



**GOBIERNO *de*
GUATEMALA**

**MINISTERIO DE
ENERGÍA
Y MINAS**



EXPANSION PLAN OF THE TRANSPORTATION SYSTEM

2022 - 2052

EXPANSION PLAN OF THE
**TRANSPORTATION
SYSTEM**
2022-2052

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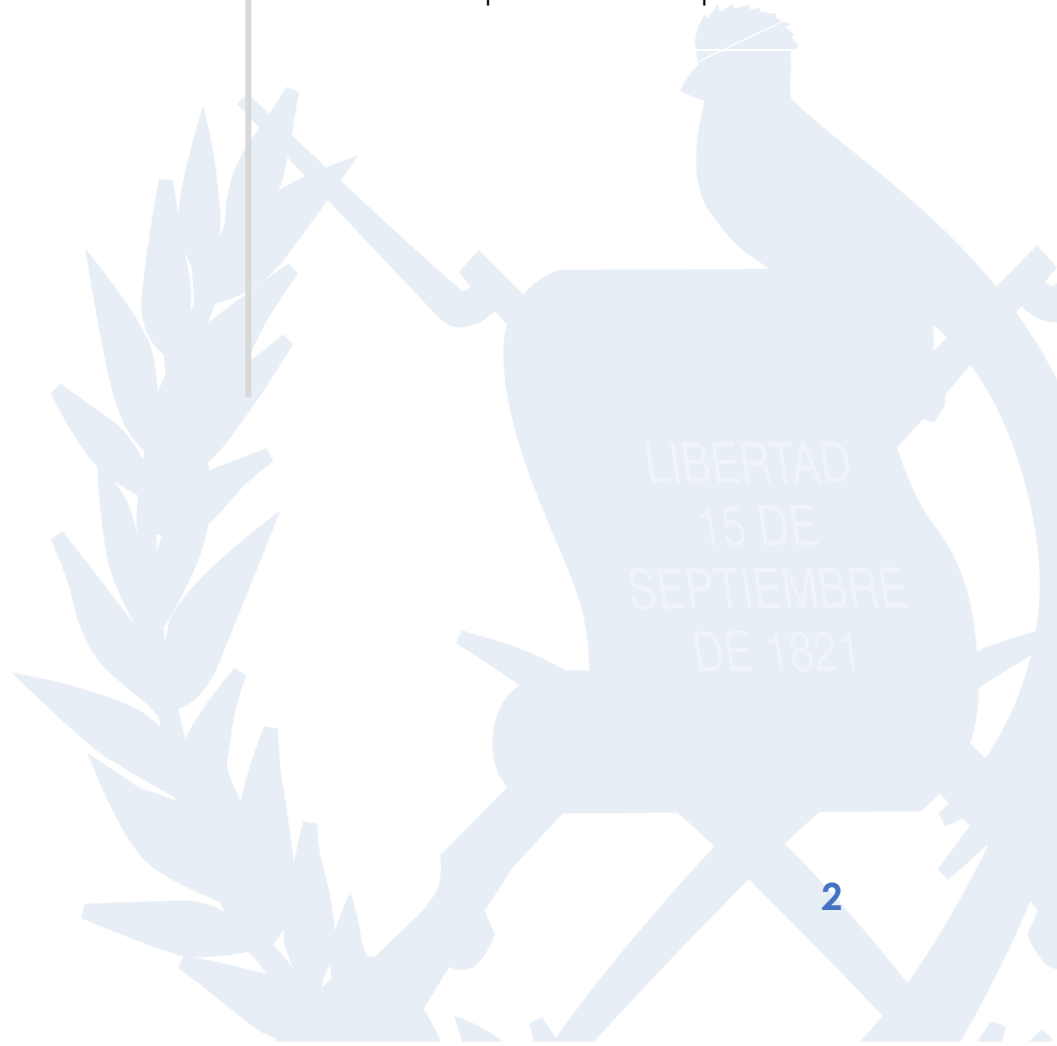


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PRESENTATION

The Government of Guatemala through the Ministry of Energy and Mines, has the honor to present the Expansion Plan of the Transportation System PET-2022-2052 (for its acronym in Spanish) in compliance with the mandate of the General Law on Electricity. Given the strategic importance of electricity in the economic recovery of the country following the COVID-19 pandemic and its contribution in meeting the goals set in the Government General Policy 2020-2024; Plan for National Development K'atun 2032; national development priorities of SEGEPLAN (for its acronym in Spanish) and the Sustainable Development Goals.

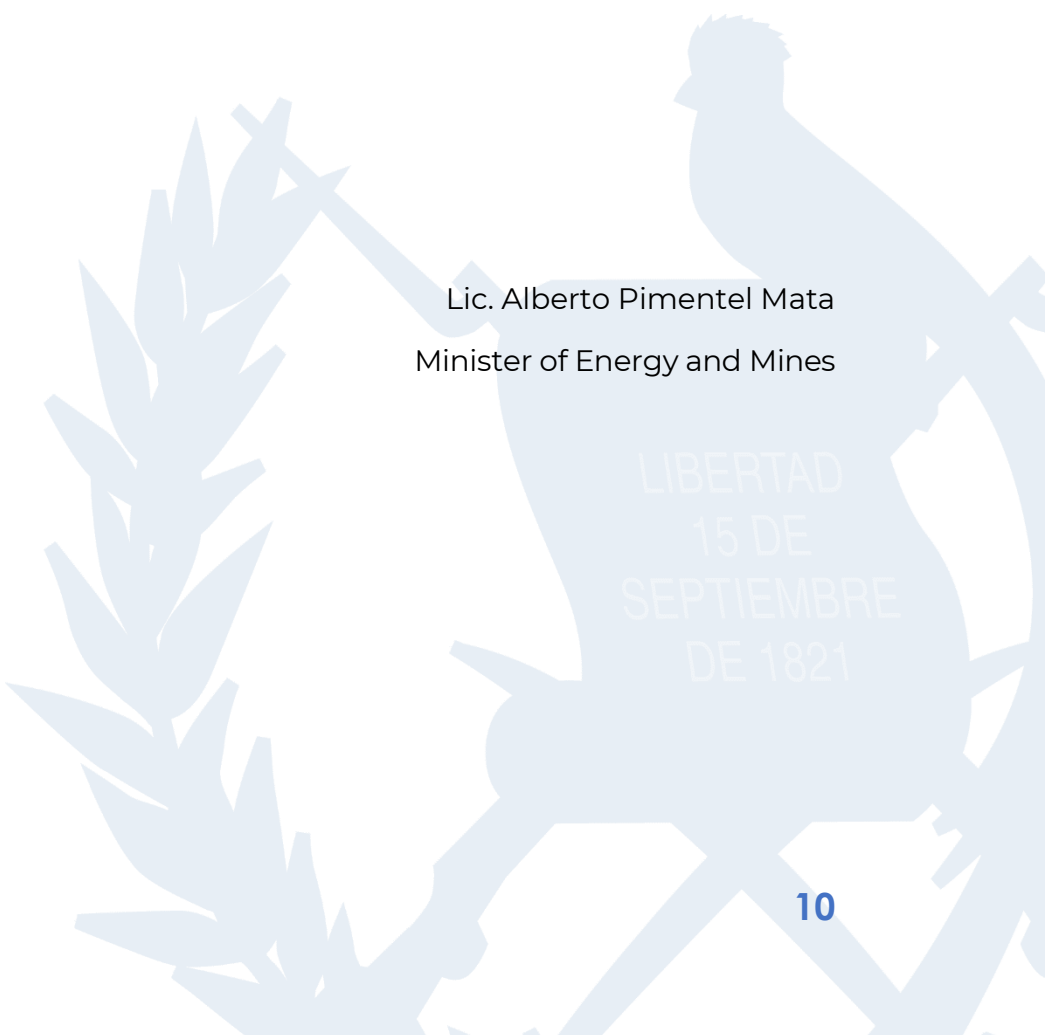
The Plan was produced considering the importance of having a strategic Transmission infrastructure that guarantees the electricity supply to all users, allowing the connection of Generation in different parts of the country, as well as the connection of large users and facilitating the execution of the plan for the economic recovery of the country.

The Strategic infrastructure represents for Guatemala the opportunity to optimize transactions with our neighboring countries, Mexico, El Salvador, Honduras, and Belize, and additionally promote economic development in our country and generate prosperity mainly in the borders with such countries, promoting industry and permanent and decent employment. This plan considers the necessary infrastructure to promote the establishment of Green Hydrogen production chains, aware of the technological innovation that has been identified that the production and use of Green Hydrogen will be fundamental for the transition to an efficient and environmentally responsible energy matrix.

Guatemala today requires a great effort in the commissioning of transmission infrastructure specifically related to Rural Electrification because currently there is an 89.26% coverage of access to electricity in the national territory, with more than 400,000 households that do not have this service. A strategic objective was established within the General Government Policy 2020-2024 to focus efforts to achieve 90% coverage by 2023, prioritizing the rural population in unfavorable economic conditions.

Investments in transmission will allow us to have a safe, reliable, and quality system to meet the needs of rural electrification and guarantee the growth of demand in the long term and reach all users and producers of energy, with the quality they require in accordance with current regulations, and thus generate the conditions for human and economic development of all Guatemalans.

It is important to emphasize that planning is a strategic tool for the country and for the electric sector, which allows us to make Guatemala an Efficient, Sustainable and Competitive country with a horizon towards the year 2052.



Lic. Alberto Pimentel Mata
Minister of Energy and Mines



EXECUTIVE SUMMARY

The Expansion Plan of the Transportation System is based on Article 54 of the Regulation of the General Law on Electricity. It is prepared in compliance with the Government General Policy 2020-2024 and in response to the PET's request for evaluation to be consolidated as a strategic and supporting instrument of the Economic Recovery Plan of Guatemala and the Innovation and Development Plan.

The Plan has a 30-year study horizon, with a long-term vision to the year 2052, based on the average useful life of the critical transmission assets; the remuneration schemes and consistency with the rest of the strategic instruments in energy matters; policies, plans of the Ministry of Energy and Mines and the growth of the population at the national level, to reach and maintain the coverage of access of electricity in indicators above 99%, thus improving the human development indexes in the country.

The Expansion Plan of the Transportation System PET-2022-2052 is prepared based on the identification of the actions contained in the Economic Recovery Plan, determining the deficiencies in the transmission network; because of this identification, the natural growth of demand is analyzed, defining seasonal demand scenarios, these scenarios incorporate the plants defined in the Indicative Expansion Plan of the Generation System. A contingency analysis is performed to assess the performance of the network in the face of fortuitous events, allowing to determine the reinforcements to guarantee the reliability of

the Transportation System. The Plan considers rural electrification as a predominant variable, so reinforcements are incorporated to adapt the network in such a way that rural electrification projects are more efficient.

The selection of reinforcements takes into consideration variables such as: average distance from the distribution network to users; average distance from the network to communities without access to the grid; current load of network elements; future load based on likely demand scenarios; transgressions in product quality limits as a result of natural demand growth; network deficiencies in the face of contingencies; generation potential; projected new generation; quality indexes and future interconnection scenarios.

The plan establishes 69 kV reinforcements that will boost the growth of the electric coverage index in the country; the recommended works are included throughout the national territory; they also improve the quality, safety, and performance indexes of the network at that voltage level and in the associated distribution networks. Reinforcements are included in the 230 kV transmission network, and the new 400 kV backbone network, passing through the most important generation and demand poles of the country, from the south in the department of Escuintla, towards Guatemala City, Tactic in Alta Verapaz and Petén Itzá in the north in the department of Petén, networks that will improve the capacity and access to the Interconnected Nacional System, as well as bilateral interconnections, encouraging international transactions and promoting foreign investment in the country. The Plan consolidates the electricity grid as a strategic and transversal infrastructure to promote compliance with the Economic Recovery Plan of Guatemala; Innovation and Development Plan and the Government General Policy 2020-2024, for the benefit of the Guatemalan population.

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Minister of Energy and Mines

INTRODUCTION

The history of the use of electricity in the world has demonstrated its importance in the productive development of a country's economy; due to its nature and ease of conversion, electricity have a fundamental role in all the productive sectors of a nation, this leads us to infer that access to electricity has a fundamental influence on development and therefore the correct planning of the infrastructure to supply future demand is a strategic objective in the Economic Recovery Plan of the country.

The Ministry of Energy and Mines (MEM), as the guiding entity of the electric subsector of Guatemala, through its specialized technical body, the Unit of Mining Energy Planning, and in compliance with the current legislation of the country and of the electric subsector, presents the Expansion Plan of the Transportation System with a long-term vision to fulfill with the objectives and goals of the Energy Policy.

The Plan is comprised by two sections, the first section contains the necessary information to contextualize the reader about the Expansion Plan of the Transportation System in Guatemala; the second section describes the works that contribute to the fulfillment of the Government General Policy 2020-2024 and that propitiate the materialization of the plan for economic recovery.

This Plan is focused on improving the life conditions, human development indexes (HDI) of the Guatemalan people, additionally it responds to achieve the industrialization of the country, the increase in the electric coverage index of the country, because electricity is an essential service, which is part of the development of productive processes, such as tourism, agriculture, cattle ranching, services, trade and free trade zones.



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Figure 1: Benefits of the Expansion of the Transportation System in Guatemala.



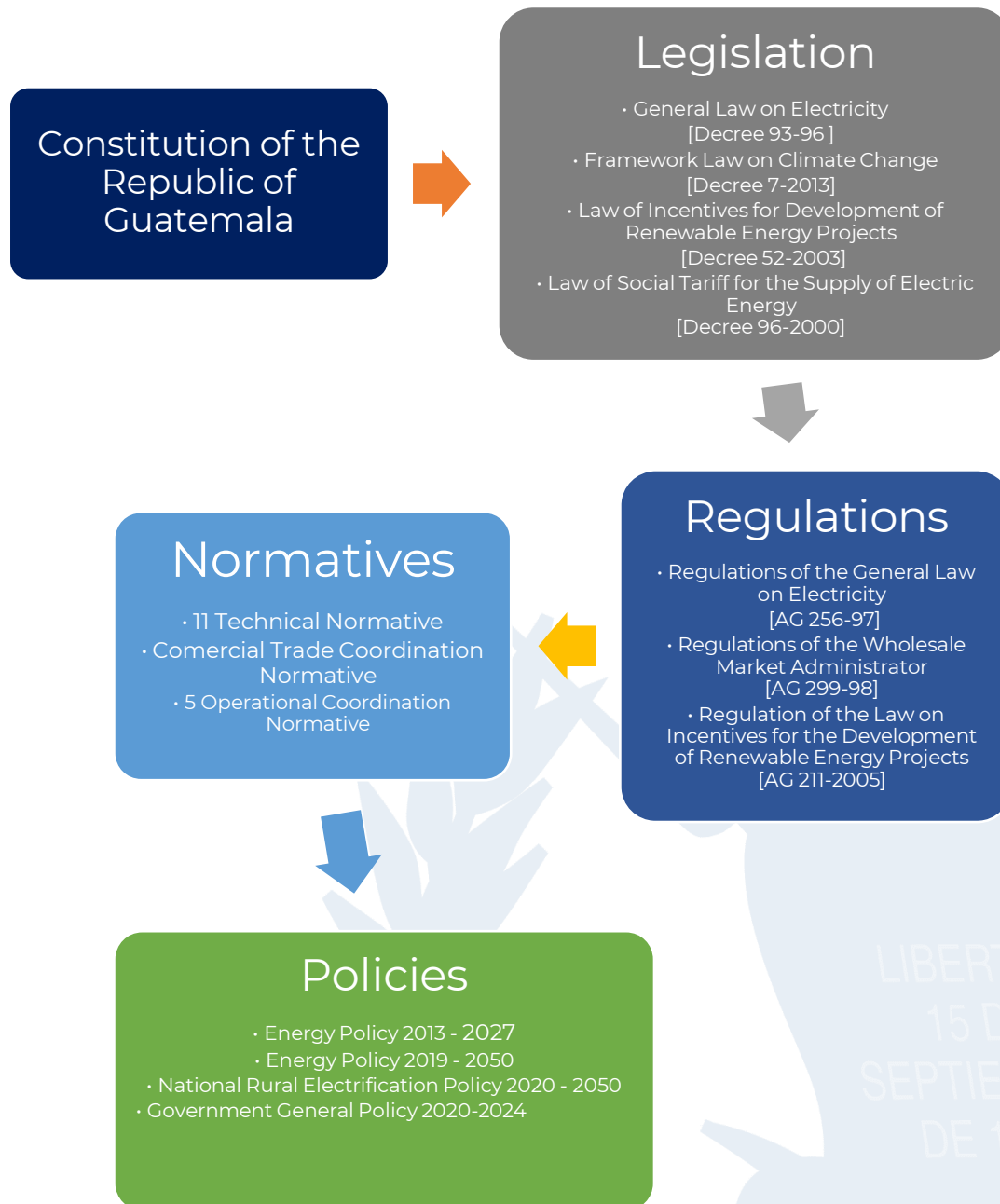
Fuente: Ministerio de Energía y Minas.

This document contains information about the economic context of the country; regulatory framework; variables and structure of the electric sector; commitments, goals and objectives, as well as the current situation of the transmission grid; projected demand; short, medium and long term reinforcements divided by departments according to the coverage index. Finally, the conclusions and recommendations are presented for the planning of the Transmission System for the Interconnected Nacional System (SNI for its acronym in Spanish).

1. REGULATORY FRAMEWORK

The electric sub-sector is organized and operates under a political and legal framework composed of laws, regulations, norms, and policies described in the following scheme:

Figure 2: Legal framework of the Electric Subsector.



Source: Ministry of Energy and Mines.

1.1. General Law on Electricity



The General Electricity on Law was approved through Decree No. 93-96 of the Congress of the Republic of Guatemala and was implemented for the development and assurance of the national electricity system.

This Law establishes the mechanisms that govern and monitor the activities of the electric power market, which is comprised of the activities of generation, commercialization, transmission, distribution and electricity consumption.

1.2. Regulation of General Law on Electricity



Through Executive Order No. 256-97, the Regulation of General Law on Electricity (RLGE for its acronym in Spanish) were made official, in accordance with Article 4 of the transitory provisions of the General Law on Electricity. The purpose of the RLGE is to regulate the necessary norms for the adequate application of the General Law on Electricity.

Article 54 of these Regulations establishes the procedure for the preparation of the Expansion Plan of the Transportation System, the stakeholders involved and the submission dates.

1.3. Regulation of the Wholesale Market Administrator

Subsequently, the President of the Republic signs Executive Order No. 299-98, which allows the entry into force of the Regulations of the Wholesale Market Administrator (RAMM for its acronym in Spanish), in accordance with Article 38 of the RLGE, which instructs the Ministry of Energy and Mines to prepare the specific regulations governing the operation of the Wholesale Market Administrator.

Article 15 Bis of the RAMM instructs the respective procedure for the preparation of the Expansion Plan of Generation, which must be prepared every 2 years, with a minimum study horizon of 10 years; being submitted to the AMM and the Commission of Electric Energy (CNEE for its acronym in Spanish) before September 30th of each year of preparation, and officially published by the MEM before the end of the first fortnight of January of the respective year of its publication.

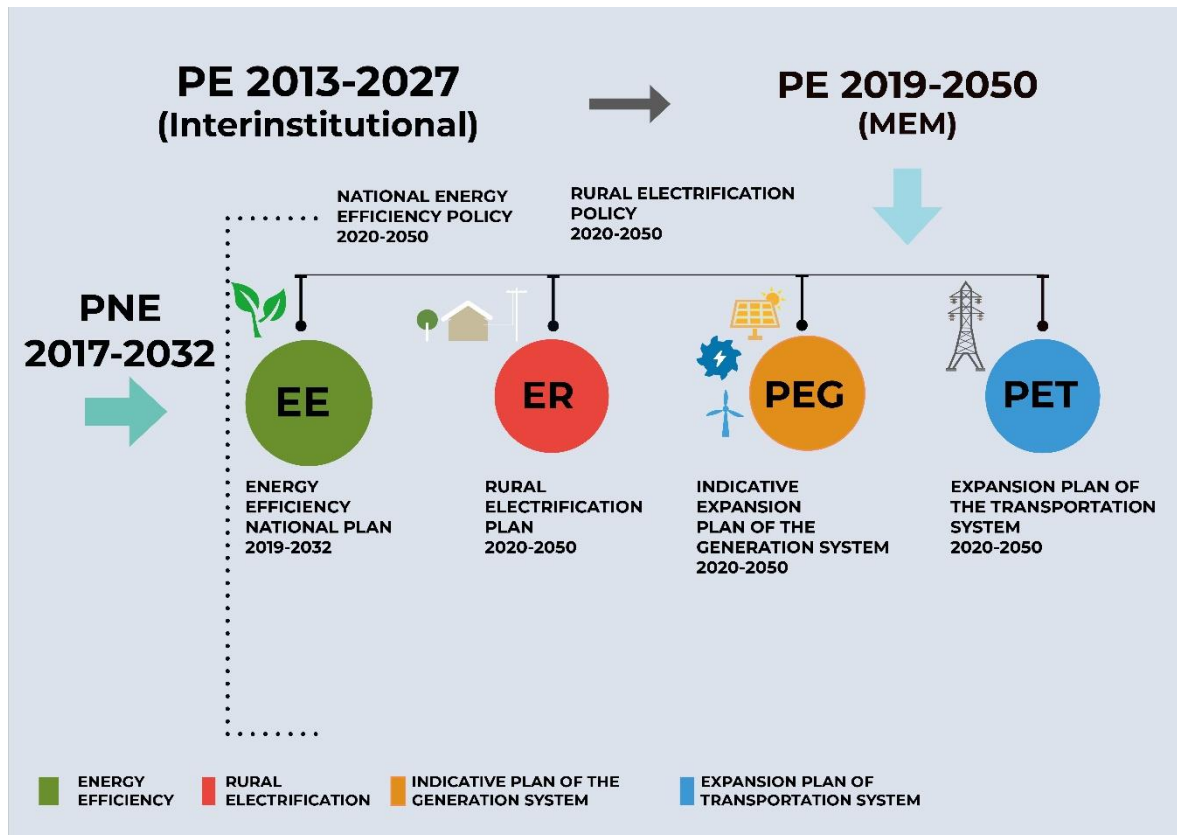


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2. GUIDELINES

The Ministry of Energy and Mines has presented a range of proposed actions and programs that respond to the various mandates and commitments of the energy sector that Guatemala has at the national and international level, the publication of these actions and programs have been made through various public policies and plans; the following figure shows the connection between the official documents.

