAXIMUN POWER DEMAND**



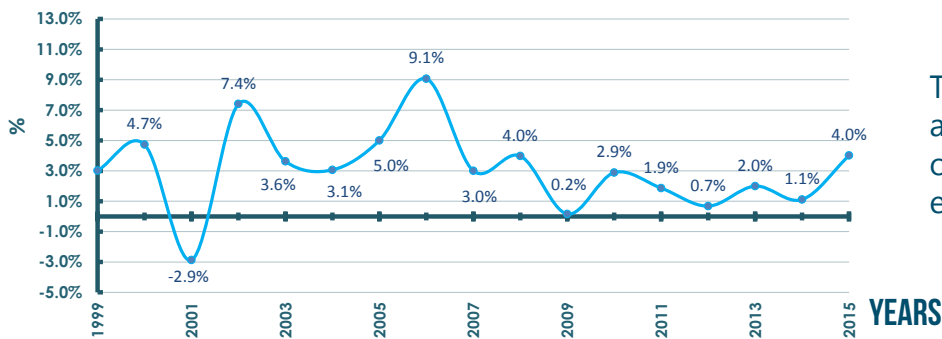
**MONTHLY MAXIMUN POWER DEMAND**



# ENERGY DEMAND EVOLUTION



A typical hour load profile is shown for 2015. As it is shown the current load profile has changed exhibiting two peaks which coincide with the 14 and 18-20hrs.



The negative variations in 2001 and 2009 are mainly, the result of natural phenomena and the economic crisis respectively.



# BASES FOR TO THE TRANSFORMATION OF ENERGY SECTOR IN EL SALVADOR

## CONFORMATION OF THE NATIONAL ENERGY COUNCIL TO LEAD THE NATIONAL ENERGY POLICY

2010/2024

The National Energy Council's Directive Board is integrated by ministers of Economics Ministry, who presides, the Technical and planning Secretary of the presidency, the treasury Ministry, Public Works Ministry, the Environmental and Natural Resources Ministry and the Consumer Protection Agency.

## ACTIONS PERFORMED FOR THE DIVERSIFICATION THE ENERGY MATRIX AND INVESTMENT INCENTIVES IN THE ELECTRIC SECTOR.



REFORMS TO THE ELECTRICITY MARKET OPERATION



INCENTIVES FOR INVESTMENTS IN THE ELECTRICITY SECTOR



### REFORMS TO THE MARKET OPERATION

Important modifications to the *"Transmission System and Wholesale Electricity Market Operation based on Production Cost"* Regulation were made to allow the inclusion of the non-conventional renewable generators.

EXECUTIVE DECREE  
**N° 15**

The public biddings destined to non-conventional renewable energy sources, will be able to subscribe through non-standardized supply contracts without Firm Power compromises.

EXECUTIVE DECREE  
**N° 80**

Non-conventional renewable power plants have dispatch priority, which will be regarded as having variable Operational Costs equal to zero.

AGREEMENT  
NO. 132-E-2014

Modifications to the *"Norms regarding long term contracts through free competition processes"*.



## INCENTIVES FOR THE INVESTMENTS IN THE ELECTRIC SECTOR

### MAIN INCENTIVES:

Legal frameworks have been developed to foster the investments in the electricity sector:



#### FISCAL INCENTIVES LAW FOR RENEWABLE ENERGY

to Foster renewable energy resources in electricity generation.

1. Duty-Free on importing for equipment destined to electricity generation (During the first 10 years)
2. Exemptions to the income tax for a 5 year period to projects greater than 10 MW, and to a 10 year period to projects smaller than 10 MW.
3. Total exemption of the payment for taxes coming directly of the sales of the Certified Emission Reductions (CERs, in the framework of the Clean Development Mechanism) or similar Carbon Markets.