Figure 3: Relationships of national plans and policies in the energy sector.



Source: Proprietary Production, MEM.

In addition to the diagram shown in Figure 3, other policy documents are mentioned below, which are necessary for the development of this document.

2.1. Plan for National Development K'atun 2032

The Plan for National Development K'atun 2032, proposes a common vision of the country, with confidence in a better future. It considers improving the quality of life of the inhabitants by efficiently providing basic services, including quality energy services, and promoting development in the country.

Among the priorities set forth in the K'atun plan, the Expansion Plan of the Transportation System responds to the following: "Access to quality energy with national coverage". This priority has one result, two goals: 100% energy coverage in rural areas, for domestic use and quality energy throughout the country for use in productive, industrial, commercial, and agricultural activities; and five guidelines related to the optimization of national transmission systems.

2.2. 2030 Agenda and Sustainable Development Goals

The 2030 Agenda for Sustainable Development with its 17 Sustainable Development Goals (SDGs), which was approved in September 2015 by the United Nations General Assembly, establishes a transformative vision towards economic, social and environmental sustainability of the 193 Member States, in which Guatemala belongs. Specifically in SDG 7 "Affordable and clean energy" determines that sustainable energy is an opportunity that transforms lives, economies, and the planet.

The creation and implementation of this plan directly contributes to meeting the following SDG 7 target: "By 2030, ensure universal access to affordable, reliable and modern energy services".

The reinforcement and expansion of the Electric Transmission System guarantees access to electric energy service, which is an affordable, reliable and modern commodity.

2.3. National Development Priorities and Strategic Goals

The various branches of government, civil society, the private sector and international organizations signed their commitment to the National Agenda for Sustainable Development and how it can be articulated with the Plan for National Development K'atun 2032.

The establishment of national priorities aims to seek integrated goals between the 80 goals established in the K'atun development plan and the 129 Goals

established in the SDGs, determining that between the two plans there are 99 goals that are related.

Figure 4: National Development Priorities



Source: K'atun 2032.

The integration of these objectives was synthesized into 16 objectives of the Strategic Development Goals (SDGs), which are transversal to both the K'atun Development Plan and the Sustainable Development Goals.

2.4. Economic Recovery Plan of Guatemala

For the year 2021, the country has adopted actions that contribute to the generation of employment, commercial exchange, attraction of new investments and growth of MSMEs in order to face the ravages of the coronavirus pandemic (COVID-19), and the Government has adopted measures in favor of the Guatemalan population that have guaranteed the protection of the population and the growth of the economy, according to the concrete measures described in the Economic Recovery Plan.

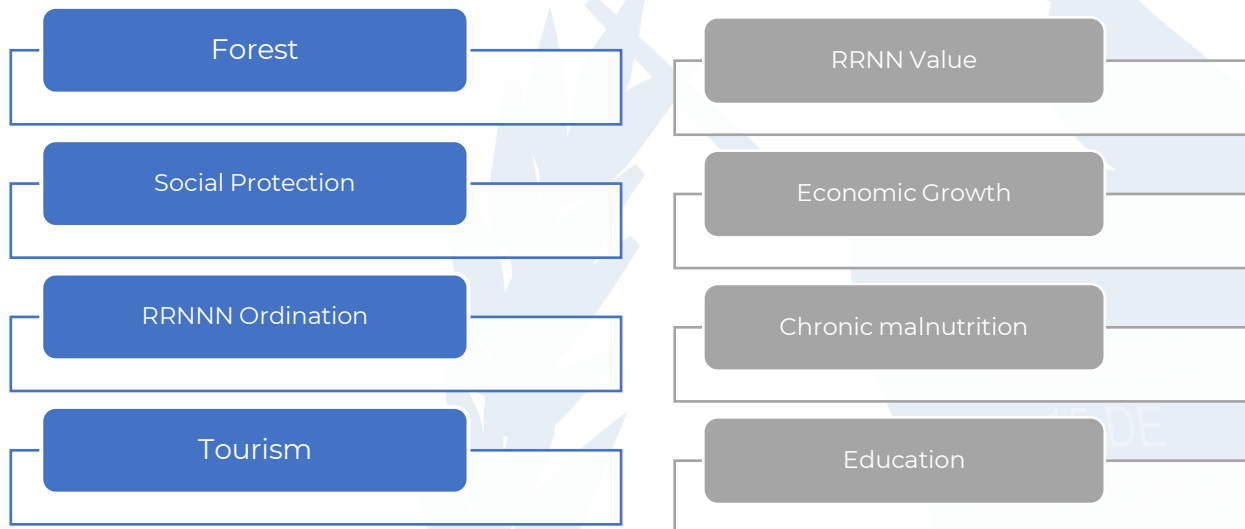
The strategy is based on 3 core concepts:

- Recover and generate new jobs.
- Actions to attract more strategic investments to the country.
- Actions to promote the use of Guatemalan goods and services.

✓ Transversal core concepts:

- Occupational health and safety
- Innovation
- Sustainability

Figure 5: Strategic Development Goals.



Source: Proprietary Production, SEGEPLAN.

2.5. Government General Policy GGP-2020-2024

The Government General Policy 2020-2024 arises from the harmonization of the strategic actions contained in the K'atun 2032, National Innovation and Development Plan; and the Sustainable Development Goals. It also contemplates a series of actions grouped into five strategic pillars: economy, competitiveness, and prosperity; social development; governance and security in development; responsible and transparent state; and relations with the world.

In synergy with the strategic and global pillars, the preservation and sustainable management of the environment is incorporated as a transversal core concept in synergy with the strategic pillars. The Government General Policy seeks the establishment of a more efficient and effective state in the fulfillment of its commitments to development, progress, peace, and equity for the entire population, thus progressively contributing to the transformation necessary to achieve the vision of the future desired for Guatemala.

Figure 6: Pillars of Government General Policy.



Source: Government General Policy 2020-2024.

2.6. Energy Policy 2013-2027

In response to Article 3 of the General Law on Electricity, on February 15, 2013, through Executive Order 80-2013, the Energy Policy 2013-2027 was made official. The efforts of this policy are focused on strengthening the country's conditions to make it more competitive, efficient, and sustainable in the use and exploitation of resources, directed towards the conservation of national strategic reserves, the satisfaction of needs and technological development.

Figure 7: Core Concepts Energy Policy 2013 - 2027.



Source: Energy Policy 2013-2027, MEM.

The energy policy 2013-2027 groups strategies and actions in 5 core concepts: Electricity security and supply at competitive prices; Fuel security and supply at competitive prices; Exploitation of oil reserves for local supply; Energy saving and efficient use; and Reduction in the use of firewood in the country. For the purposes of this plan, the objectives, actions, and goals formulated within the first core concept "**Electricity security and supply at competitive prices**" and the fourth core concept "Energy saving and efficient use" are taken into consideration.

2.7. Energy Policy 2019-2050

The Energy Policy 2019 - 2050 is of an institutional nature, with a mandatory mandate for the Ministry of Energy and Mines; it is important to emphasize that this policy does not discard or omit the validity of the Energy Policy 2013 - 2027, it is only an update to it.

The structure of this policy has been formulated as follows:

Table 1: Composition of consumption sectors and transversal core concepts, Energy Policy 2019 – 2050.

| Consumer sectors | Ejes Transversales | | | | |
|-----------------------------------|-----------------------------------|-----------------------------|-------------------|-------------------------|----------------------|
| Residential | Supply and end use of electricity | Supply and end use of fuels | Energy Efficiency | Sustainable Development | Firewood Consumption |
| Industry | | | | | |
| Mobility and Transportation | | | | | |
| Trade, Services and Institutional | | | | | |
| Energy Industry | | | | | |

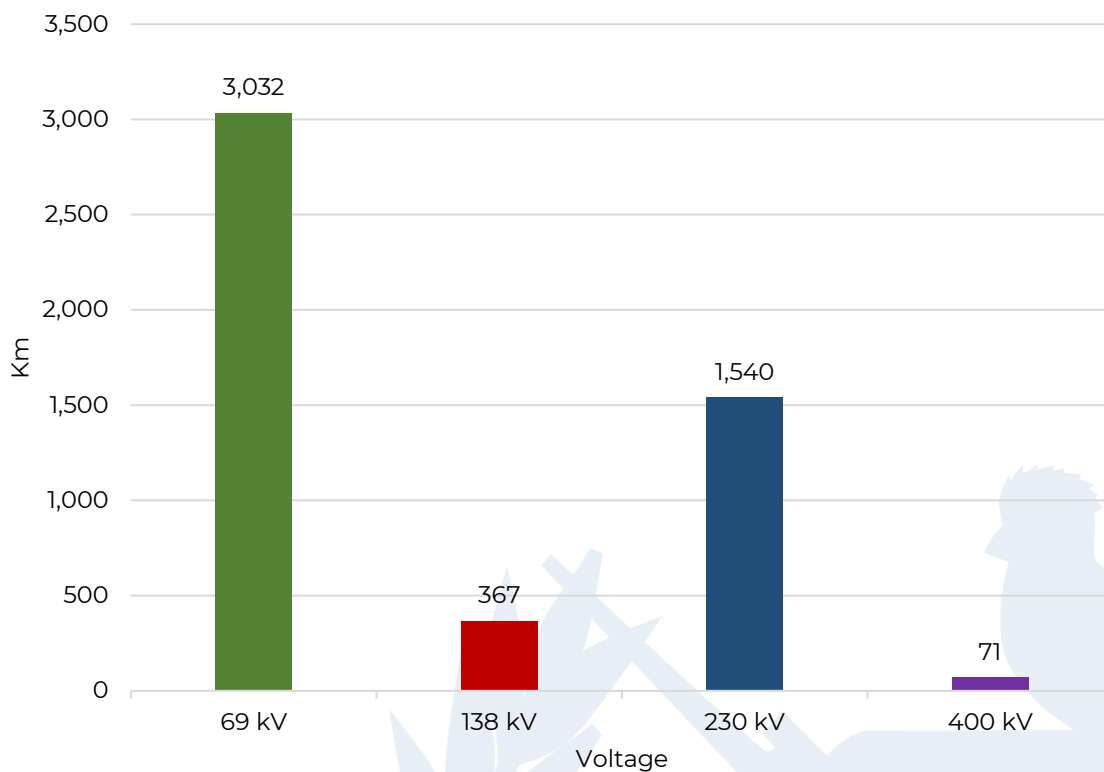
Source: Proprietary production, with data from Energy Policy 2019 - 2050, MEM.

This Policy has a total of 66 actions promoted in the matrix of consumption sectors (rows) and transversal core concepts (columns).

3. CURRENT SITUATION OF THE ELECTRIC POWER TRANSMISSION SYSTEM

Graph 1 shows the lengths in kilometers of electric power transmission lines for each voltage level. Currently, the electric power transmission system has approximately 5,010 kilometers of lines constructed throughout the country.

Graph 1: Kilometers of electric transmission lines by voltage.



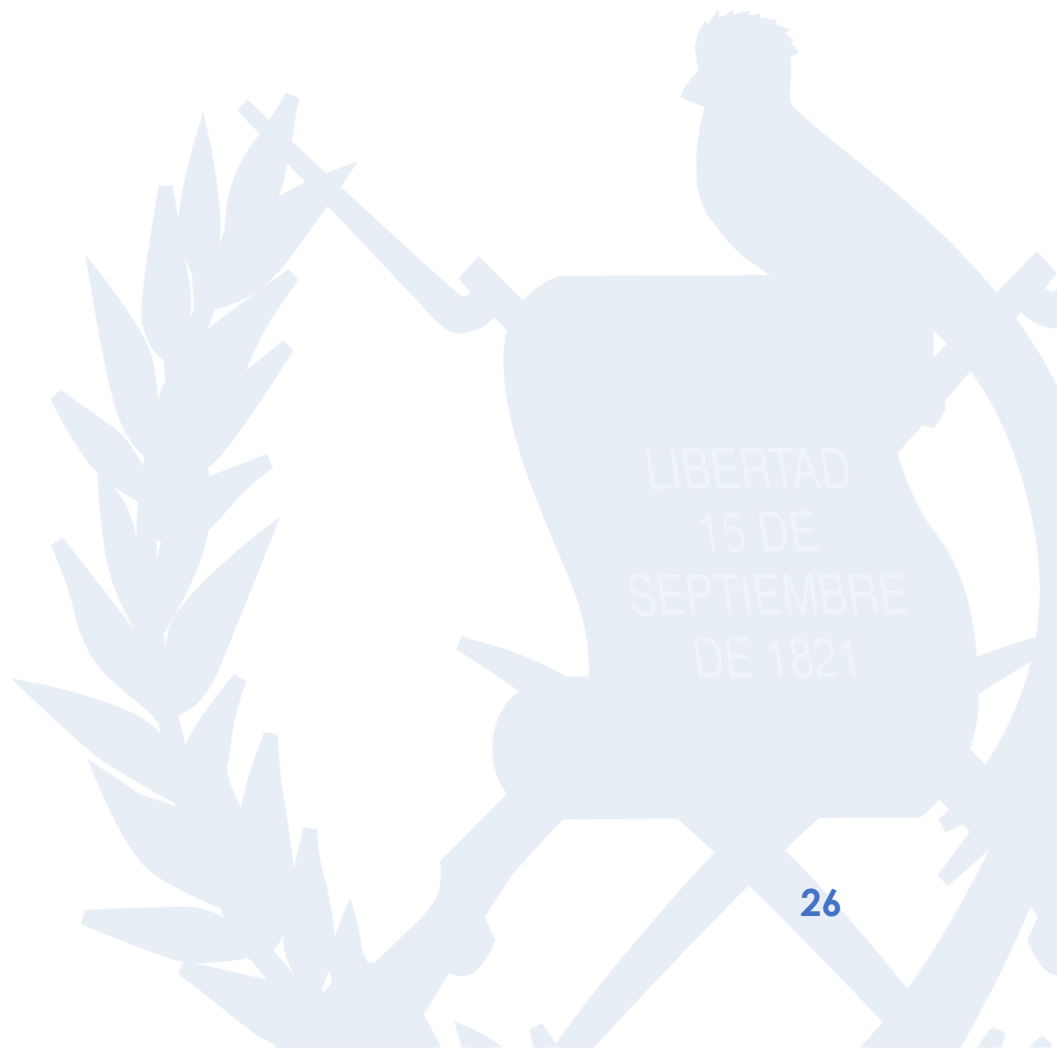
Source: CNEE.

The current situation of the electric power transmission system is presented below, classified by voltage level: 230 kV and 400 kV; 69 kV and 138 kV.

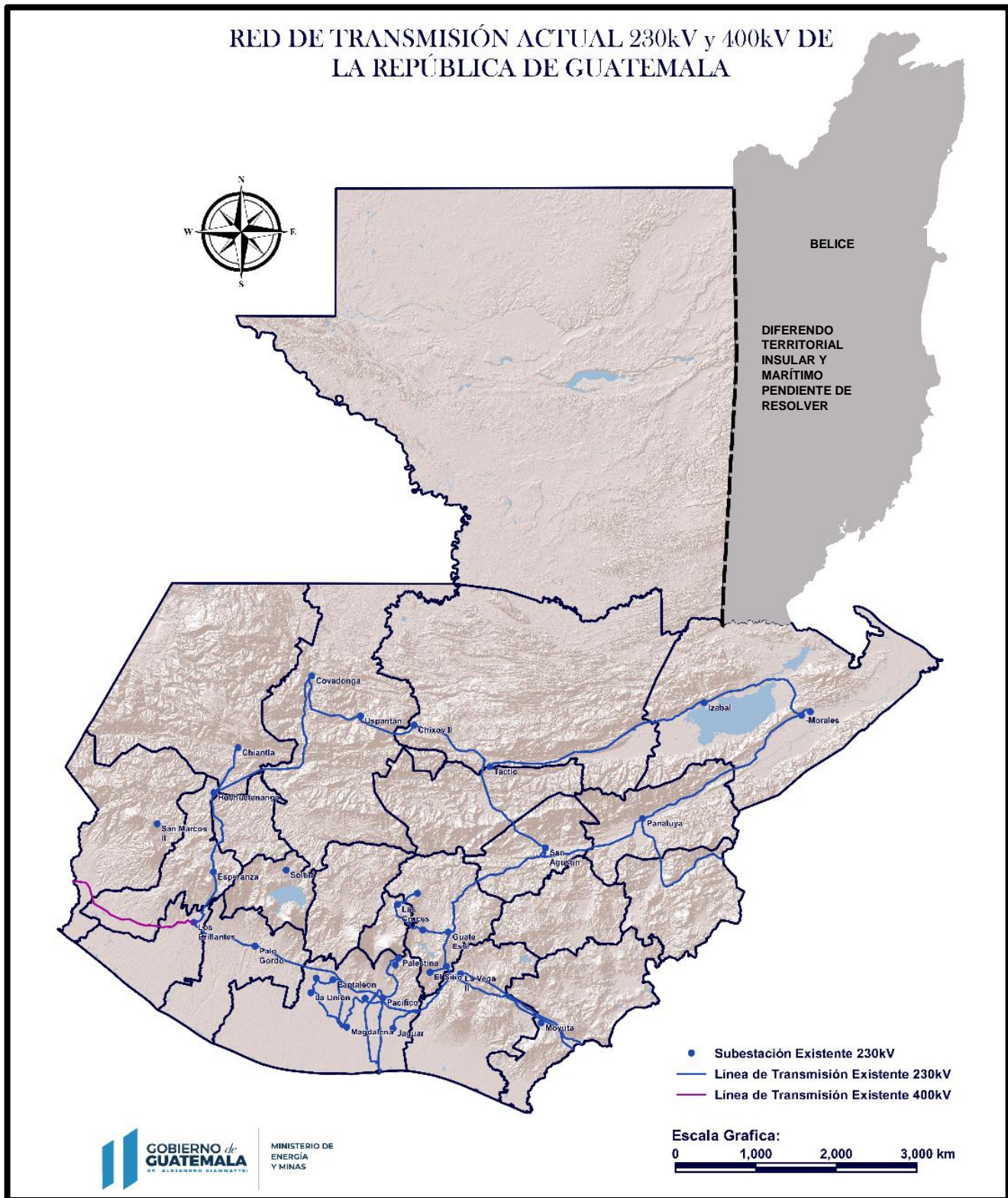
3.1. 230 kV and 400 kV Power Transmission Grid

Guatemala has a robust 230 kV infrastructure, with the addition of the network complement provided by PET-1-2009; this infrastructure enables the evacuation of generation to consumption centers. As can be seen, there is no 230 kV infrastructure in the northern region of the country. The implementation of new works in this area will benefit the population, since supply quality indexes are currently very low, and it is also very beneficial for the country by promoting a connection point for energy transactions with Mexico and Belize; it is also necessary to reinforce the 230 kV network in Huehuetenango, Quiché and Alta Verapaz, evacuation points for most of the hydroelectric generation during the wet season.

The existing 400 kV link currently interconnects Guatemala with Mexico, guaranteeing the security of electricity supply in the event of a contingency. This has led to the importance of analyzing the inclusion of a 400 kV main network from the Los Brillantes substation, passing through the metropolitan region, to a point in the northern and eastern regions of the country in order to provide a secure way to carry out electricity transactions from Mexico - Guatemala - Mexico, provide an opportunity for interconnection with Belize, and reinforce the existing interconnections with El Salvador and Honduras.



Map 1: Current 230 kV and 400 kV Electrical Transmission Grid of the Republic of Guatemala.

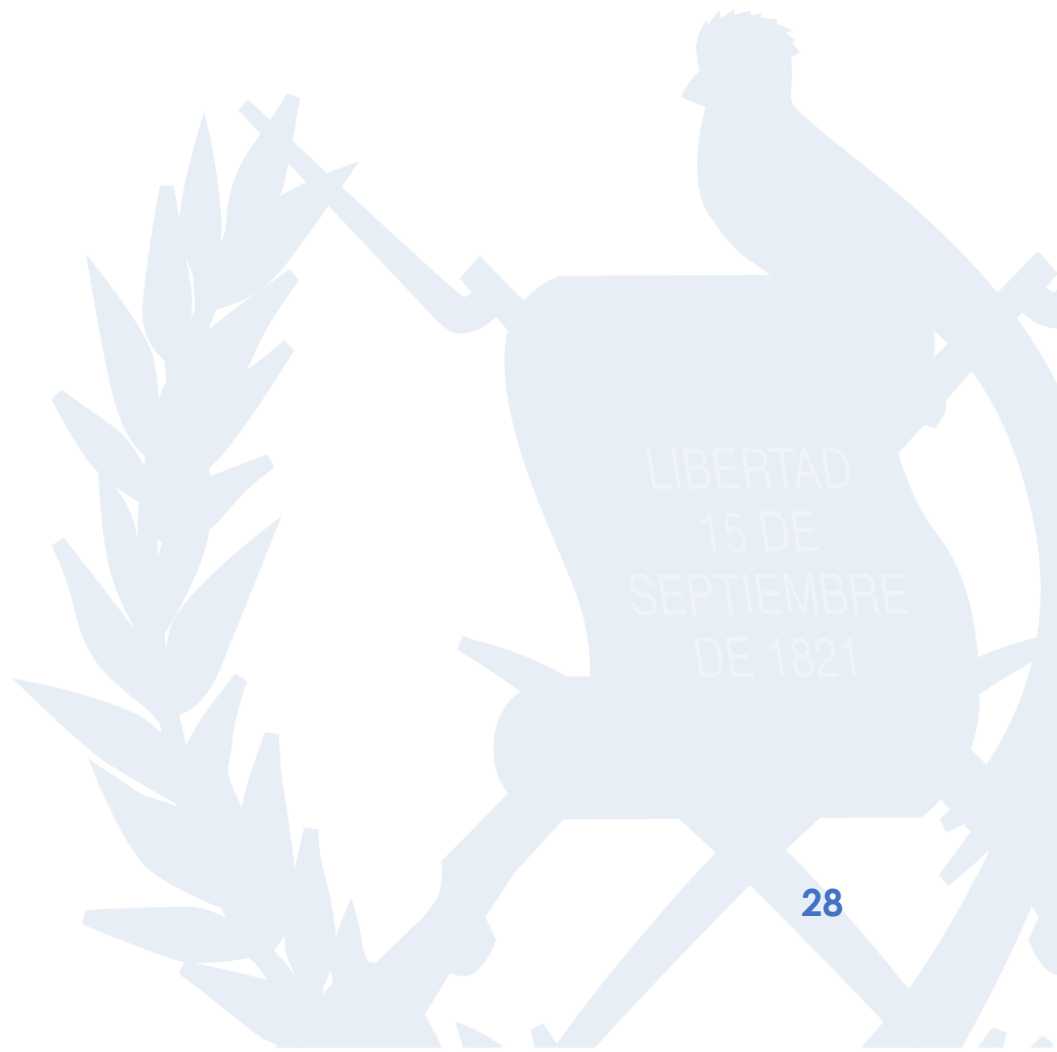


Source: Energy General Direction.

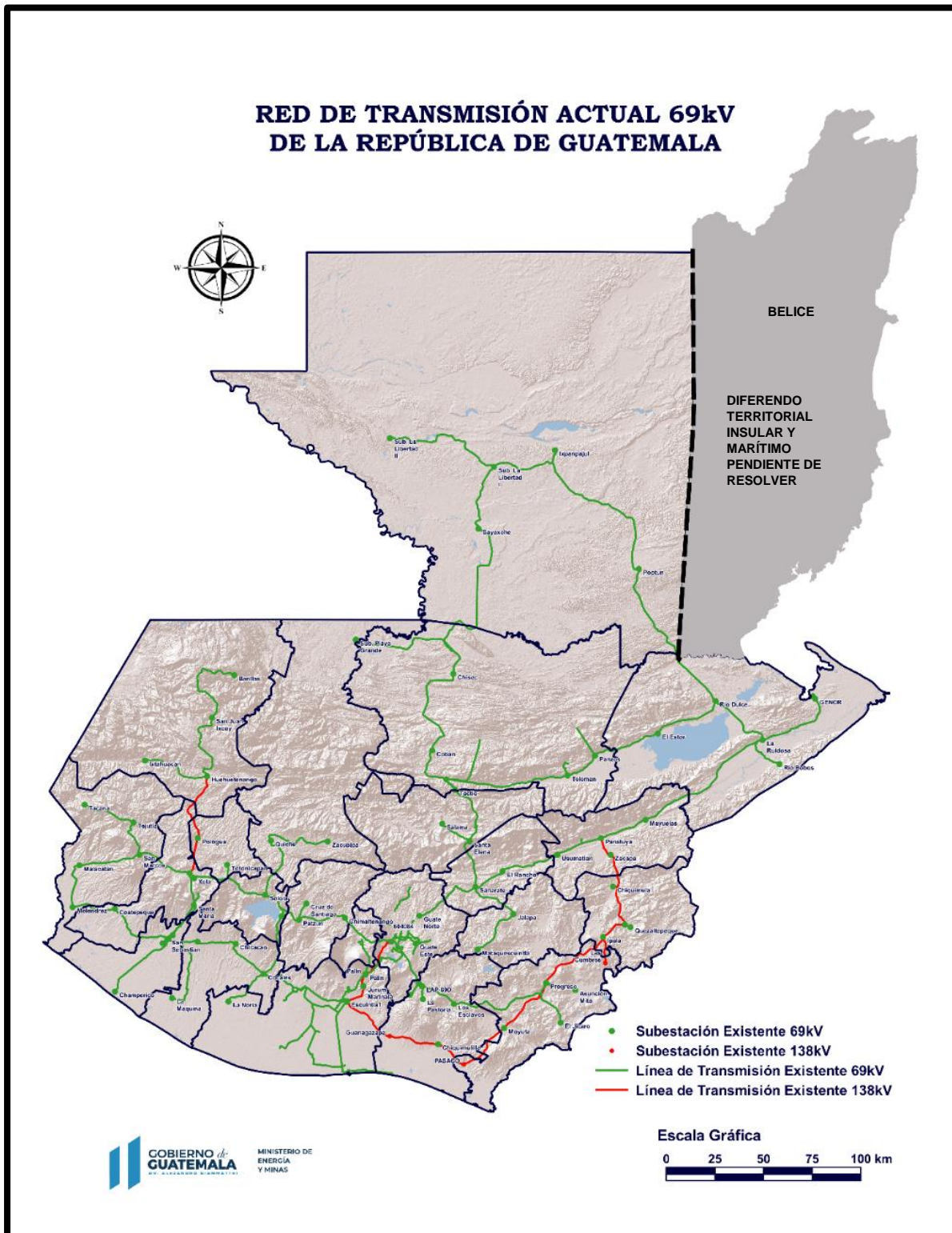
3.2. 138 kV and 69 kV Electric Transmission Grid

The National Interconnected System has a 138 kV electrical network that complements the 230 kV electrical network and serves as a link for transportation to the 69 kV network, which is very important for providing access to electrical energy in regions where the electrical coverage index has not reached 100%. Map 2 shows the distribution of the 69 kV electrical network over the national territory, including the works that currently exist and those works that are to be integrated to the network because of self-initiated projects and the PETNAC-2014 expansion project.

The construction of new infrastructure in the 69 kV network supports the electrification of the country, as shown in the map, it is necessary to reinforce the transmission network in the departments of San Marcos, Quiché, Alta Verapaz, Izabal, and Petén, thereby improving the quality of service and providing more capacity for the country to be industrialized, supporting the trade, services and tourism sector in the aforementioned departments.



Map 2: Current 69 kV Transmission Network of the Republic of Guatemala.



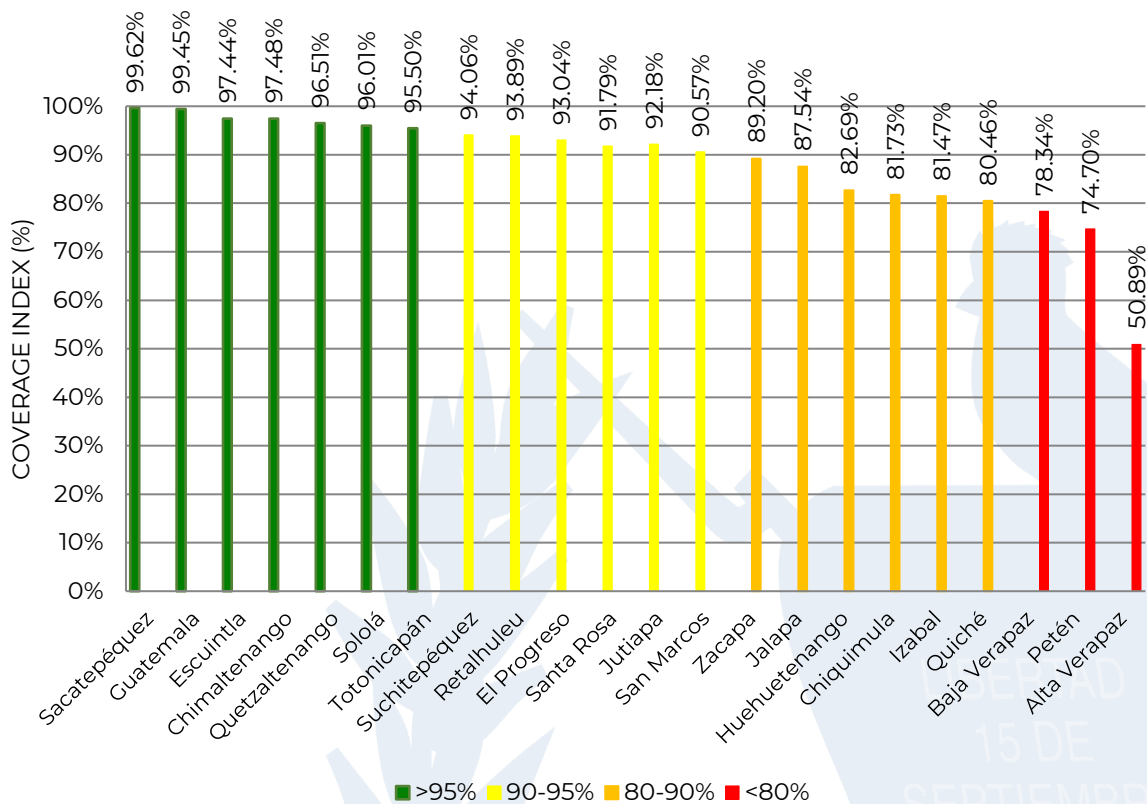
Source: Energy General Direction.

4.ELECTRIC COVERAGE INDEX

The management of electrification projects developed in the country and the opening of the electricity market have contributed to achieve an increase in the electric coverage index, however, there is still a significant gap to overcome. For the year 2021, an electrification index of 89.26% has been calculated, it is determined that 10.74% of households in the country still do not have access to the electricity network. The departments with the lowest electric coverage index are Alta Verapaz (50.89%), Petén (74.70%), Baja Verapaz (78.34%), Quiché (80.46%), Chiquimula (81.73%), Huehuetenango (82.69%); departments for which new infrastructure investment has been analyzed.

The Graph 2 shows the electric coverage indexes by department. The departments mentioned are below the 85% electrical coverage line.

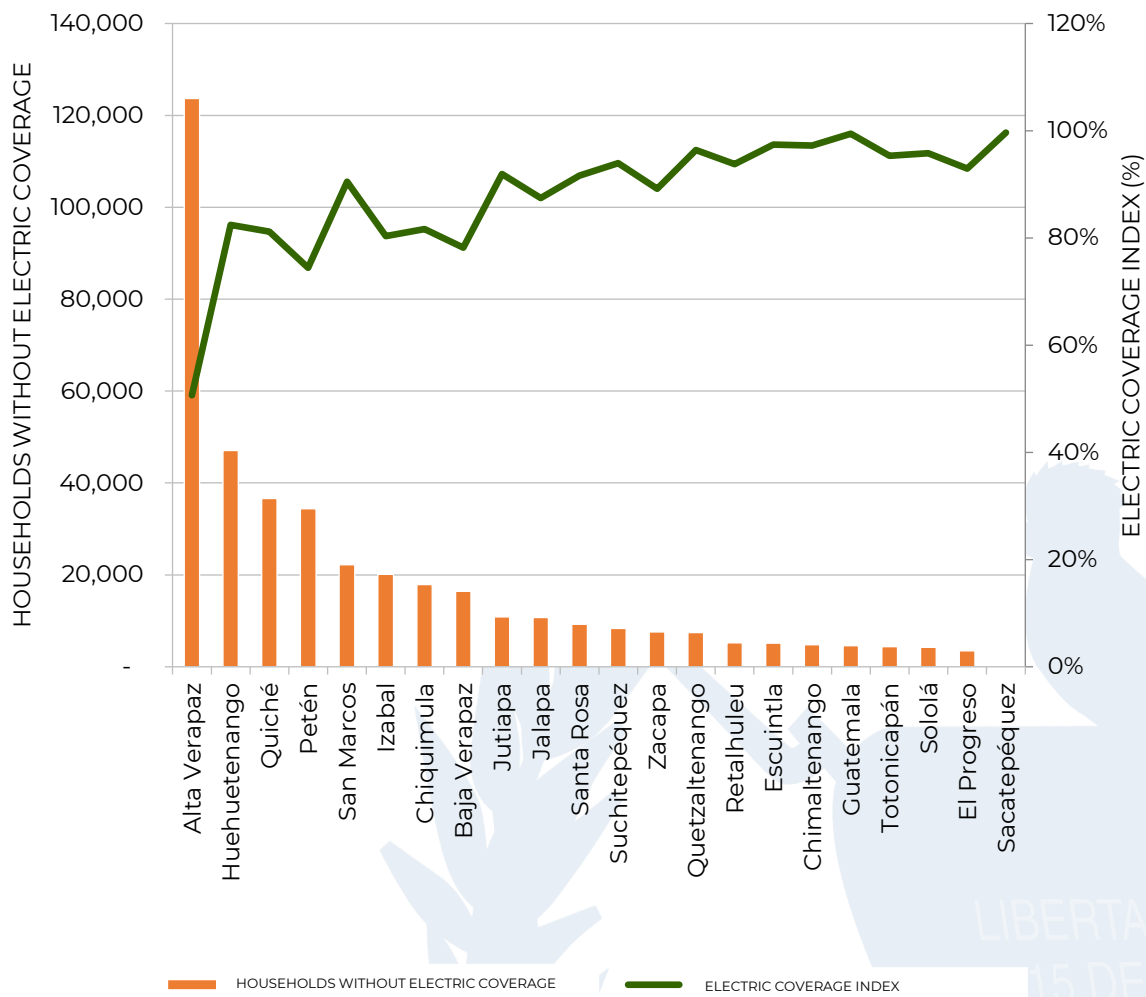
Graph 2: Departmental Electric Coverage Index.



Source: Electric Coverage Report 2021.

Another important aspect to consider is the distribution of departments with the highest number of households without electric coverage. Graph 3 shows that Alta Verapaz, Huehuetenango, Quiché, and Petén have the highest number of households without electric coverage; adding the number of households without electric coverage in the departments with rates below 80% (Alta Verapaz, Baja Verapaz and Petén), it is determined that they represent 43% of the households without electric coverage.¹

Graph 3: Households without electricity coverage.



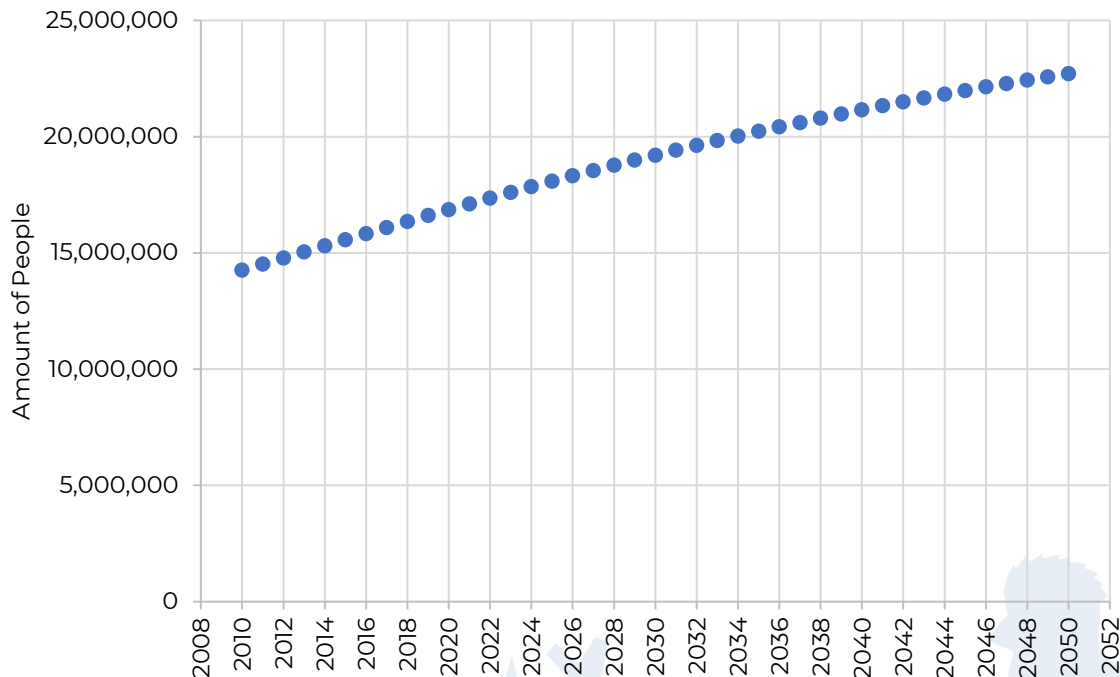
Source: Electric Coverage Index Report 2021.

¹ Electric Coverage Index Report 2021.

5. POPULATION

Based on projections made by the National Institute of Statistics (INE for its acronym in Spanish), in 2021 Guatemala has an estimated 17,109,746 people living in the country². Graph 4 presents the population history and projection broken down by year.

Graph 4: Population and Growth.



Source: National Institute of Statistics, INE.

Information from the 2018 census also shows that on average each household is composed of 4.5 members within the national territory. The population projection is an indispensable input for the development of the Expansion Plan of the Transportation System, given that it is a variable that is directly correlated with the power demand, a determining factor in decision making for the expansion of the electric infrastructure; it is estimated that by the year 2052 Guatemala will have around 22,703,298 inhabitants, a population to which the supply of electric power must be guaranteed.

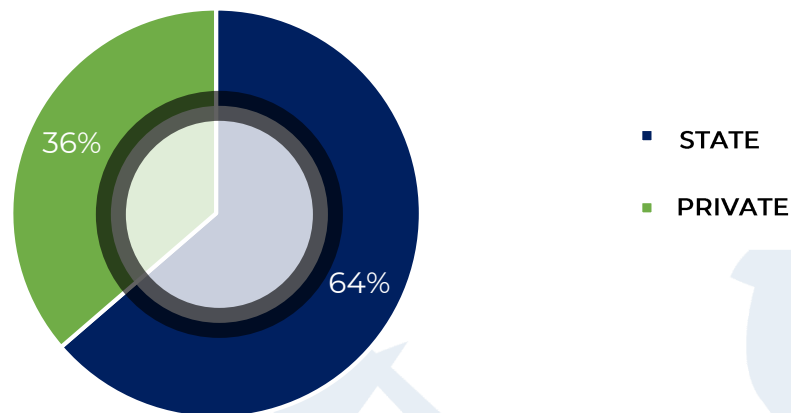
² Information obtained from the official Population Census 2018 portal, <https://www.censopoblacion.gt/proyecciones>. [Accessed: August 2021]

6. AUTHORIZED CARRIER AGENTS

The separation of functions required by the General Law on Electricity has resulted in the emergence of several Carrier Agents. As can be seen in Graph 5, 64% of the assets in transmission lines (kilometers in commercial operation) in all voltages in the Interconnected National System belong to the state sector and the remaining 36% is distributed among private agents.

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Graph 5: Transmission Lines Assets (Km).



Fuente: CNEE.

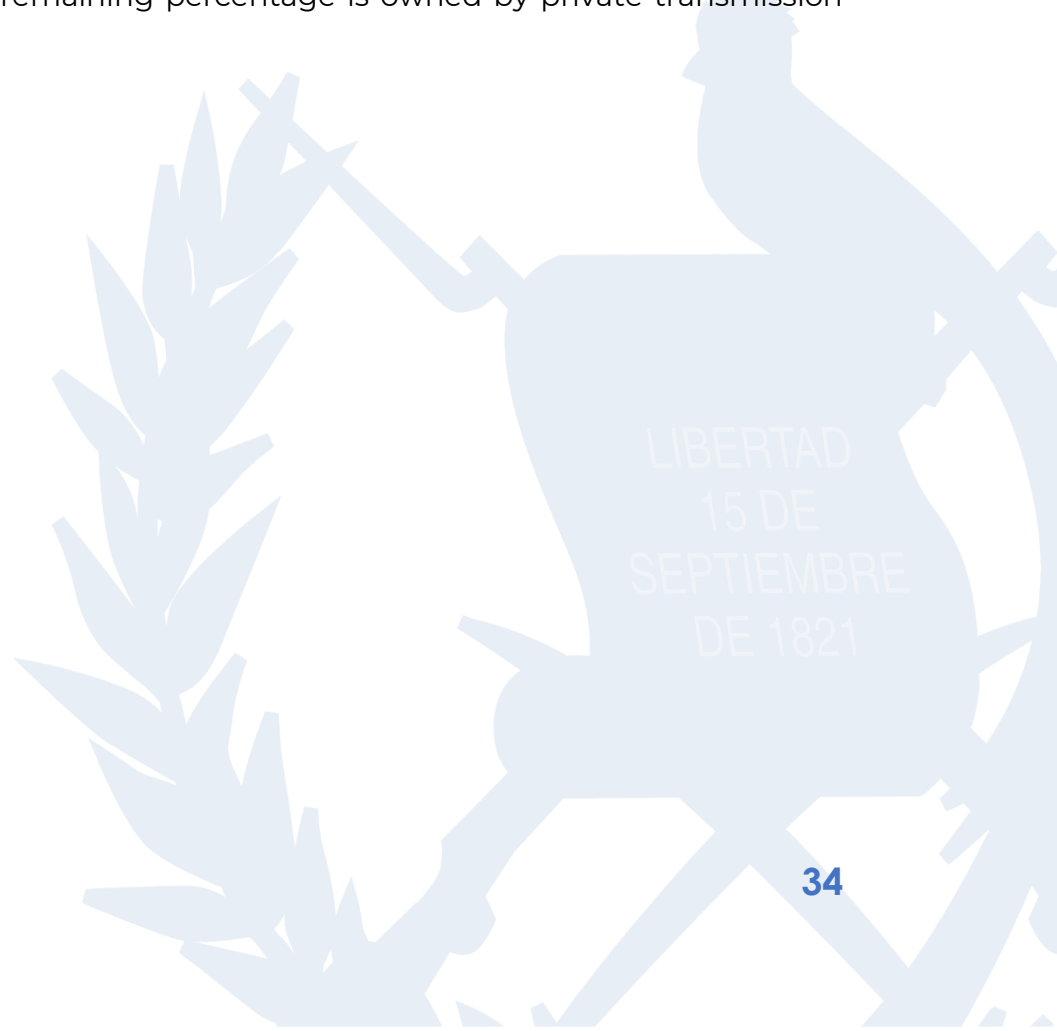
For the situation of interest, the following is the list of authorized Carrier Agents up to the date of preparation of the Plan. In total there are 17 agents authorized to provide electric energy transportation services.