<http://www.asamblea.gob.sv/ley-de-incentivos-fiscales-para-el-fomento-de-la-energia-renovable-en-la-generacion-de-electricidad>



#### PUBLIC - PRIVATE PARTNERSHIPS SPECIAL LAW

1. Development of projects with Public - Private Partnerships for the infrastructure prevision and public services in general in an effective and efficient way.

<http://www.asamblea.gob.sv/ley-especial-de-asocio-publico-privados>



#### INVESTMENT LAW

1. Egalitarian treatment to national and international investors.
2. Free transfer to the exterior of the profits and dividends related to the investment
3. Access to local funding.

<http://www.asamblea.gob.sv/ley-de-inversiones>

### OTHER INSTRUMENTS: PROJECTS CATEGORIZATION.

Depending on their size and impact, non- conventional renewable energy projects may require the less proceedings and licenses, which foster growth.



PHOTOVOLTAIC ENERGY



HYDROELECTRIC RESOURCE



GEOTHERMAL RESOURCE

<b>GROUP A</b>	<b>LOW POTENTIAL IMPACT</b>	Does not require the presentation of environmental documentation.
<b>GROUP B</b>	<b>CATEGORY 1 MODERATE POTENTIAL IMPACT</b>	It solely requires the presentation of a small form.
	<b>CATEGORY 2 HIGH POTENTIAL IMPACT</b>	An environmental impact study is needed

# PROCEDURES TO FOLLOW IN ORDER TO INCORPORATE A NEW GENERATOR IN THE ELECTRICITY SECTOR

## 1 ELECTRICAL INTERCONNECTION.

The Electricity General Law, according to its article N° 27, establishes that the Transmission Agent and the Distribution Companies must allow the interconnection of the market agents to their facilities, permitting the transportation of the electric energy, except when this represents a danger to the operation and the security of the electric system, installations and people.

In order to make viable the before mentioned, the **“Technical Norm for the Electric Interconnection and Final User Access to the Transmission Grid”** (SIGET Agreement 30-E-2011) in which the procedures, requirements and responsibilities applicable to the electrical interconnections between operators are determined, was created with the aim of guaranteeing the free access principle to the transmission and distribution facilities, as well as the quality and the safety of the system. This norm is mandatory to all operators that demand an interconnection among their installations.

The interconnections and the agreed conditions among the involved parties, must comply the established on the norm and methodologies which specify the design, access, safety, operation of electric installations and the technical characteristics of the materials and equipment according to the corresponding legal framework.

- A. Electricity General Law.
- B. Electricity General Law Regulation.
- C. Competence Law.
- D. Competence Law Regulation.
- E. Regulation Applicable to the Electricity Commercialization Activities.
- F. Technical Norms of Design, safety and Operation of the Distribution Facilities.
- G. Standards for the Construction of Aerial Electricity Distribution Lines.
- H. Technical Specifications Manuals of the Materials and Equipment utilized for the Construction of Aerial Electricity Distribution Lines.
- I. Quality of Service Norms for Distribution Systems.
- J. Standard IEEE 315-1975 “Graphic Symbols for Electrical and Electronics Diagrams”.
- K. Any other Regulation, Norm or Methodology that could be applicable to the Interconnection Activities which are issued or approved by the Senate or SIGET.






The duty of interconnection between transmitters and distributors comprises the following aspects:

- 1 To allow the link of their equipment and installations to other operators, and,
- 2 To allow the use of their equipment and installations to carry electrical energy by third parties through corresponding fee payments.

In order to enable the interconnection, the respective request must be presented either to the Transmitter or the Distributor in which it expresses the technical Characteristics of the equipment or installations to be interconnected, the point of interconnection, the maximum capacity to be demanded or injected according to the type of interconnection and the Service's start operation date.

Once received the interconnection request, the transmitter or the distributor, will have a 30 business days period to accept or reject the request. In the case that the request be accepted, the requester will be notified about the proposed technical and economic conditions to enable the interconnection. If the request is rejected a detailed report presenting the reasons why the request was dismissed will be issued.