Table 2: Authorized Carrier Agents.

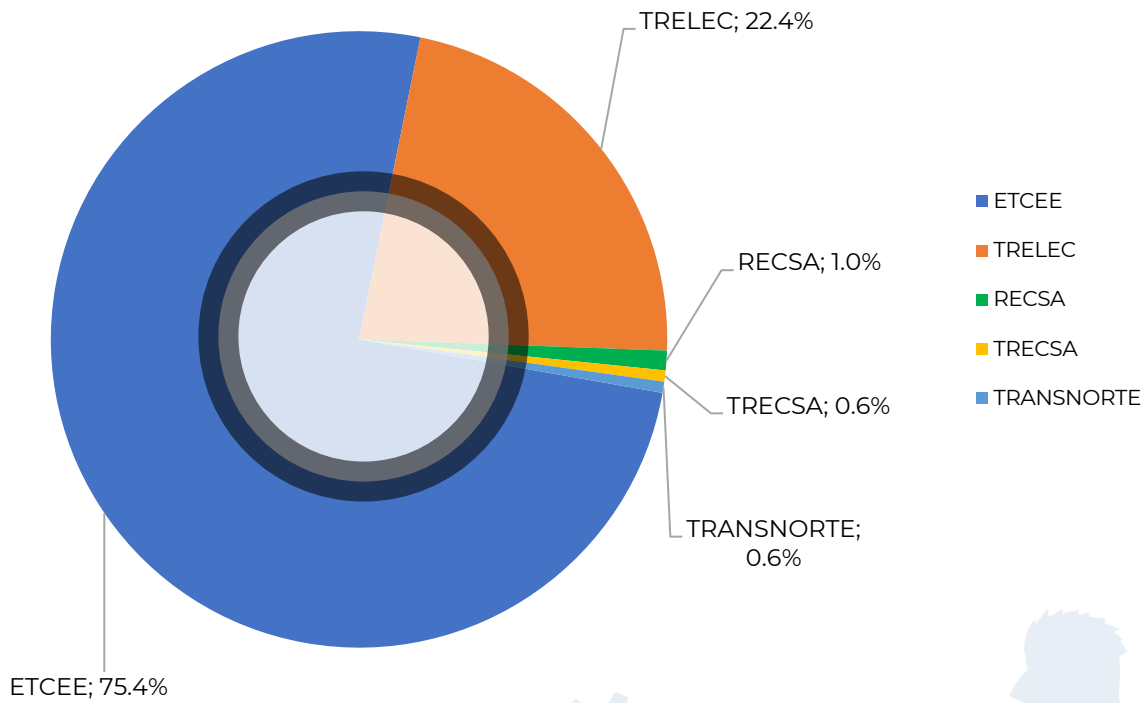
| NO. | CARRIER AGENTS |
|-----|---|
| 1 | Empresa de Transporte y Control de Energía Eléctrica del INDE |
| 2 | Transportista Eléctrica Centroamericana, Sociedad Anónima |
| 3 | Orazul Energy Guatemala Transco, Limitada |
| 4 | Redes Eléctricas de Centroamérica, Sociedad Anónima |
| 5 | Transporte de Electricidad de Occidente |
| 6 | Empresa Propietaria de la Red, Sociedad Anónima |
| 7 | Transmisora de Energía Renovable, Sociedad Anónima |
| 8 | Transmisión de Energía, Sociedad Anónima |
| 9 | Transportadora de Energía de Centroamérica, Sociedad Anónima |
| 10 | Transportes Eléctricos del Sur, Sociedad Anónima |
| 11 | Transfosur, Sociedad Anónima |
| 12 | Transporte de Energía Alternativa, Sociedad Anónima |
| 13 | EEB Ingeniería y Servicios, Sociedad Anónima |
| 14 | Transporte de Energía Eléctrica del Norte, Sociedad Anónima |
| 15 | TREEGSA |
| 16 | FERSA, Sociedad Anónima |
| 17 | Electricidad y Transporte, Sociedad Anónima |

Source: Energy General Direction, Ministry of Energy and Mines.

For the 69 kV network, graph 6 shows that the electric power transmission and control company has the largest share, 75% corresponding to 2,286 kilometers of lines constructed; the remaining percentage is owned by private transmission agents.



Graph 6: Kilometers of 69 kV transmission lines.

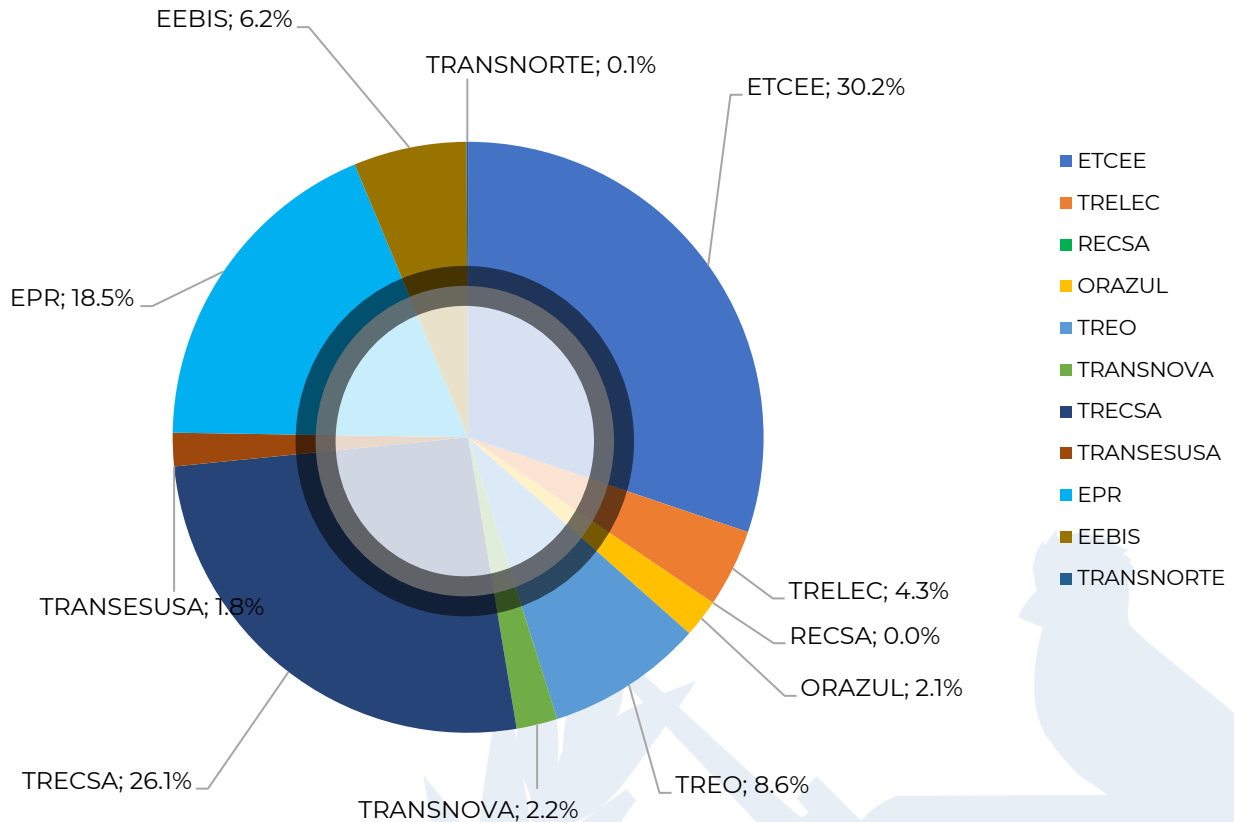


Fuente: CNEE.



The 138 kV network is completely covered by Empresa de Control y Energía Eléctrica; the distribution by line kilometers for the 230 kV network is shown in Graph 7.

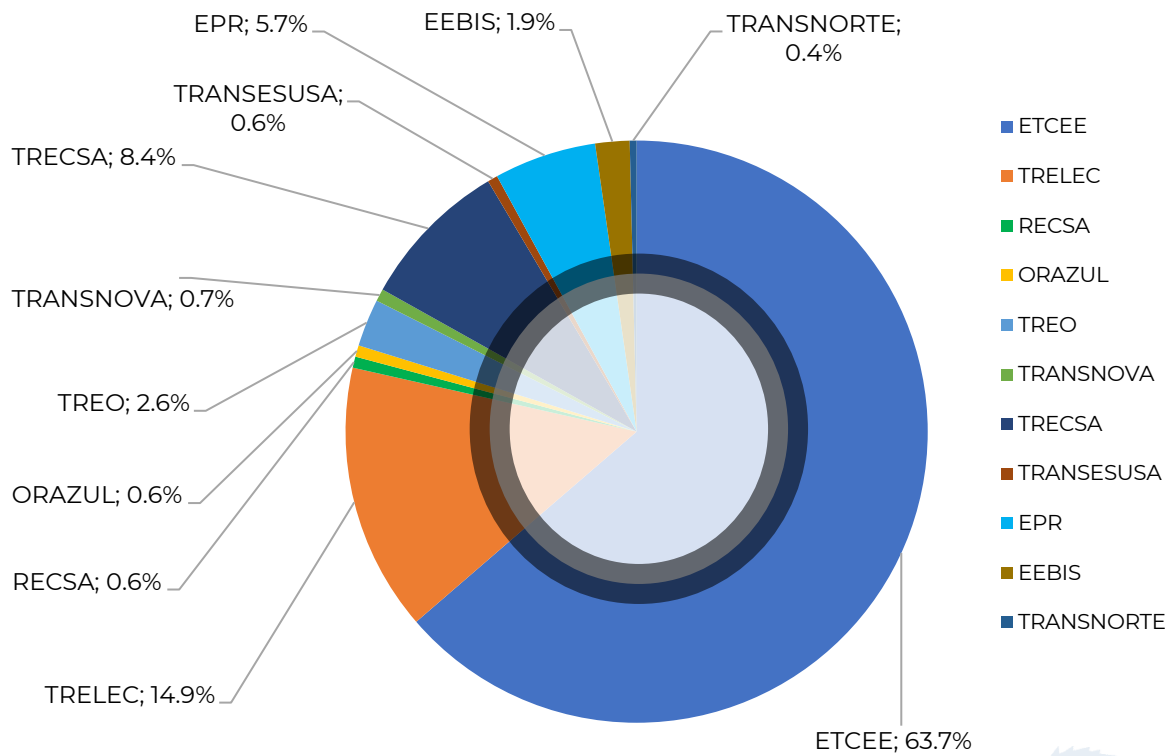
Graph 7: Kilometers of 230 kV transmission lines.



Source: CNEE.

The general distribution of the 5,010 kilometers of transmission lines built by each transmission company in the country is shown in Graph 8:

Graph 8: Total kilometers of electric transmission lines of the SNI.



Source: CNEE.



7. ELECTRICITY DISTRIBUTION

In Guatemala, the distribution of electricity is mainly carried out by three distribution agents: Guatemala's Electric Company, Anonymous Society (EEGSA, for its acronym in Spanish); Eastern Electricity Distributor (DEORSA, for its acronym in Spanish) and Western Electricity Distributor (DEOCSA, for its acronym in Spanish). Map 3 shows the regions authorized to each Distribution Agent.

Map 3: Authorization Zones Distributors.



Source: Proprietary Production.

According to Article 20 of the General Law on Electricity, the authorized delimited territorial area does not grant exclusivity in the provision of the service, which may be modified.

There are currently municipal electric companies that also provide this service. Table 3 lists the Municipal Electric Companies that currently provide this service.

Table 3: Municipal Electric Companies.

| NO | MUNICIPAL ELECTRIC COMPANY |
|----|--|
| 1 | Empresa Eléctrica Municipal Rural de Electricidad, "EMRE" Ixcán |
| 2 | Empresa Eléctrica Municipal de Gualán, Zacapa |
| 3 | Empresa Eléctrica de Guastatoya, El Progreso |
| 4 | Empresa Eléctrica Municipal de Huehuetenango |
| 5 | Empresa Eléctrica Municipal de Jalapa |
| 6 | Empresa Eléctrica Municipal de Joyabaj, Quiché |
| 7 | Empresa Eléctrica Municipal de Patulul, Suchitepéquez |
| 8 | Empresa Eléctrica Municipal de Puerto Barrios |
| 9 | Empresa Eléctrica Municipal de Quetzaltenango |
| 10 | Empresa Eléctrica Municipal de Retalhuleu |
| 11 | Empresa Eléctrica Municipal de San Marcos |
| 12 | Empresa Eléctrica Municipal de San Pedro Pinula, Jalapa |
| 13 | Empresa Eléctrica Municipal de San Pedro Sacatepéquez, San Marcos |
| 13 | Empresa Eléctrica Municipal de Zacapa |
| 14 | Empresa Eléctrica Municipal Sayaxché, Petén |
| 15 | Empresa Eléctrica Municipal de Tacaná, San Marcos |
| 16 | Empresa Eléctrica Municipal "Río Yulxak" de Santa Eulalia, Huehuetenango |

Source: Energy General Direction, Ministry of Energy and Mines

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8. ELECTRICITY TRANSMISSION REMUNERATION

In accordance with Article 1 of the General Law on Electricity, with respect to prices: "The prices for the provision of electricity services are free, with the exception of transmission and distribution services subject to authorization". Likewise, one of the functions of the National Commission of Electric Energy is to define the transmission and distribution tariffs subject to regulation. This definition is made given the natural monopoly nature of the electricity transmission activity.

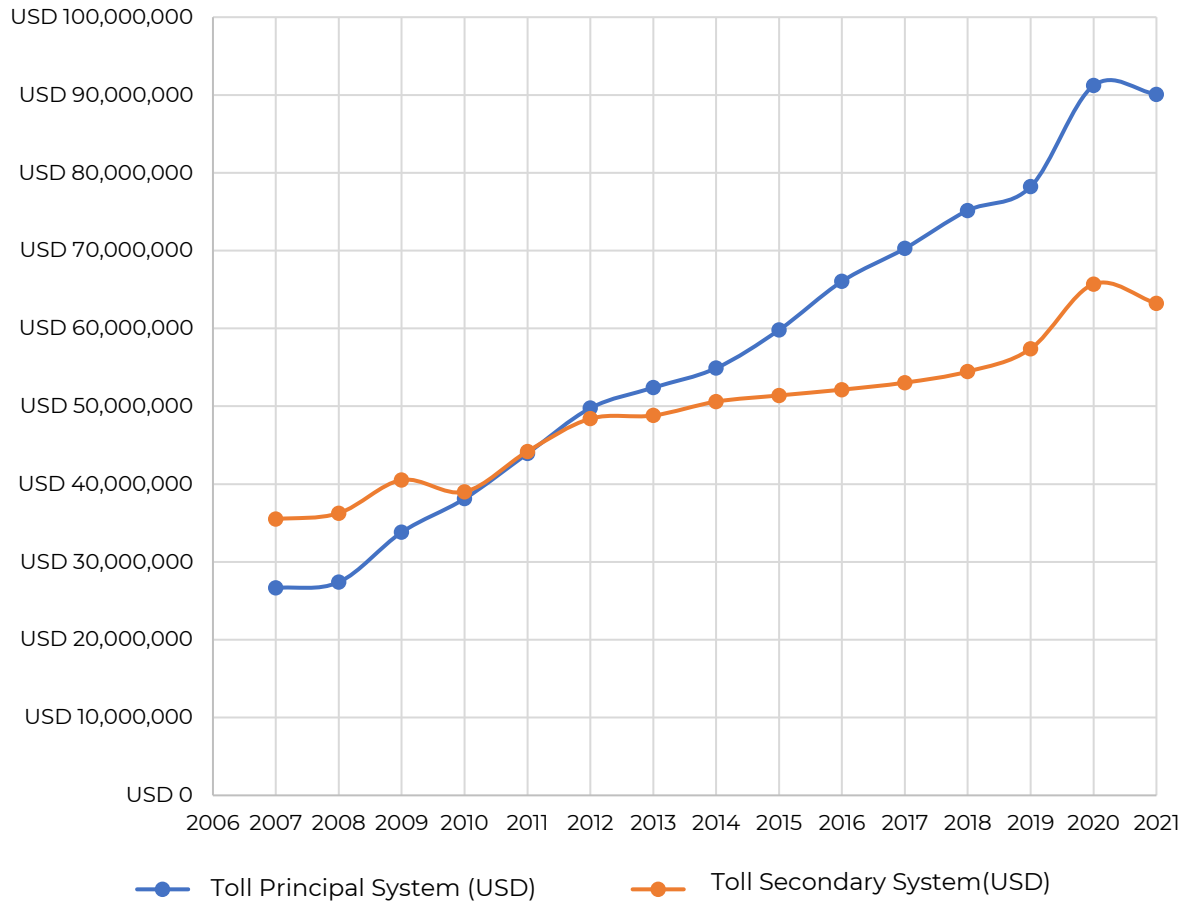
The regulation establishes that the Carrier will receive annually for its facilities dedicated to the Electric Energy Transportation Service (STEE, for its acronym in Spanish), divided into twelve monthly payments in advance, a remuneration called Toll. The toll is then the remuneration received by the carrier for the use of its facilities.

All generators and importers of electric power connected to the National Electric System will pay tolls for the use of the main system per kW of firm power connected. In the secondary systems, tolls will be paid according to the specific uses that the generators make of these systems. It is the obligation of the generators interconnected to the National Electric System to build the transmission facilities to take their energy to the main system or to pay secondary tolls for such purpose.

The toll in the main system is calculated by dividing the annuity of the investment and the operation and maintenance costs of the main system, for optimally dimensioned facilities, by the total firm power connected to the corresponding electric system. This is how a transmission agent receives remuneration for allowing the use of its facilities, which can be classified as main system works or secondary system works.

Graph 1 shows the historical remuneration paid to transmission agents up to September 2021 and a projection for the last quarter of the year. Such remunerations are divided by main system and secondary system.

Graph 9: Remuneration for the use of the Electric Transmission System.



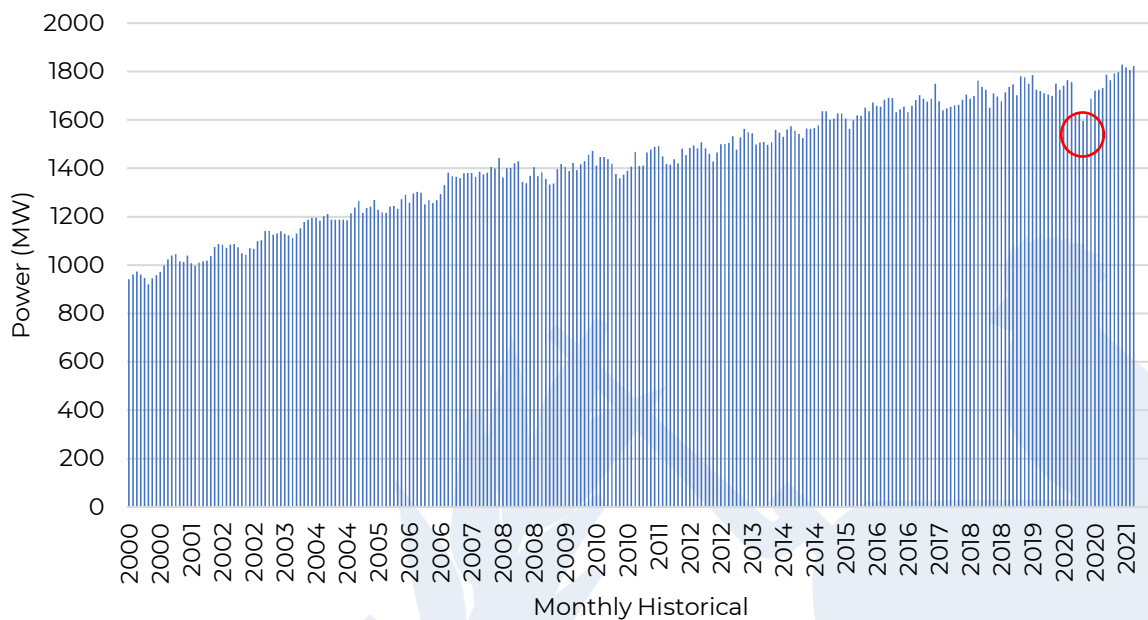
Source: Proprietary Production based on data from AMM annual reports.

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9. ELECTRIC POWER DEMAND

The maximum electric power demand for each month since 2000 is shown in graph 10, which has grown at an average monthly rate of 0.3%, and an average annual rate of 2.8%. However, due to the measures taken to counteract the effects of COVID-19, from February to March 2020 there was a variation rate of -0.4%; the March-April 2020 variation rate was -7.8%, showing a retraction in the growth of demand. With the reopening, there has been a gradual reincorporation, reflected in the demand, as of July 2020, a growth has been sustained that has been maintained to date.

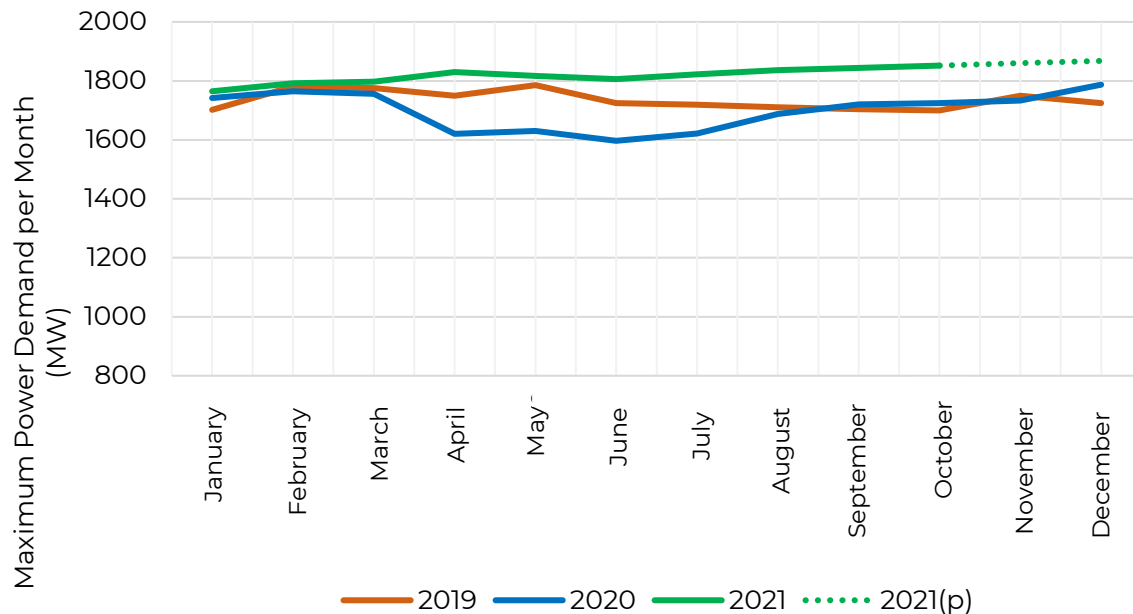
Graph 10: Historical Electric Power Demand.



Source: Proprietary Production with data from the AMM.

The power demand for the first quarter of the year 2021 was 1797 MW, reflecting an increase of 2.4 % with respect to that of the year 2020; in the second quarter for the year 2021 the maximum power demand was 1829 MW, which in comparison with that presented in the year 2020 had an increase of 214 MW; in the third quarter of the year 2021 the maximum demand presented was 1822 MW, which in comparison with that presented in the year 2020 increased by 146 MW.

Graph 11: Maximum power demand per month.

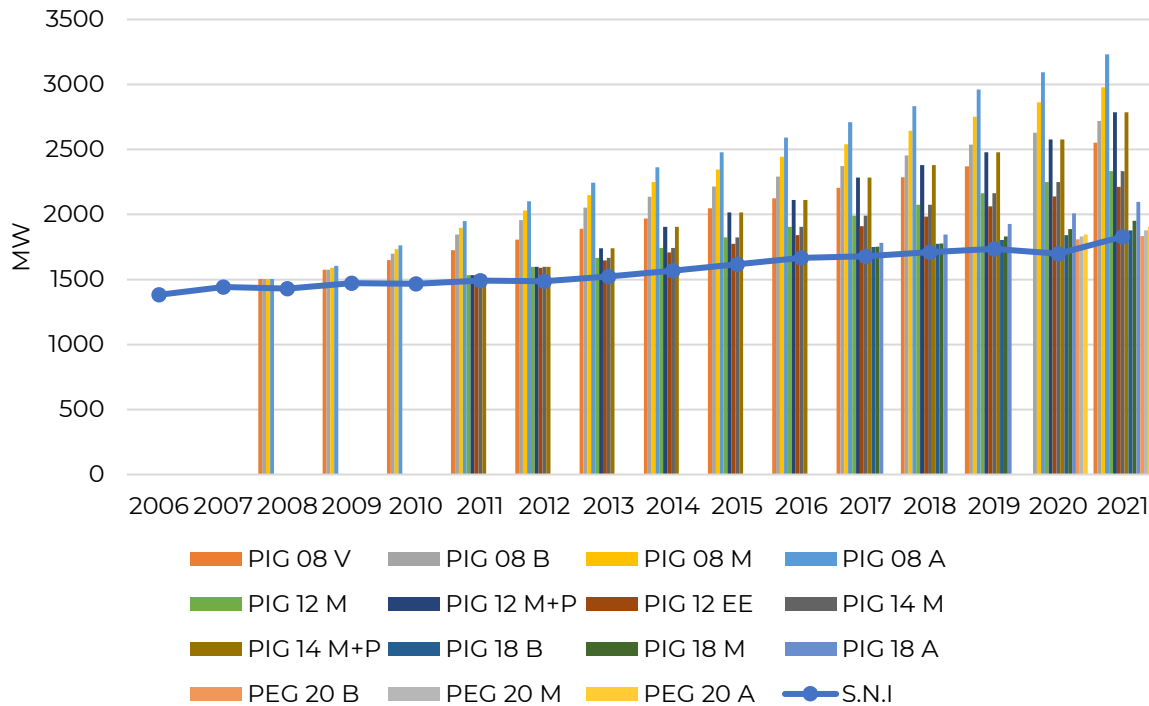


Source: Proprietary Production with data from the AMM.

The maximum power demand for 2020 was 1,787.2 MW and was registered in December. The maximum power demand for the year 2021, was 1,829.53 MW, recorded in the month of April. The annual variation rate 2019-2020 was 3.6%. Graph 11 presents the maximum power demanded each month, ordered to compare the annual growth from 2000 to July 2021. It can be clearly observed in the first 10 years that the maximum demand was presented in the months of November or December, from 2008 onwards there was a growth with occurrence in the first half of each year.

According to the legal and regulatory framework concerning the Guatemalan generation system, the indicative Expansion Plans have presented the maximum expected demand projections since the first edition, carried out in 2008 by the National Commission of Electric Energy, until the last edition made by the Unit of Mining Energy Planning of the Ministry of Energy and Mines. Since then, the projections related to the growth of the electric energy demand and the maximum power demand have allowed the expansion of both the Generation System and the Transportation System, which allows the electric sub-sector to have enough supply for the residential, industrial, and commercial sectors. La Graph 12 allows comparing the demand projections made at the time for the different Indicative Expansion Plans of Generation with the historical maximum power demand.

Graph 12: Comparison, power demand projection.

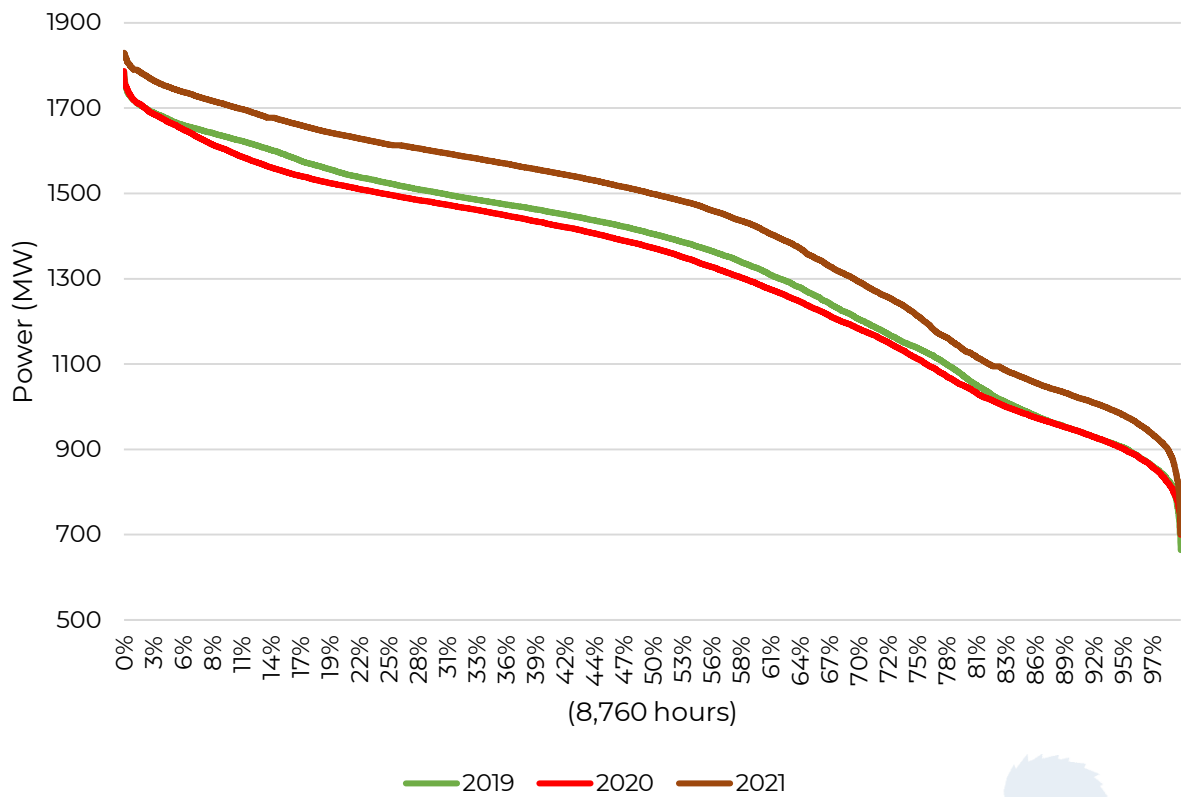


Source: Proprietary production with data from AMM, CNEE and MEM.

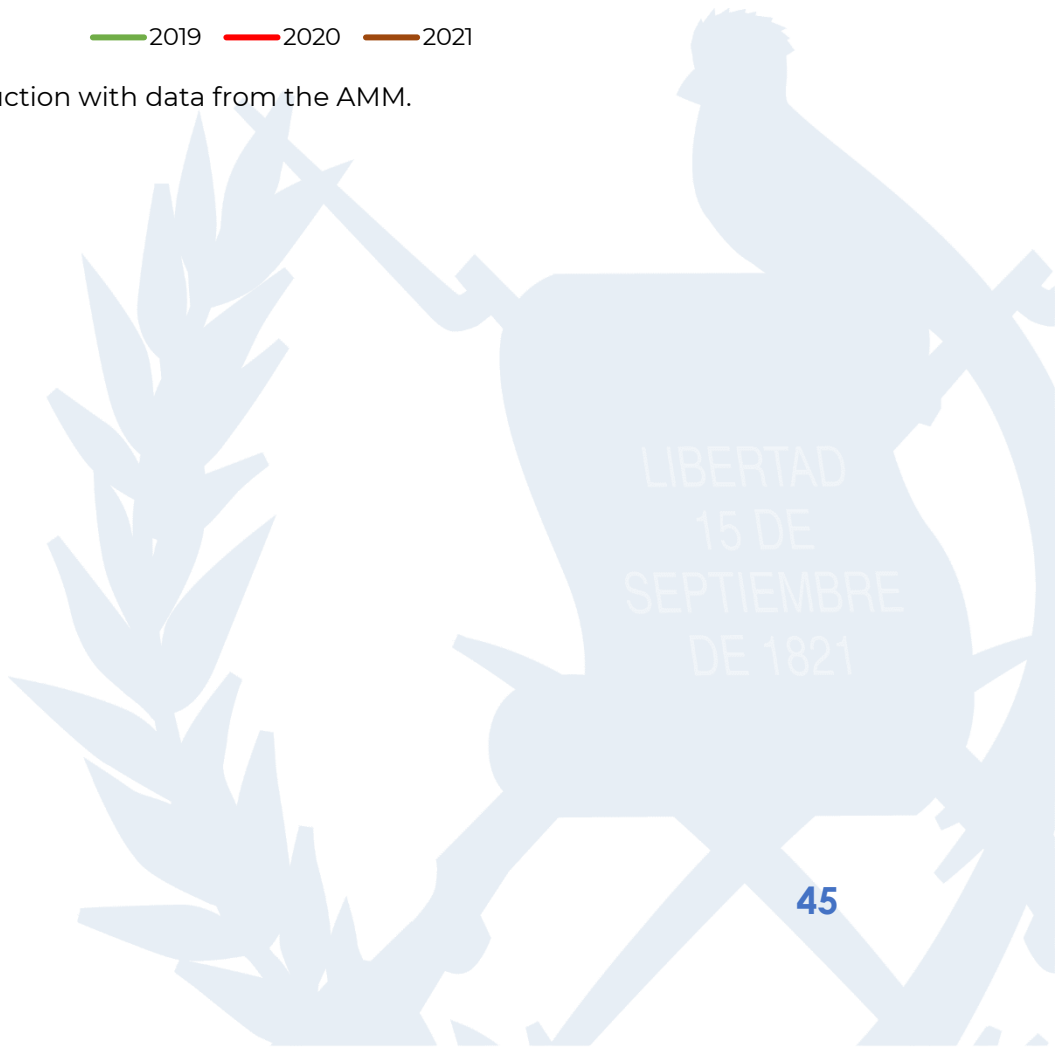
The growth in the maximum power demand has historically followed the same trend due to population growth and economic growth. The latter is the item that has the greatest uncertainty and has the greatest influence on the growth of the maximum power demand, especially in the case of energy-intensive industries. Historical information allows recommending to the national Generation System and to the power plants that constitute the generation park an approximate market in which they can participate; however, the attraction of energy intensive industries is also an activity that can be done privately.

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Graph 13: Annual Monotonic Hourly Power Demand Curves.



Source: Proprietary production with data from the AMM.

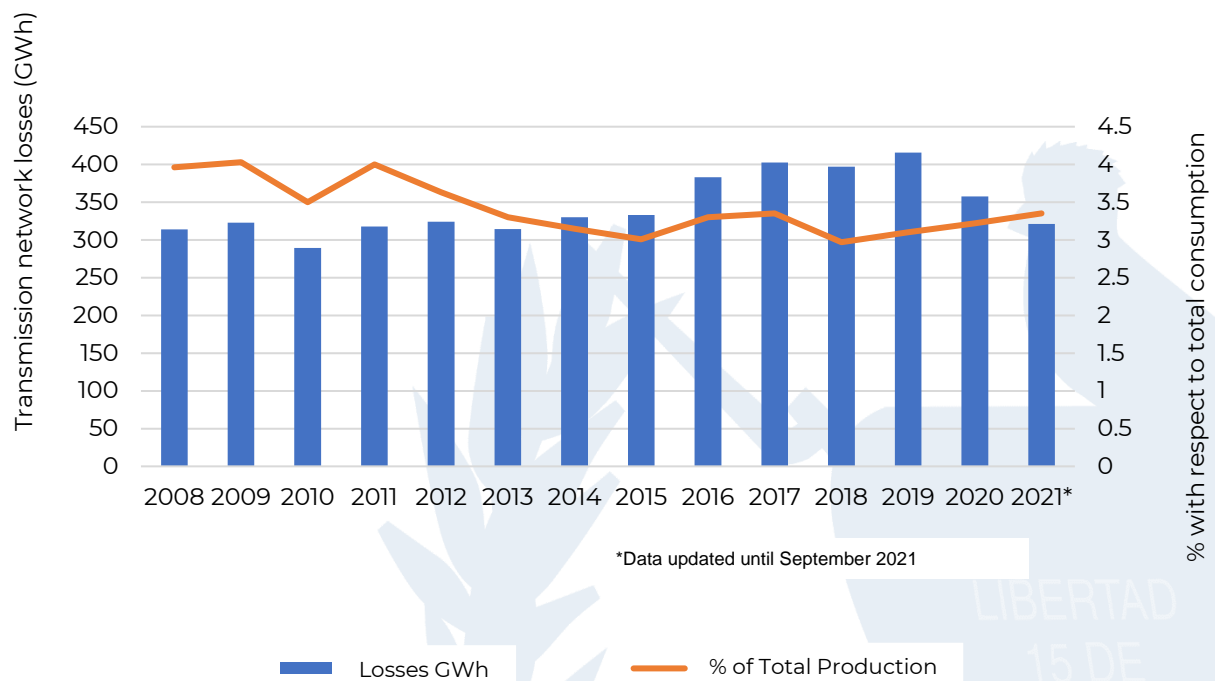


10. LOSSES IN THE POWER TRANSMISSION NETWORK

Losses occur in the electric power transmission system, which are inherent to the operating process of the electric grids; however, the amount of energy lost can be optimized in accordance with good planning practices. The losses recorded in the annual statistical reports of the Wholesale Market Administrator represent in global terms the losses that occur in the SNI grid.

Graph 14 shows the losses registered during the last few years, attributable to the main and secondary systems of the transmission network. In addition, the proportion that represents the volume of losses of the total production is shown on a secondary axis; the percentage has been decreasing as reinforcements are integrated into the network.

Graph 14: Record of annual SNI losses.



Source: Proprietary production, with data from the AMM.

It is observed that in 2021 there is a reduction of losses compared to 2020, considering that the data is updated until September and that in 2016 there was a significant variation compared to 2015. It is important to mention that during 2020 there was a reduction in energy production due to the global pandemic.

The following section presents the greenhouse gas emissions associated with the network losses described above.

10.1. Greenhouse Gas Emissions

The calculation of greenhouse gas emissions for the country's energy sector is prepared annually by the Ministry of Energy and Mines under the IPCC 2006 methodology. From these calculations we obtain the total emissions of the electricity subsector and a specific Grid Emission Factor³ for transmission lines, distribution, and electricity consumption of the SNI.

Table 4: Annual Grid Emission Factor of GHG Emissions for Guatemala.

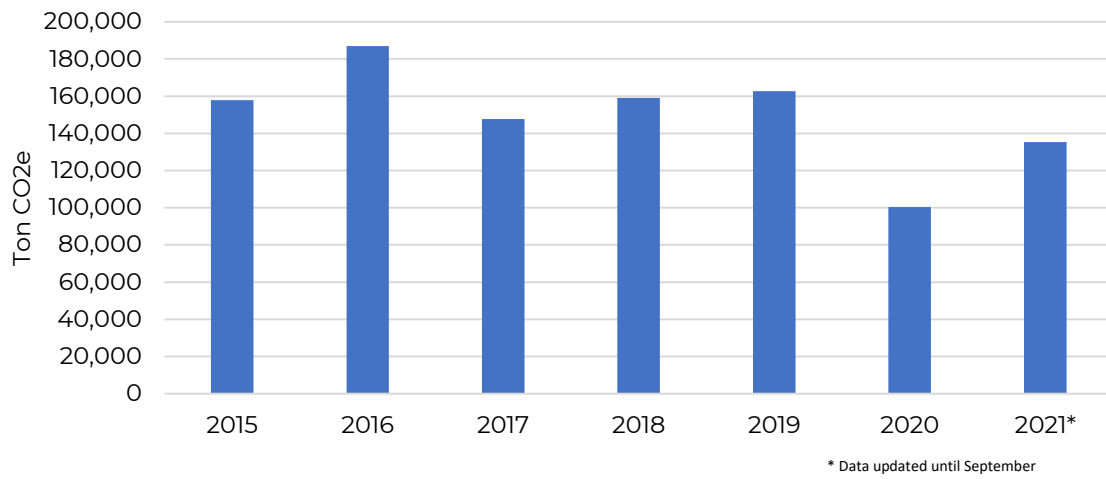
| YEAR | GRID EMISSION FACTOR (KG CO2E/KWH) |
|------|------------------------------------|
| 2014 | 0.5475 |
| 2015 | 0.4742 |
| 2016 | 0.4877 |
| 2017 | 0.3671 |
| 2018 | 0.4006 |
| 2019 | 0.3913 |
| 2020 | 0.2853 |
| 2021 | 0.4220 |

Source: Proprietary production, with data from the Ministry of Energy and Mines.

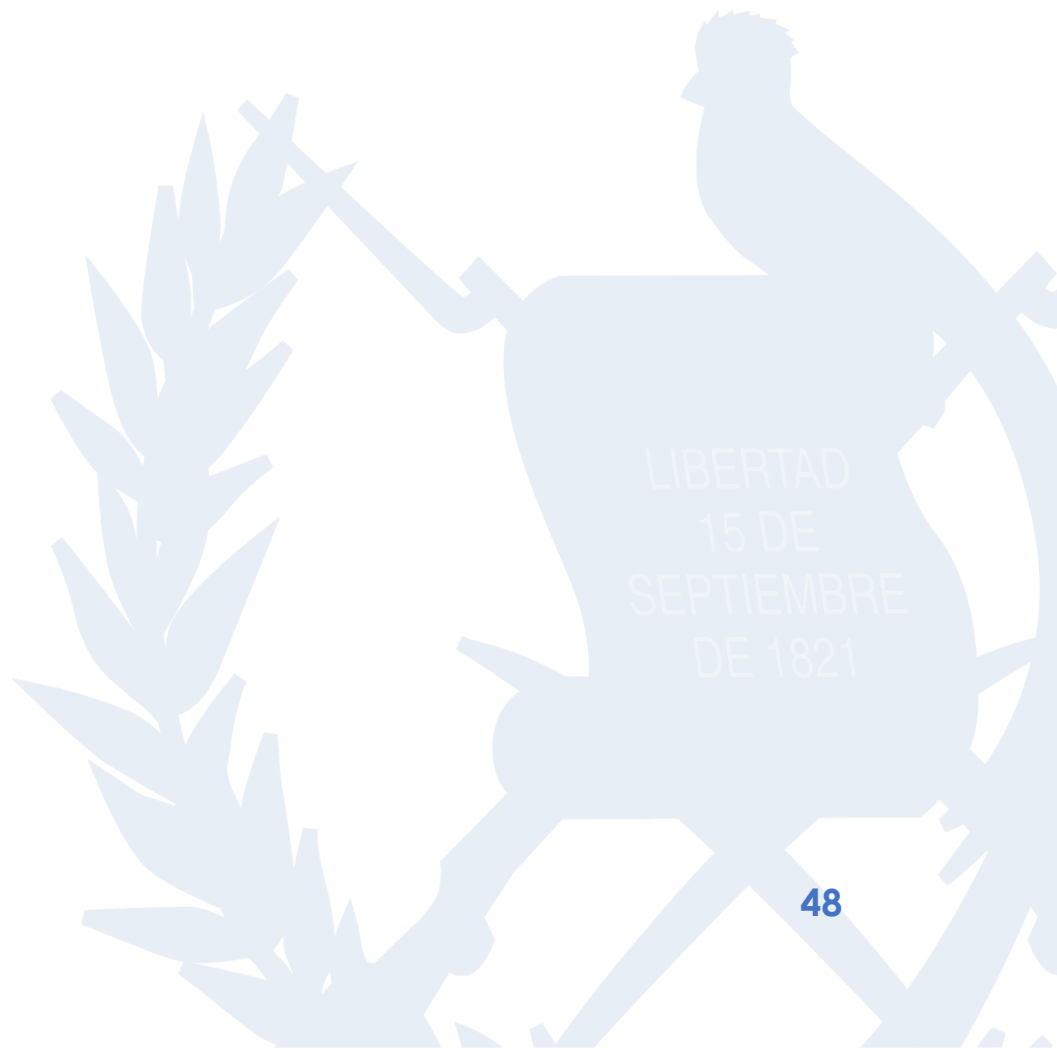
The Grid Emission Factor varies annually, since its calculation depends on the amount and diversity of fuels used for electricity generation throughout the year; these factors allow us to observe the GHG emissions produced by losses in the transmission and distribution networks that are declared in each annual statistical report of the Wholesale Market Administrator, Graph 15 shows these emissions calculated for the last few years.