Investors will have to present either the transmitter or the distributor the following information:

-  1. Geographical Coordinates for the placement of the project.
-  2. Name of the county where the project will be installed.
-  3. Power to be installed.
-  4. Level of Tension of the Generation Plant.
-  5. Information regarding the inverter or the final user:

Whole name or Business name.  
Date of Birth or Date of the construction of the Enterprise.  
Profession, Category that the enterprise performs  
Address, Phone numbers, PBX, Web Page (If it had)  
E-mail of contact.



6. Generation Technology.

## 2

# ENVIRONMENTAL LICENSES

## REQUIREMENTS

The Environmental Law, its Regulation, and the Norm that the Environmental and Natural Resources Ministry (MARN) elaborates, are the legal instruments that have to be taken into account in order to comply the legal environmental regulations.

MARN has developed a **Categorization of the Activities, Works or Projects According to the Environmental Law**, with which it is determined if an activity, work or project either requires the delivery of an Environmental Impact Study or not. This means that this categorization will allow knowing the type of environmental documentation that the investor should present in order to expedite the environmental evaluation process, if needed. The categorization activities, works and projects are based on the following criteria:

### SPAN

It is a criterion associated with the size, extension, surface, volume, or magnitude of an activity, Work or Project.

### NATURE OF THE ENVIRONMENTAL POTENTIAL

It refers to the sensibility of the site or the state of conservation of the environmental factors: Water, soil, air, flora and fauna of the environment where an activity, Work or Project is intended to be installed, namely the capacity that the environment has to assimilate or neutralize the potential impacts to be generated by human activities and the period of time that it requires for its recovery without and exogenous intervention.

### NATURE OF THE ENVIRONMENTAL IMPACT

This criterion is related with the type of process to be executed, and with its associated potential risk.

## 3

## INSTALLATION LICENSES OF GENERATING POWER PLANTS WITH THE REGULATOR

Projects that participate in the electricity market will need to be registered on the **Registry for Operators of Electricity Sector** that SIGET coordinates and they will be subject to the compliance of the current Environmental Law.

Requirements to sign in as an Operator in the Electricity Market and to develop Generating Power Plants:



- 1 All new investments require to be registered on SIGET's Electricity Registry, according to what is established on the SIGET's Creation Law Regulation.



- 2 Concessions will be granted by the Senate in accordance with the established on the **Regulatory Law for Concession Granting to Electricity Generation Projects on Small Scale**; in which the conditions of the use of the resource are established, and for a maximum period of time of fifty years.

People interested must present a formal request including the following documents:

- A. Data from the requester, relative to his existence and legal capacity.
- B. Prefeasibility study of the project which will include a descriptive memoir and the corresponding maps.
- C. An Environmental Impact Study previously approved by the competent authorities in the field, which should allow systematically the evaluation of the project's effects and its appendixes works, in its construction stages, operation and abandonment; the comparison of the different existing options, taking preventive measures and the design of actions to mitigate the project's adverse effects.
- D. Project's expected commercial operation starting date.

The detail of these procedures can be found at: <http://energiasrenovables.cne.gob.sv/>

Investments in thermoelectric or non-conventional generating technologies, among which Eolic, Solar (and any of its variants), biomass and tidal technologies are included, should be registered in the Registry for Operators of Electricity Sector that SIGET coordinates and which is annually updated.

The detail of these procedures can be found at: <http://www.siget.gob.sv/index.php/temas/temas-n/documentos/formularios>

## 4

## INSCRIPTION TO PARTICIPATE IN THE WHOLESALE ELECTRICITY MARKET (MME)

The operation of the MME is ruled by the “**Transmission System and Wholesale Electricity Market Operation based on Production Cost**” regulation also known as ROBCP. According to the dispositions of this regulation in the MME a programmed dispatch is carried out for each programmed hour period, being these periods based on production costs for each available generating unit in the electric system. A Natural Person or a Legal Entity who is interested in becoming a **Partaker of the Market (PM)** must present a formal request to UT.

In the Inscription Appendix, Appendix B of the ROBCP, is described the information and the requested procedure to submit a formal request. UT will verify that the applicant submits the required information; the request will be accepted and the applicant will be incorporated as PM in the requested date only if the request complies with all the requirements established in the Inscription Appendix.

In order to partake in the MME, each PM has the responsibility of informing about its generation in time, modality or format required by the UT for units equal or greater than 5 MW (Article 3.2.3.1 ROBCP).

## 5

## FISCAL INCENTIVES

To foster investments in renewable energy resources, regulations have been developed to guarantee and promote a wider market in the sense of the better use of these resources. To achieve this, there exists the **Tax Incentive Law to Foster Renewable Energy Resources for Electricity Generation** and a **Technical Norm** to characterize the projects that take advantage of the renewable resources in electricity generation, which are developed by SIGET, and with which all tax benefits that are awarded for all installation projects for electricity generation based on Hydraulic, Geothermal, Eolic, Solar and Biomass resources are regulated.

These benefits consist of exemptions to the income tax for a and Duty-Free on importing depending on the capacity of the plant and the total exemption of the payments for taxes coming directly of the sales of the Certified Emission Reductions (CERs).

Tax Incentives can be classified into three categories:

- 1 During the first 10 years the investors will benefit from Duty-Free on importing for machinery, equipment and supplies.
- 2 Exemptions to the income tax due to Electricity Commercialization.
- 3 Total exemption of the payment for taxes coming directly of the sales of the Certified Emission Reductions (CERs, in the framework of the Clean Development Mechanism) or similar Carbon Markets.

# BIDDING PROCESSES

In El Salvador the bidding processes for long term Contracts (CLP) have been introduced as part of the normative changes established by the government which are tools that allow to stabilize the tariffs to the electricity final users within a Production Cost-based Electricity Market.

The necessity to gradually minimize the dependence on Oil derivatives and the diversification of the national energy matrix are the starting points to promote the bidding processes for new generation sources in the country.

## 1 355MW BIDDING PROCESS

DECEMBER  
2012

Release  
(desert process for the first time)

- 11 | Enterprises Bought the Bidding Bases
- 02 | Enterprises presented Offers

Required Power	Allowed Technologies	Offer Power	Offer Price
<b>355 MW</b>	<b>NG</b> NATURAL GAS	<b>NG</b> 355 MW	<b>NG</b> 119.99 US\$/MWH
	<b>MC</b> MINERAL COAL	<b>MC</b> 170 MW	<b>MC</b> 135.03 US\$/MWH

### BIDDER GRANTED

The Natural Gas (NG) offer was granted to the Pacific Energy (EP) enterprise and the contract was Bidder Granted signed on December 20th 2013.

This project will execute social benefit works for an amount approximately US\$532,500 /year.

## EL SALVADOR WILL BECOME IN A NATURAL GAS HUB

Besides of injecting the less expensive electric energy generated on the system, the Natural Gas will bring to the country an opportunity to lead the Regional Natural Gas Market.

The projected private investment rounds between 800 and 1000 Mill US\$, the biggest investment in the history of the country.

The Natural Gas will not just be useful to diversify the energy matrix but also will provide a clean and efficient energy for the country.



## 2 15MW NON-CONVENTIONAL RENEWABLE ENERGY BIDDING PROCESS

This Process was exclusively targeted to small renewable projects for hydroelectric, Solar and Biogas technologies, connected to the Distribution Grid not having the option for participating in the Wholesale Electricity Market. A 30 Mill US\$ Investment for these projects is estimated.