³ Grid Emission factor: Factor of GHG emissions produced using transmission, distribution and electrical installations of an interconnected grid. It is measured in [CO_{2e}/kWh].

Graph 15: Annual GHG emissions produced by SNI losses.



Source: Proprietary production, with information from the Ministry of Energy and Mines.

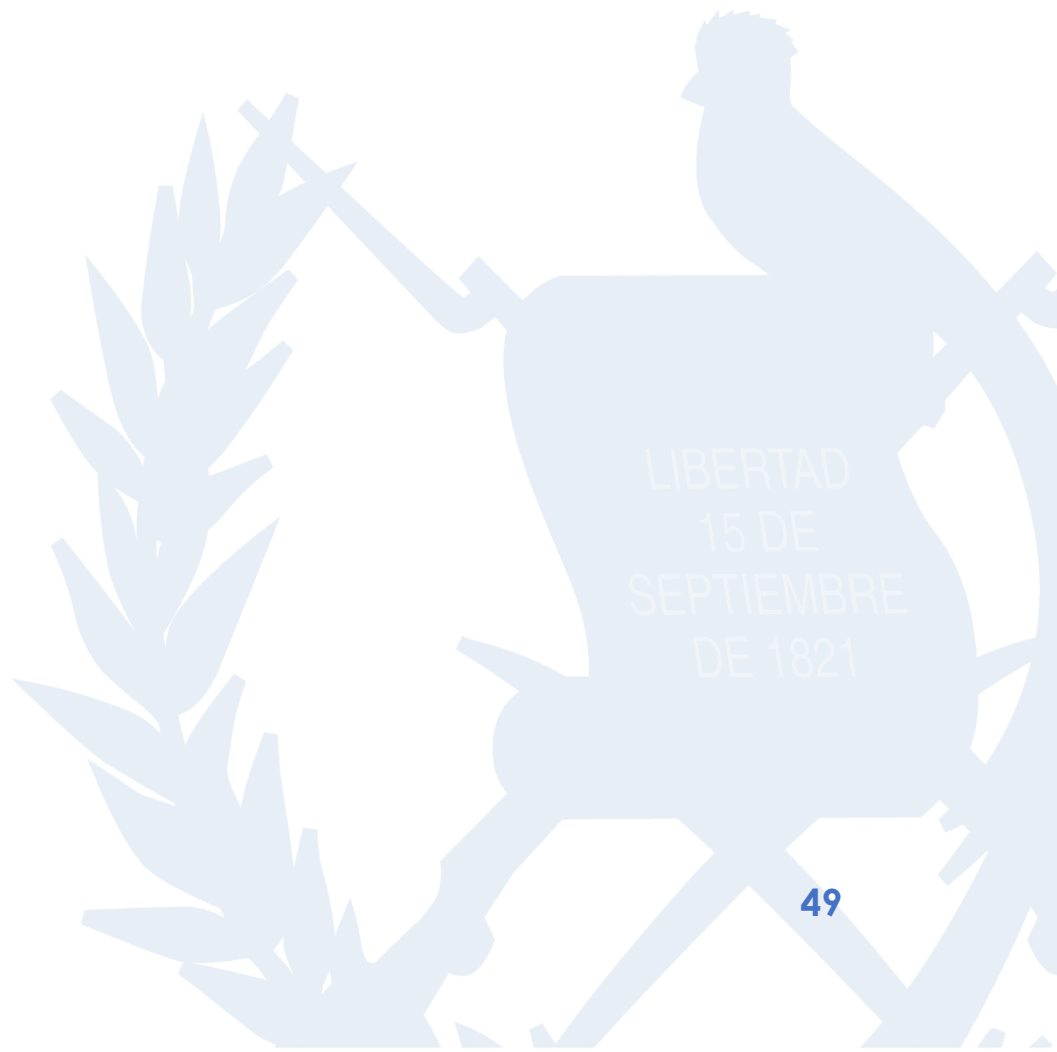


11. AWARDED EXPANSION PLANS

In Guatemala there is a mechanism for the construction of new electric infrastructure necessary to guarantee the supply of demand. This procedure consists of making an expansion plan through a technical entity in which reinforcements are proposed. Subsequently, the National Commission of Electric Energy determines which of the proposed works are considered part of the main system and necessary for the next two years. Once they are defined with these conditions, fulfilling the two requirements, they must be issued bids for their construction. As a result of this mechanism, the following projects are currently under construction: PET-1-2009 and PETNAC.

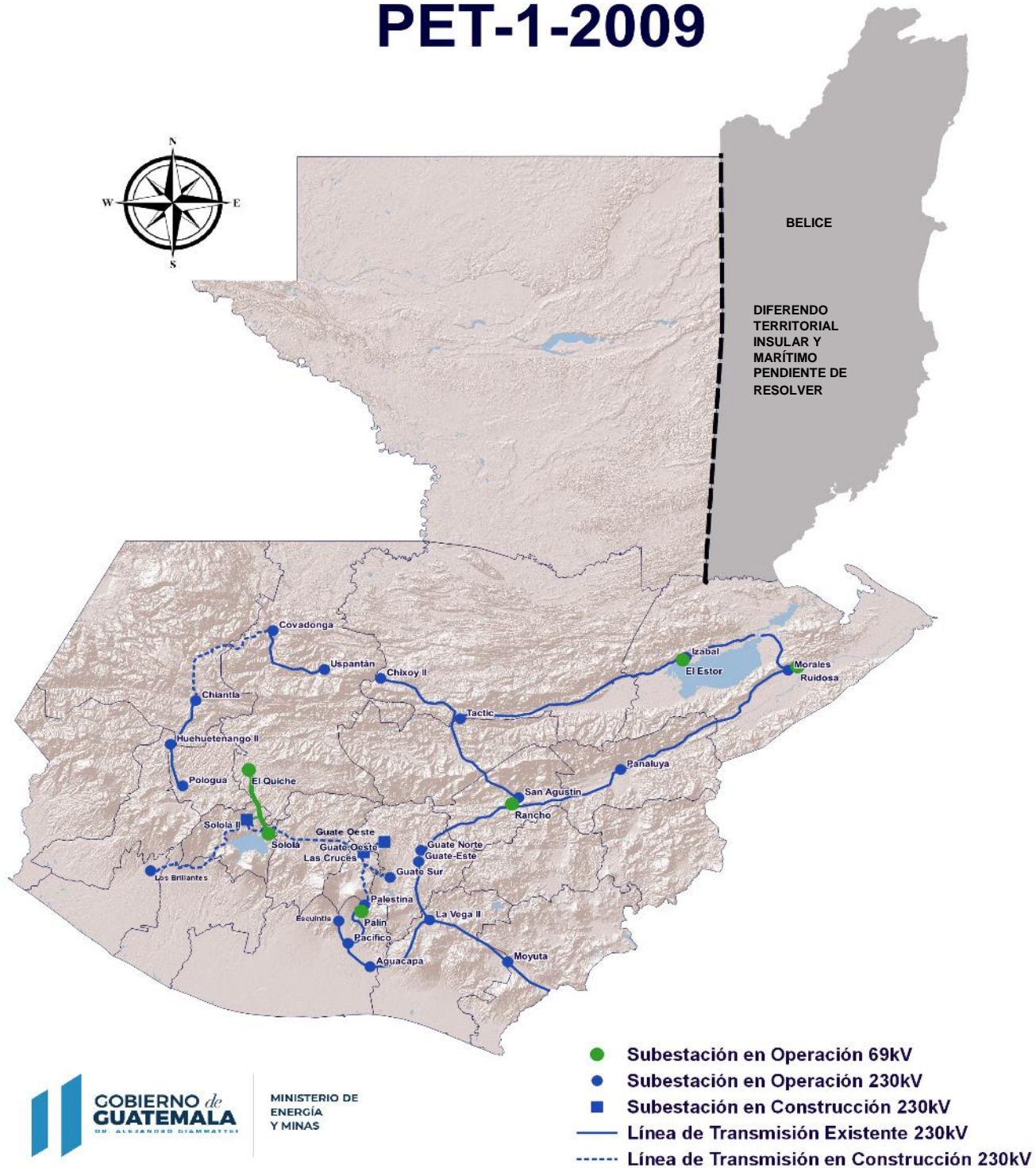
11.1. PET-1-2009

This project basically consists of the addition of a 230 kV network, which initially considered the addition of 12 substations and more than 850 kilometers of line. Map 4 shows the georeferenced location of the infrastructure considered in the PET-1-2009 project.



Map 4: PET-1-2009 Project.

PET-1-2009



Currently, the status of execution of the transmission lines, adjustments, and interconnections of the PET-1-2009 project is described in Table 5.

Table 5: Construction Progress, Transmission Lines PET-1-2009.

| LOT | TRANSMISSION LINE | ADVANCE | VOLTAGE (KV) |
|---------------------------------------|---|--------------------|--------------|
| A | Adequacy TL Aguacapa-Frontera and connection to La Vega II | 100% | 230 |
| | Adequacy TL GuateEste-Jalpatagua and connection to La Vega II | 100% | 230 |
| | Adequacy TL Escuintla II-San José and connection to Pacífico | 100% | 230 |
| | Adequacy TL San Joaquín-Aguacapa and connection to Pacífico | 100% | 230 |
| | Palestina-Pacífico | 100% | 230 |
| | Interconnection Palestina-Palín | 100% | 69 |
| | Las Cruces-GuateOeste | 100% | 230 |
| | Las Cruces-Palestina | 71.50% | 230 |
| | Huehuetenango II- Pologua | 100% | 138 |
| | Covadonga-Uspantán | 100% | 230 |
| | B | Chiantla-Covadonga | 36.54% |
| Chiantla-Huehuetenango II | | 100% | 230 |
| Morales-Panaluya | | 100% | 230 |
| Interconnection Morales-Ruidosa 69 kV | | 100% | 69 |
| C | Tactic-Izabal | 100% | 230 |
| | Interconnection Izabal-Estor | 100% | 69 |
| D | Izabal-Morales | 100% | 230 |
| | Interconnection San Agustín-El Rancho | 100% | 69 |
| | Adequacy Guate Norte-Panaluya and connection to San Agustín | 100% | 230 |
| E | Chixoy II-San Agustín | 100% | 230 |
| | Guate Sur-Las Cruces 230 kV | 87.42% | 230 |
| | Las Cruces-Sololá | 53.59% | 230 |
| F | Sololá-Brillantes | 19.77% | 230 |
| | Adequacy TL Sololá-El Quiché and Connection to Sololá | 1% | 69 |

Source: Proprietary production with data from monthly progress report 2021, TRECSEA.

Table 6 presents the progress related to the substations awarded in the PET-1-2009 project:

Table 6: Construction Progress, Electrical Substations PET-1-2009.

| LOT | SUBSTATION | ADVANCE | VOLTAGE (KV) | POWER (MVA) |
|-----|----------------------------|---------|--------------|-------------|
| A | Pacífico | 100% | 230 | |
| | La Vega II | 100% | 230 | |
| | Palestina | 100% | 230/69 | |
| | Adequacy Palín | 100% | 69 | 195 |
| | GuateOeste | 79% | 230/69 | 195 |
| | Las Cruces | 92% | 230 | |
| | Chiantla | 100% | 230 | |
| B | Expansion Huehuetenango II | 100% | 230/138 | 150 |
| | Expansion Covadonga | 100% | 230 | |
| | Expansion Uspantán | 100% | 230 | |
| | Morales | 100% | 230/69 | |
| C | Expansion Panaluya | 100% | 230 | |
| | Adequacy Ruidosa | 100% | 69 | 150 |
| | Izabal | 100% | 230/69 | |
| D | Adequacy Tactic (GIS) | 100% | 230/69 | |
| | Adequacy Estor 69 kV | 100% | 69 | 150 |
| | San Agustín | 100% | 230/69 | |
| E | Adequacy Rancho | 100% | 69 | 150 |
| | Adequacy Chixoy II | 100% | 230 | |
| F | Adequacy Guate Sur | 84.50% | 230 | |
| | Sololá | 90 % | 230/69 | 150 |

Source: Proprietary production with data from monthly progress report 2021, TRECSA.

In short, Table 7 summarizes the progress in the construction of the works.

Table 7: PET-1-2009 Project Execution Status.

| ACTIVITY | LOT A | LOT B | LOT C | LOT D | LOT E | LOT F |
|------------|--------|--------|-------|-------|-------|--------|
| EASEMENT | 97.13% | 81.97% | 100% | 100% | 100% | 65.20% |
| CIVIL WORK | 91.09% | 68.20% | 100% | 100% | 100% | 46.27% |
| ASSEMBLY | 91.09% | 67.89% | 100% | 100% | 100% | 44.78% |
| WIRING | 86.39% | 61.07% | 100% | 100% | 100% | 29.79% |

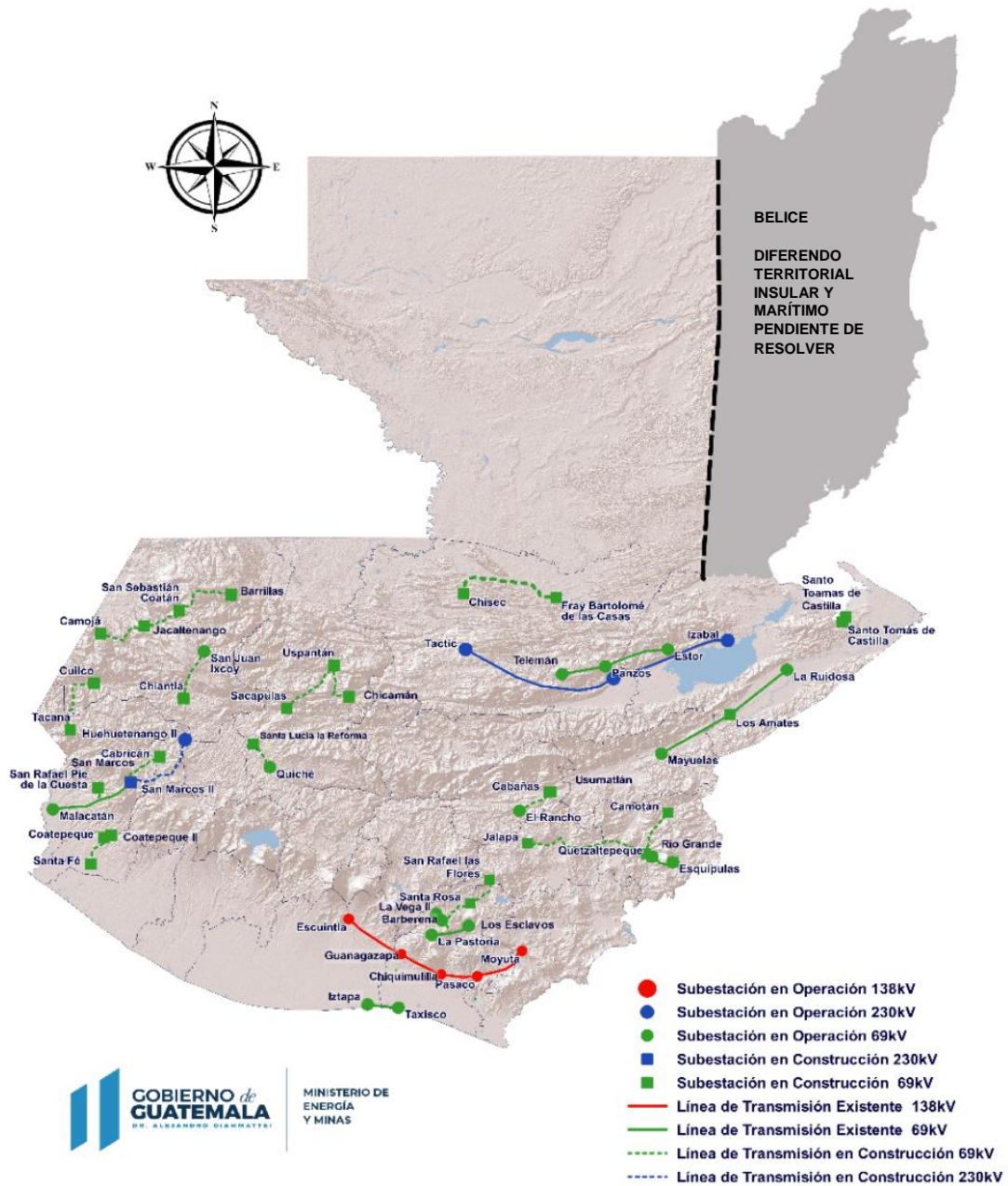
Source: Energy General Direction.

11.2. PETNAC-2014

The PETNAC project considers the inclusion of new infrastructure to the Interconnected National System, mostly for the construction of 69 kV infrastructure. This project is important because it aims to improve the quality of those points where the service has certain deficiencies. In addition, since it brings the power transmission network closer to the consumption centers, it has a considerable impact on the reduction of losses in the SNI.



Map 5: PETNAC-2014 Project.



Source: Energy General Direction.

Table 8: Construction Progress, Transmission Lines PETNAC-2014.

| LOT | TRANSMISSION LINE | ADVANCE | VOLTAGE (KV) |
|-----|--|---------|--------------|
| A | Camojá - Jacaltenango | 6.67% | 69 |
| | Jacaltenango - San Sebastián Coatán | 6.67% | 69 |
| | San Sebastián Coatán - Barillas | 6.67% | 69 |
| | Chiantla - San Juan Ixcoy | 6.67% | 69 |
| | Cuilco - Tacaná | 6.67% | 69 |
| | Uspantán - Sacapulas | 6.67% | 69 |
| | Uspantán - Chicamán | 6.67% | 69 |
| B | Adequacy San Marcos - Malacatán and Connection to San Pie de la Cuesta | 55.50% | 69 |
| | Coatepeque - Santa Fé | 21.33% | 69 |
| | San Marcos II - Huehuetenango II | 10.83% | 230 |
| | San Marcos II - San Marcos | 10.83% | 69 |
| | San Marcos II - Cabricán | 10.83% | 69 |
| | Quiché - Santa Lucía la Reforma | 10.83% | 69 |
| D | Iztapa -Taxisco | 100% | 69 |
| | Adequacy Escuintla - Chiquimulilla and connection with Guanagazapa | 100% | 138 |
| | Adequacy Chiquimulilla - Moyuta and connection to Pasaco | 100% | 138 |
| | La Vega II - Barberena | 100% | 69 |
| | Adequacy of La Pastoría - Los Esclavos and Barberena connection | 100% | 69 |
| | Quetzaltepeque - Esquipulas | 100% | 69 |
| | Río Grande - Camotán | 79.00% | 69 |
| | Adequacy El Rancho - Usumatlán | 0% | 69 |
| | Río Grande - Jalapa | 86.00% | 69 |
| | Barberena - Santa Rosa | 0% | 69 |
| | Santa Rosa - San Rafael las Flores | 0% | 69 |
| E | Chisec - Fray Bartolomé de las Casas | 57.54% | 69 |
| | Puerto Barrios - Santo Tomas de Castilla | 4 % | 69 |
| | Adequacy La Ruidosa - Mayuelas and connection to Los Amates | 39 % | 69 |
| | Adequacy Telemán - El Estor and connection to Panzós | 100 % | 69 |
| | Adequacy Tactic-Izabal and connection to Panzós | 100 % | 230 |

Source: Proprietary production with data from monthly progress report 2021.

Table 9 shows the progress in the construction of the substations awarded in the PETNAC 2014 project.