**2013**  
LAUNCHING

NUMBER OF OFFERS  
**42**

### TECHNOLOGIES

### POWER OFFERED

### MEAN OFFER PRICES

<b>PCH</b> Small Hydroelectric Plants 2 OFFERS	<b>PCH</b> 0.495 MW	<b>PCH</b> 161.75 US\$/MWH
<b>SFV</b> Photovoltaic Plants 37 OFFERS	<b>SFV</b> 14.36 MW	<b>SFV</b> 181.79 US\$/MWH
<b>BG</b> Biogas 3 OFFERS	<b>BG</b> 0.65 MW	<b>BG</b> 228.00 US\$/MWH

### SIGNED CONTRACTS

28 SFV      2 BG      2 PCH

## 3 100 MW RENEWABLE ENERGY BIDDING PROCESS

With the purpose of incorporating new large scale- renewable energy projects in the national energy matrix, a 100 MW Renewable Energy Bidding Process was launched, specifically targeted for Solar and Eolic Technologies to participate in the Wholesale Electricity Market.

**POWER  
REQUIRED**

**40 MW**

Eolic Energy

**60 MW**

Photovoltaic Energy

This bidding process counted with the participation of 26 national and international enterprises with the participation of countries such as: Spain, France and Mexico.

<b>SFV (PV) TECHNOLOGY</b>	<b>NEOEN-ALMAVAL</b>	<b>SOLAR RESERVE DEVELOPMENT CO. II, LLC</b>	<b>“LA TRINIDAD” PROJECT</b>	<b>“LA TRINIDAD” PROJECT</b>
<b>POWER ( MW )</b>	<b>60.00</b>	<b>20.00</b>	<b>8.00</b>	<b>6.00</b>
<b>PRICE ( US\$/MWH )</b>	<b>101.90</b>	<b>125.37</b>	<b>123.88</b>	<b>123.98</b>

## **4 NEW BIDDING PROCESS FOR THE HIRING OF 150 MW NON-CONVENTIONAL RENEWABLE ENERGY RESOURCES (ERNC)**

El Salvador is the only country in the region which has currently carried out studies that allow the analysis of the effects on the electricity grid that the new non-conventional renewable energy resources (ERNC) may have, which consider the Electric System’s Spinning Reserve. This is the second study carried out for the inclusion of these technologies in the 2016-2020 time window.

[http://estadisticas.cne.gob.sv/images/boletines/estudios/Estudio\\_ROR.pdf](http://estadisticas.cne.gob.sv/images/boletines/estudios/Estudio_ROR.pdf)

This type of study becomes a very important decision-making tool in terms of the Energy Policy, inasmuch as without the obtained results, the amount of ERNC to be included to the national energy matrix could be overestimated, causing problems to the system’s operation.

Considering the obtained results on the study, a decision to foster a new non-conventional renewable energy resource bidding process has been taken into consideration, which is targeted to Eolic and Solar Generation through long term PPA’s .

As part of an innovation to this bidding process, the participants will have the possibility of leasing lands that are unoccupied for the installment of their plants. Also enterprises that are allocated will have to assume social responsibility and will have to implement social development programs that will benefit many families in the surroundings of the projects once these start operating.

The 150 MW Bidding Process Bases are expected to be presented the first days of February 2016, with the aim that the signed projects may be able to start their operations in 2019 for Solar Technologies and 2020 for Eolic Technologies. The expected schedule of the process is attached.

# NEW BIDDING PROCESS FOR CONTRACTING 150 MW NON-CONVENTIONAL RENEWABLE ENERGY RESOURCES (NGRE)

2015

**1** Adaptation of the Previous Bidding Terms November to December

**2** Publication of the Previous Terms and Reception of inquiries February

**3** Adjustments to the Terms by the Distributors March

2016

**4** Calling to Bidding and the Terms Sales April

**5** Consultation Period for the proponents and adjustments to the Terms May - July

**6** Reception and Evaluation of the Offers August - November

2017

**7** Publication and Contracts Signing November - January

# **ELECTRICITY SECTOR OF EL SALVADOR**

**National Energy Council**

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UNÁMONOS PARA CRECER

**2016**

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