Table 9: Construction Progress, Electrical Substations PETNAC-2014.

| LOT | SUBSTATION | ADVANCE | VOLTAGE (KV) | POWER (MVA) |
|-----|--|---------|-----------------|----------------|
| A | Camojá | 6.90% | 69/13.8 | 14 |
| | Jacaltenango | 6.90% | 69/34.5 | 14 |
| | San Sebastián Coatán | 6.90% | 69/13.8 | 14 |
| | Cuilco | 6.90% | 69/13.8 | 14 |
| | Expansion of Electric Substation Uspantan | 6.90% | 69 | |
| | Expansion of Electric Substation Chiantla | 6.90% | 69 | |
| B | San Rafael Pie de la Cuesta | 77.86% | 69/13.8 | 14 |
| | San Marcos II | 11.21% | 230/69 | 150 |
| | Cabricán | 11.21% | 69/13.8 | 14 |
| | Santa Fé | 25.86% | 69/13.8 | 14 |
| | Coatepeque II | | 69/13.8 | 14 |
| | Santa Lucía la Reforma | 11.21% | 69/13.8 | 14 |
| | Expansion of Electric Substation Huehuetenango II | 11.21% | 230/138 | |
| D | Expansion of Electric Substation Itzapa | 100% | 69 | |
| | Taxisco | 100% | 69/13.8 | 14 |
| | Guanagazapa | 100% | 138/13.8 | 14 |
| | Pasaco | 100% | 138/13.8 | 14 |
| | Expansion of Electric Substation La Vega II | 100% | 69 | |
| | Barberena | 100% | 69/13.8 | 14 |
| | Esquipulas | 100% | 69/13.8 | 14 |
| | Camotán | 88% | 69/13.8 | 14 |
| | Cabañas | 87% | 69/13.8 | 14 |
| | Santa Rosa | 0% | 69/13.8 | 14 |
| | Expansion of Electric Substation San Rafael las Flores | 0% | 69 | |
| E | Fray Bartolomé de las Casas | 67.31% | 69/13.8 | |
| | Panzós | 100% | 230/69 | 150 |
| | Los Amates | 62 % | 69/13.8 | 14 |
| | Santo Tomas de Castilla | 31 % | 69/13.8 | 14 |
| | Expansion of Electric Substation Puerto Barrios | 3 % | 69 | |

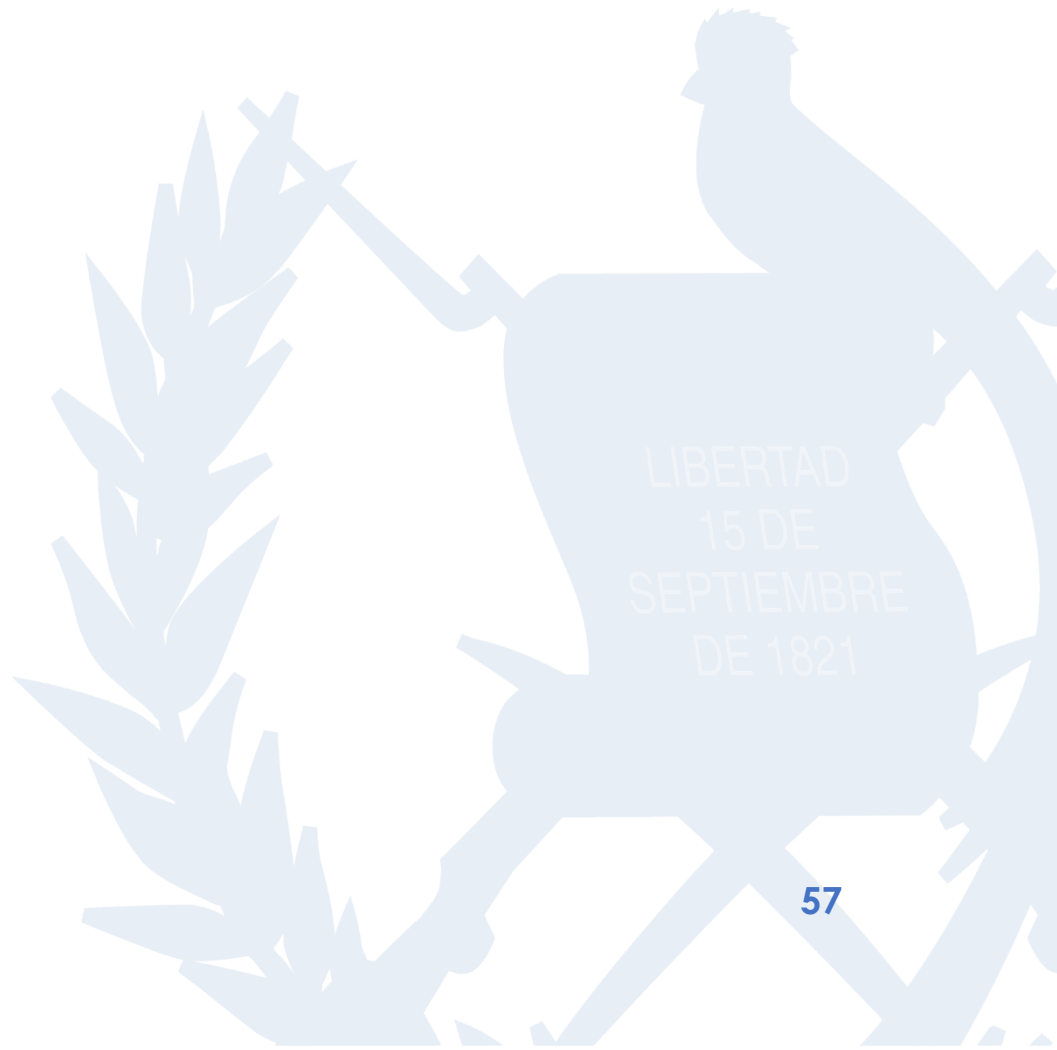
Source: Proprietary production with data from monthly progress report 2021.

A summary of the progress of the works by lot is shown in Table 10.

Table 10: PETNAC Project Execution Status - 2014.

| ACTIVITY | LOT A | LOT B | LOT D | LOT E |
|---------------------------------|--------|--------|--------|--------|
| ENVIRONMENTAL IMPACT ASSESSMENT | 25.00% | 37.50% | 100% | 100% |
| SUBSTATIONS | 6.90% | 24.76% | 79.00% | 52.66% |
| TRANSMISSION LINES | 6.67% | 20.02% | 57.00% | 60.11% |
| GENERAL ADVANCE | 6.77% | 22.19% | 88.52% | 56.39% |

Source: Progress Report 2021, Energy General Direction.

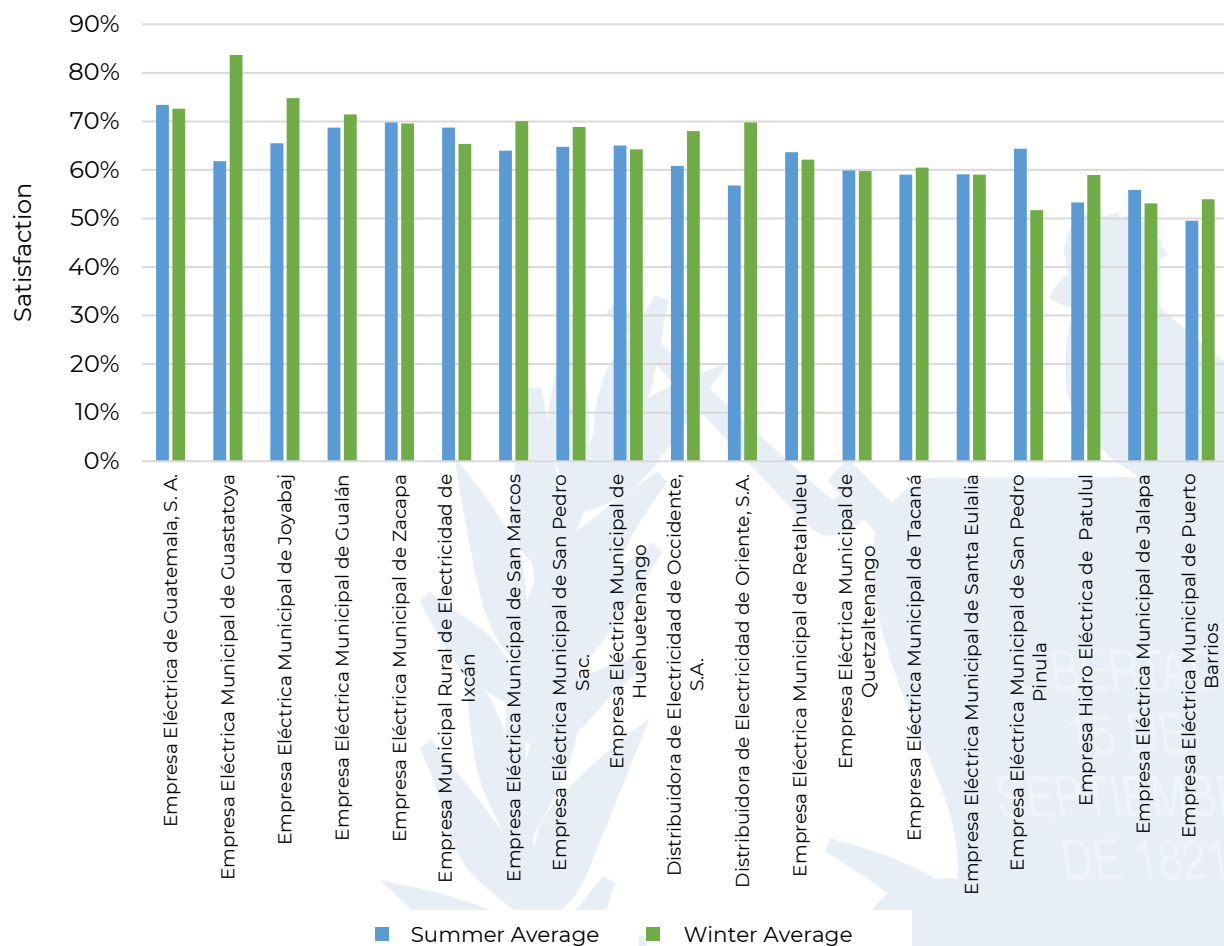


12. QUALITY SURVEY

Article 11 of the Regulation of the General Law on Electricity, surveys, states that "every year the Distributor will make, at its own cost, a representative survey to consumers located in the area where it provides the service, in which they will rate the quality of the service received. The survey will be referred to the aspects of quality of service indicated in these Regulation and any other indicated by the Commission". As a result of complying with this article, the results of the survey in 2020 are presented in Graph 16.

This graph describes the satisfaction of a sample of users in each authorization zone, the surveys present data from the winter season and the summer season.

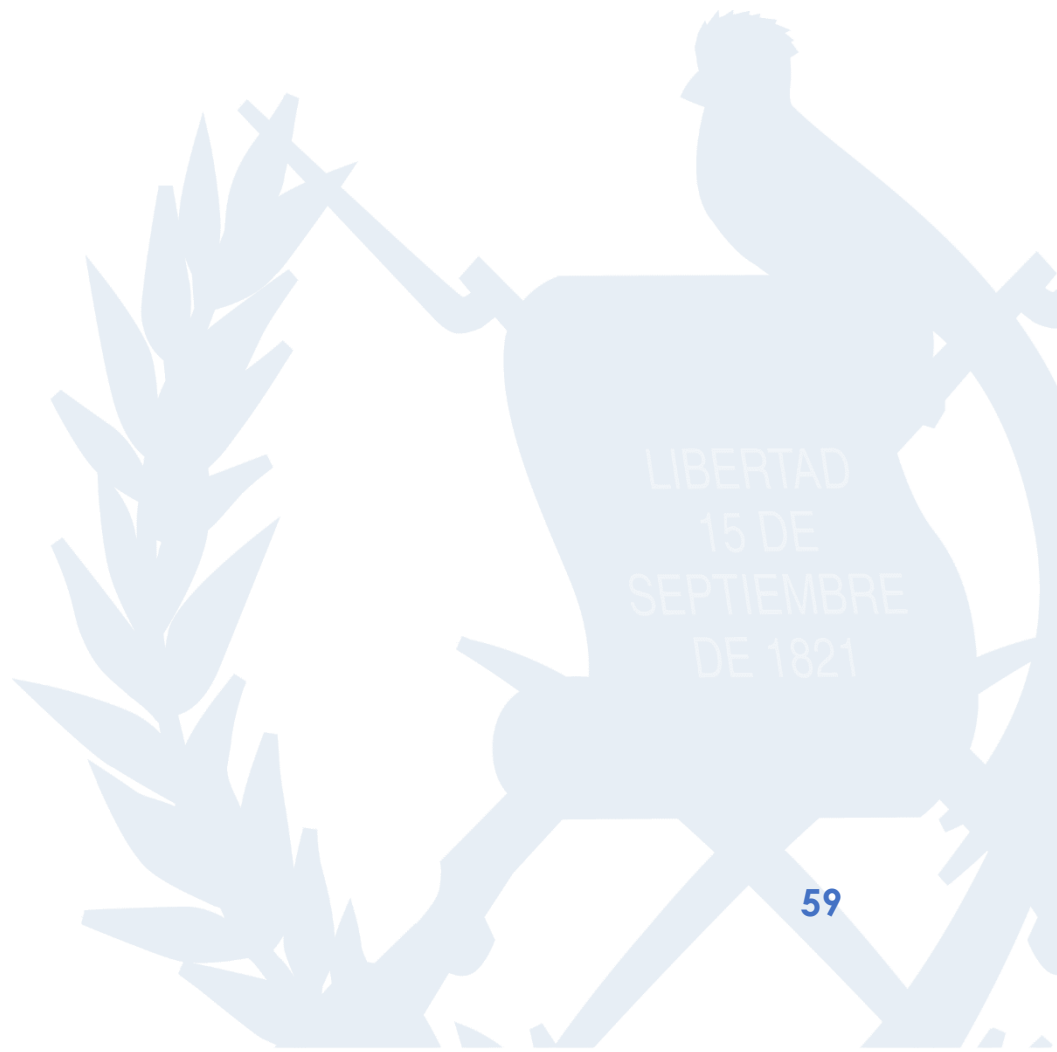
Graph 16: Quality Surveys.



Source: Proprietary production with data from National Commission of Electric Energy

According to the survey, the distributor with the best satisfaction percentage is the Guatemala' Electric Company with 73%, while the distributors DEORSA and DEOCSA have an average of 63.27% and 64.40%, respectively.

These surveys are a representative reflection of the perception that users have of the company that provides them with distribution services.



13. EXPANSION PLAN OF THE TRANSPORTATION SYSTEM NETWORK

13.1. General Objective

Plan the growth of the Electric Power Transmission Grid infrastructure necessary to meet the country's future (projected) demand and access to the electric grid for new users; guaranteeing the quality of the electric power supply, the fulfillment of the goals set forth in the Energy Policy 2019-2050, the Government General Policy 2020-2024 and to contribute with the necessary actions for the execution of the plan for the Economic Recovery of the country, thus achieving support so that 90% of the population has access to electric energy in the year 2023 and reach the coverage of access to electric energy by the year 2032 at 99.99% of the population and maintain it by 2052.

13.2. Specific Objectives

- ✓ Consolidate the electric grid as a strategic infrastructure for the economic, social, and industrial development of the country.
- ✓ Determine the infrastructure needed to achieve 99.99% electric coverage by the year 2032.
- ✓ Complement the Expansion Plan of the Transportation System 2020-2050 to guide the infrastructure towards the achievement of the goals set forth in the Government General Policy 2020-2024.
- ✓ Propose the necessary network reinforcements to guarantee operational security, expand the coverage index and improve the quality of electric energy service in the country.
- ✓ Create the necessary conditions for energy integration by taking advantage of existing interconnections and possible future expansions or interconnections.
- ✓ Facilitate access for the connection of new generation to the transmission grid, allowing evacuation from generation points to load centers.

- ✓ Reduce greenhouse gas emissions associated with power transmission system losses.
- ✓ Increase national direct investment and foreign investment in the country's free trade zones.
- ✓ Employment generation in the areas of influence of the proposed projects.
- ✓ Improve the quality of electric energy service to end users, guaranteeing an electric energy supply within the ranges allowed by the -NTSD- standard.
- ✓ Promote the generation of electric energy at points where there is potential which is not currently being exploited.
- ✓ Provide adequate conditions to guarantee supply in the sectors of health, education, tourism, security, agriculture, commerce, service, and free trade zones.
- ✓ Improve human development indexes (HDI).
- ✓ Supporting the construction of the prosperity wall on the border with Mexico, promoting business investment in the area, and bilateral trade.
- ✓ Promote business investment along the border with El Salvador, Honduras, and Belize, as well as bilateral trade.
- ✓ Promote firm and opportunity transactions of Power and Electric Energy with our neighbor countries.

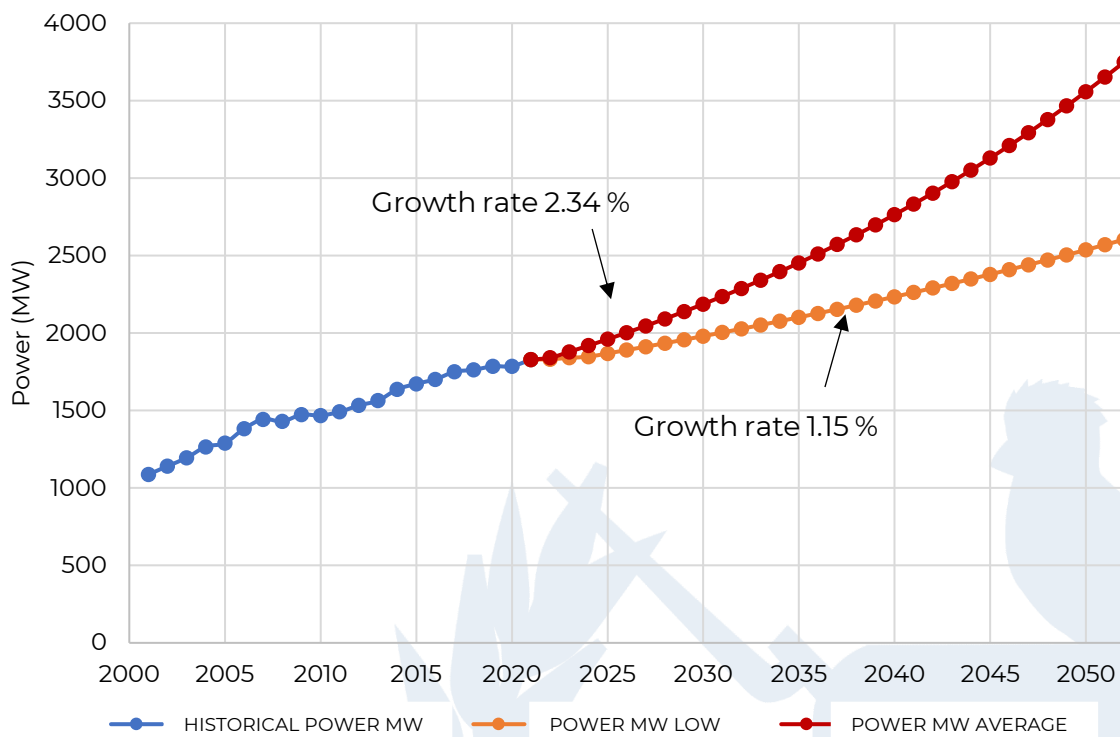


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13.3. Demand Projection

The estimation of future demand is an indispensable input in the planning of transmission expansion since it defines the need for investment in the capacity of the current electric transmission infrastructure. The long-term vision requires an estimate based on population growth forecasts, economic growth and other variables; this information is used to forecast demand up to the year 2032, for subsequent years a trend projection is made.

Graph 17: Demand Projection 2052.



Source: Proprietary Production, Ministry of Energy and Mines.

Graph 17 presents the projections made by integrating 2 scenarios, one of medium growth and the other of low growth. According to the projection, it is expected that for the year 2052 under a medium demand scenario, the power of the National Interconnected System will be 3749.2 MW; and for a minimum demand scenario, 2603.60 MW. It is estimated that the scenario with the highest probability of occurrence is the medium growth scenario.

The table shows projected demand values from 2022, 2032 and 2052.

Table 11: Power demand projection.

| POWER DEMAND (MW) | | |
|-------------------|------|---------|
| YEAR | LOW | AVERAGE |
| 2022 | 1830 | 1840 |
| 2032 | 2027 | 2288 |
| 2052 | 2603 | 3749 |

Source: Proprietary Production, MEM.

13.4. Planning Premises

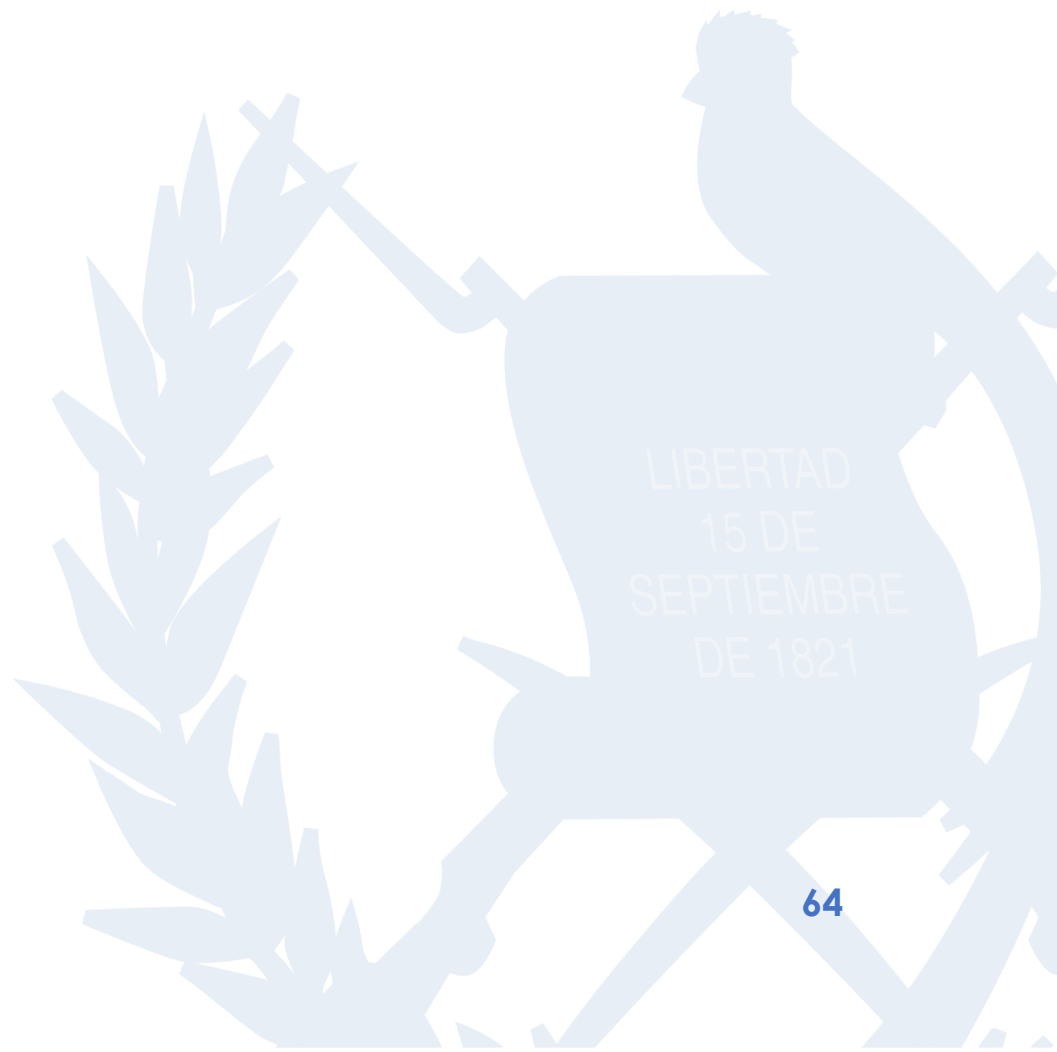
The evaluation of new works in the transmission system was made according to some design conditions such as increasing access to electric energy, improving the quality of energy supply in the western and northern regions of the country; likewise, the design of an electric transmission network prepared to transport electric energy at 400 kV and evacuate the generation to the consumption centers was considered, for this purpose, the following premises were considered:

- Database of the Interconnected National System provided by the Wholesale Market Administrator and the expansion plans of the transmission agents.
- Current electrification situation, projections made by this Ministry regarding new users with access to the transmission network in the study horizon.
- Schedule for the entry of the candidate power generation plants included in the Indicative Expansion Plan of Generation 2022-2052.
- Time horizon: short, medium, and long term.
- Existing seasonality in the country: dry and wet seasons.
- Works awarded in the PET-1-2009 project in commercial operation.
- Works awarded in the PETNAC-2014 project in commercial operation.
- Energy transactions with Mexico and the Regional Electric Market.
- Generation dispatch proposed by the Wholesale Market Administrator in its long-term programming.

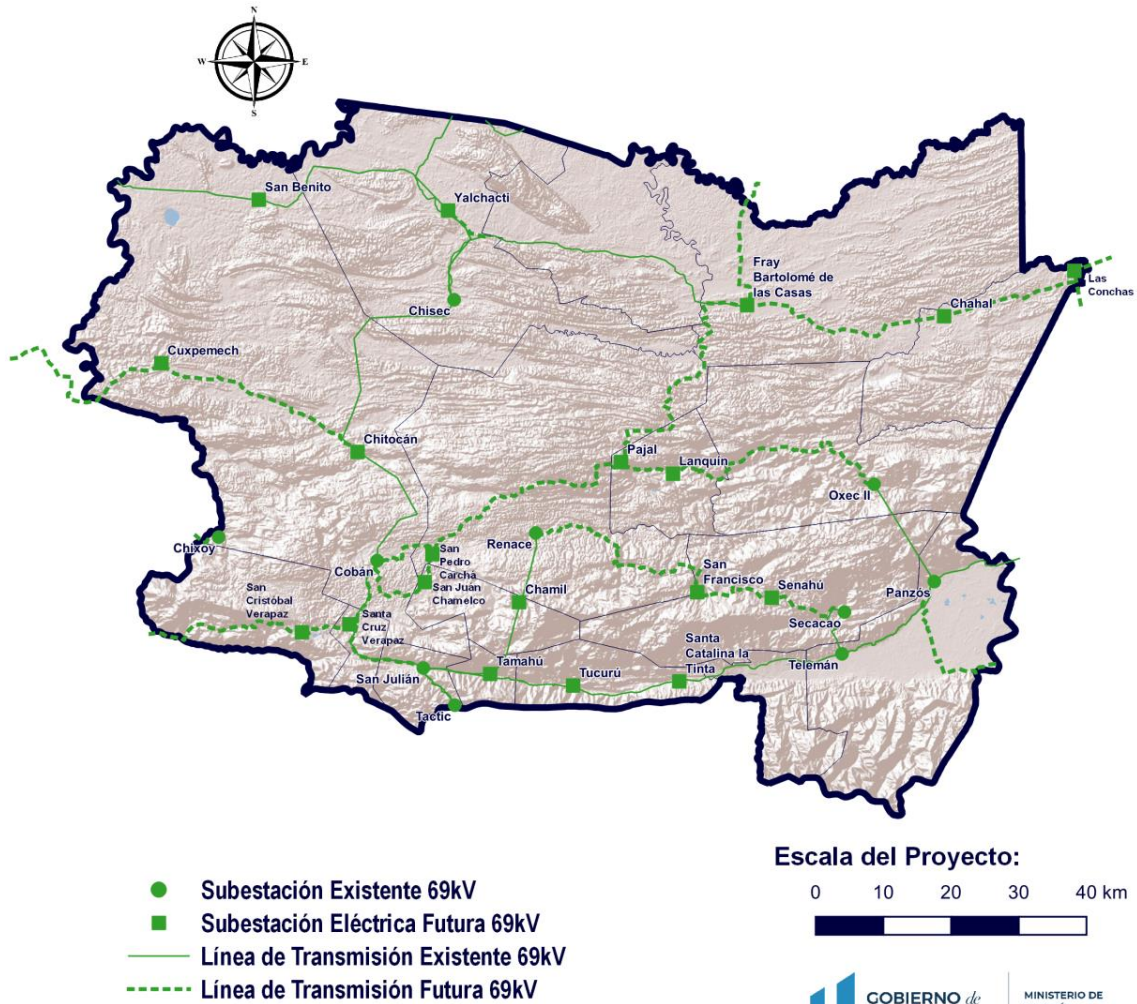
14. 69kV-138 kV ELECTRIC TRANSMISSION NETWORK REINFORCEMENTS

The reinforcements presented below aim to create the necessary conditions to improve the quality of service in the regions where there is little access to the electrical energy network, and thus contribute to the increase of the country's electrification index in the departments with the lowest coverage at the national level and those prioritized according to the rural electrification plan: Alta Verapaz, Petén, Baja Verapaz, Quiché, Izabal, Chiquimula, Huehuetenango, Jalapa, Zacapa and San Marcos.

To improve the reliability of the system for each department with the proposed reinforcements, the construction of meshed networks is proposed, guaranteeing the supply of electrical energy. Points are proposed to be able to provide an electrical energy exchange in the border areas with Mexico, Belize, Honduras, and El Salvador.

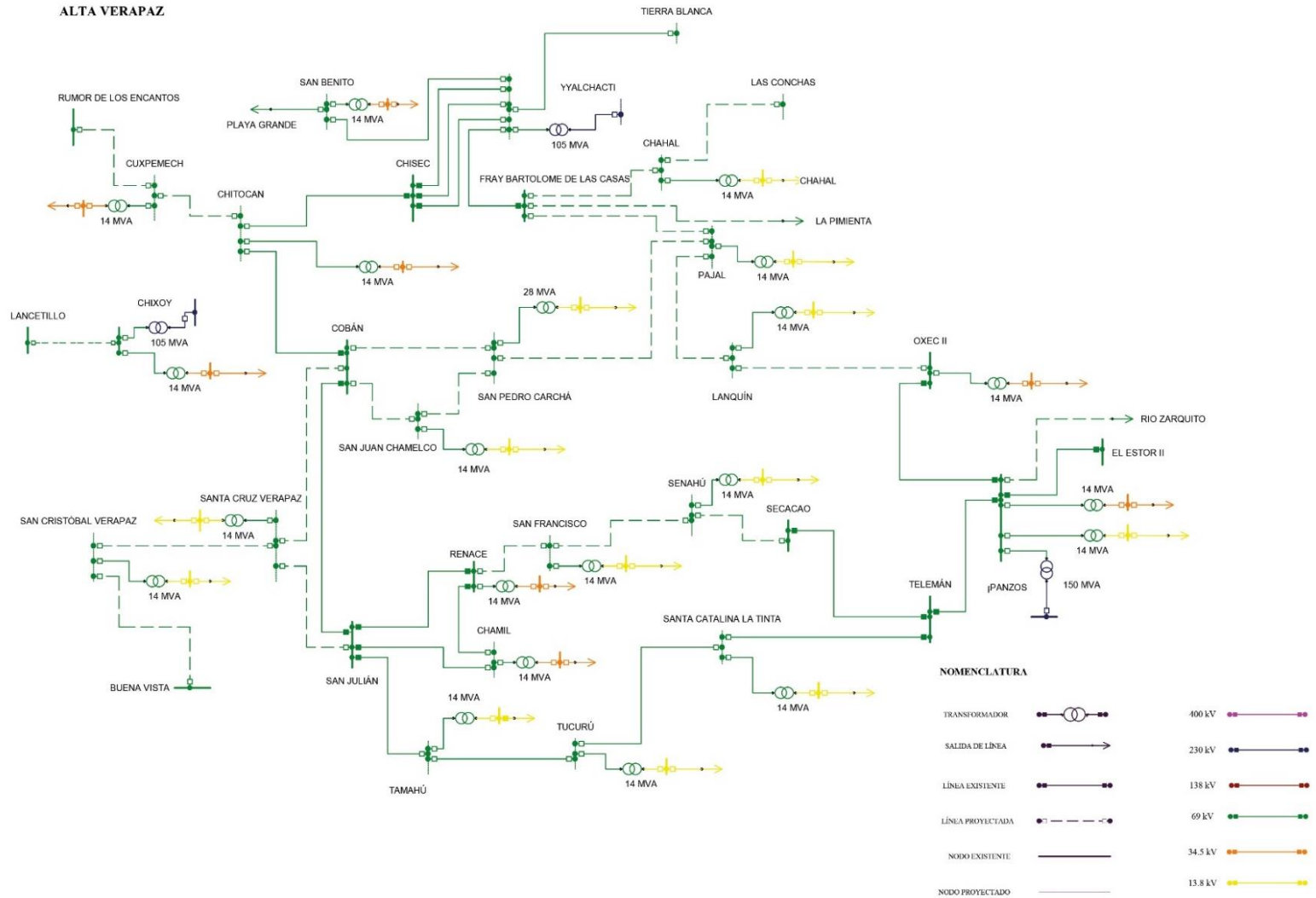


14.1. Department of Alta Verapaz





14.1.1. Single-line Diagram of Alta Verapaz



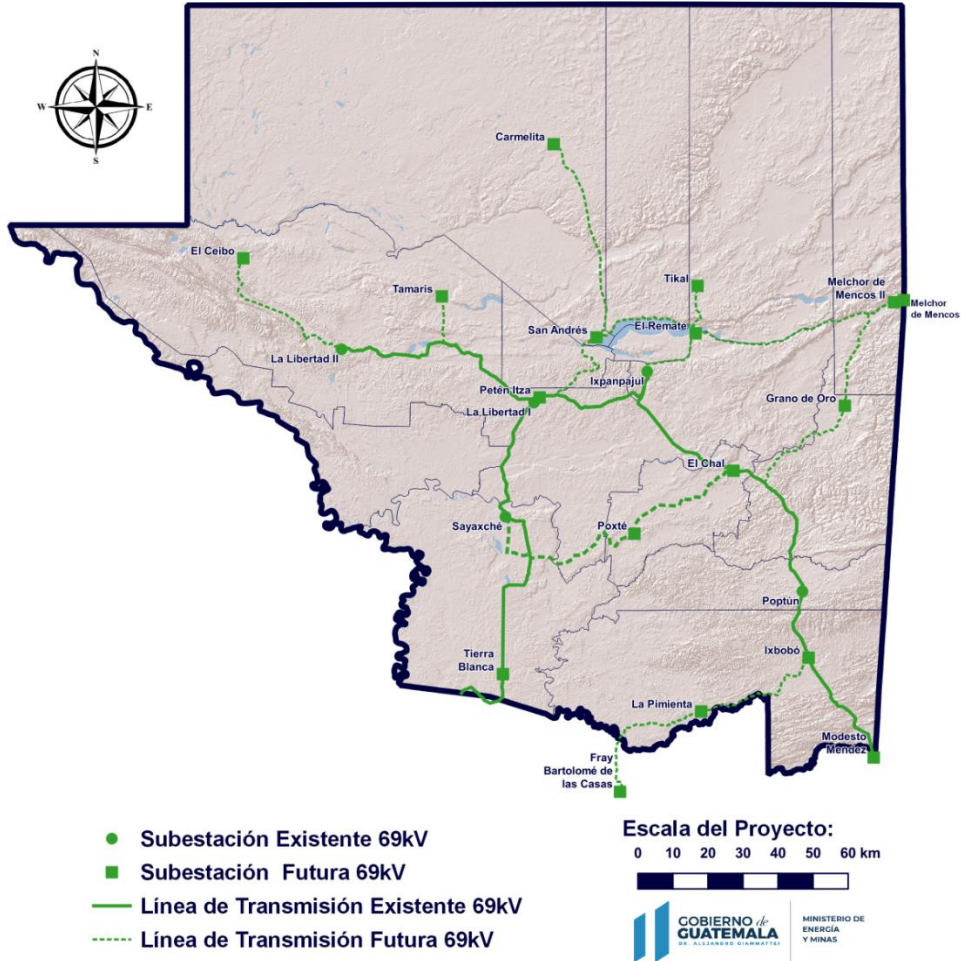
14.1.2. Electric Substations of Alta Verapaz

| TYPE OF WORK | MUNICIPALITY | ELECTRIC SUBSTATION | SUBSTATION TYPE | VOLTAGE (kV) | CAPACITY (MVA) |
|--------------|-----------------------------|-----------------------------|-----------------|--------------|----------------|
| EXISTING | SANTA CATALINA LA TINTA | LA TINTA | Transformation | 69/13.8 | 10/14 |
| NEW | TUCURÚ | TUCURÚ | Transformation | 69/13.8 | 10/14 |
| NEW | SAN PEDRO CARCHÁ | SAN PEDRO CARCHÁ | Transformation | 69/13.8 | 20/28 |
| NEW | LANQUÍN | LANQUÍN | Transformation | 69/34.5 | 10/14 |
| EXISTING | CAHABÓN | OEXEC II | Expansion | 69/34.5 | 10/14 |
| EXISTING | SAN PEDRO CARCHÁ | RENACE | Expansion | 69/34.5 | 10/14 |
| NEW | SANTA CRUZ VERAPAZ | SANTA CRUZ VERAPAZ | Transformation | 69/13.8 | 10/14 |
| EXISTING | PANZÓS | PANZÓS | Expansion | 69/13.8 | 10/14 |
| EXISTING | PANZÓS | PANZÓS | Expansion | 69/34.5 | 10/14 |
| NEW | COBÁN | CHITOCAN | Transformation | 69/34.5 | 10/14 |
| NEW | COBÁN | SAN BENITO | Transformation | 69/34.5 | 10/14 |
| NEW | SENAHÚ | SENAHÚ | Transformation | 69/13.8 | 10/14 |
| NEW | CHAHAL | CHAHAL | Transformation | 69/13.8 | 10/14 |
| NEW | COBÁN | CUXPEMECH | Transformation | 69/34.5 | 10/14 |
| NEW | TAMAHÚ | TAMAHÚ | Transformation | 69/13.8 | 10/14 |
| NEW | SAN JUAN CHAMELCO | SAN JUAN CHAMELCO | Transformation | 69/13.8 | 10/14 |
| NEW | SAN PEDRO CARCHÁ | SAN FRANCISCO | Transformation | 69/34.5 | 10/14 |
| NEW | SAN CRISTÓBAL VERAPAZ | SAN CRISTÓBAL VERAPAZ | Transformation | 69/13.8 | 10/14 |
| NEW | SAN JUAN CHAMECO | CHAMIL | Transformation | 69/34.5 | 10/14 |
| NEW | LANQUÍN | PAJAL | Transformation | 69/34.5 | 10/14 |
| NEW | CHAHAL | LAS CONCHAS | Transformation | 69/13.8 | 10/14 |
| EXISTING | PANZÓS | PANZÓS | Bay of 69kV | 69 | |
| NEW | CHISEC | YALCHACTI | Bay of 69kV | 69 | |
| EXISTING | PANZÓS | PANZÓS | 69 KV FIELD | 69 | |
| EXISTING | COBÁN | COBÁN | 69 KV FIELD | 69 | |
| EXISTING | COBÁN | COBÁN | 69 KV FIELD | 69 | |
| EXISTING | CAHABÓN | OEXEC II | 69 KV FIELD | 69 | |
| EXISTING | SENAHÚ | SECACAO | 69 KV FIELD | 69 | |
| EXISTING | FRAY BARTOLOMÉ DE LAS CASAS | FRAY BARTOLOMÉ DE LAS CASAS | 69 KV FIELD | 69 | |
| EXISTING | COBÁN | COBÁN | 69 KV FIELD | 69 | |
| EXISTING | TACTIC | SAN JULIAN | 69 KV FIELD | 69 | |
| EXISTING | FRAY BARTOLOMÉ DE LAS CASAS | FRAY BARTOLOMÉ DE LAS CASAS | 69 KV FIELD | 69 | |
| NEW | SANTA CRUZ VERAPAZ | SANTA CRUZ VERAPAZ | 69 KV FIELD | 69 | |

14.1.3. Transmission Lines of Alta Verapaz

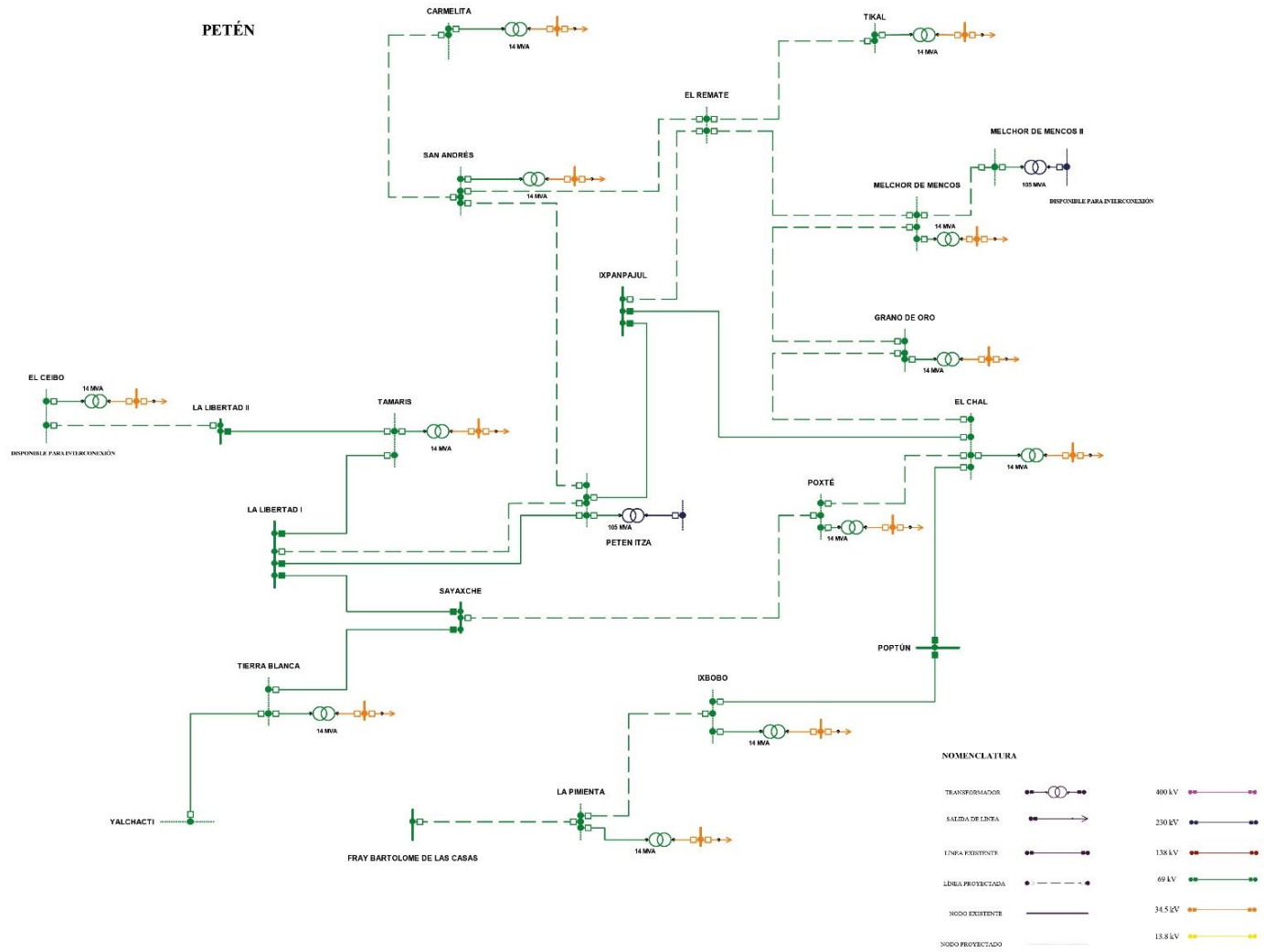
| TYPE | TRANSMISSION LINE | VOLTAGE (kV) | LENGTH (km) |
|----------|--|-----------------|----------------|
| NEW | LANQUÍN - OXEC II | 69 | 3 |
| NEW | COBÁN - SAN PEDRO CARCHÁ | 69 | 13 |
| ADEQUACY | SAN JULIÁN - COBÁN AND CONNECTION TO SANTA CRUZ VERAPAZ | 69 | 2 |
| ADEQUACY | CHISEC - SAYAXCHÉ AND CONNECTION TO YALCHACTI | 69 | 1 |
| ADEQUACY | CHISEC - FRAY BARTOLOMÉ DE LAS CASAS AND CONNECTION TO YALCHACTI | 69 | 7 |
| ADEQUACY | SAN JULIÁN - TELEMÁN AND CONNECTION TO TUCURÚ | 69 | 1 |
| ADEQUACY | SAN JULIÁN - TELEMÁN AND CONNECTION TO LA TINTA | 69 | 1 |
| NEW | SEGUNDO CIRCUITO SAN JULIÁN - COBÁN | 69 | 25 |
| ADEQUACY | COBÁN - CHISEC AND CONNECTION TO CHITOCAN | 69 | 1 |
| NEW | SECACAO – SENAHÚ | 69 | 11 |
| NEW | FRAY BARTOLOMÉ DE LAS CASAS - CHAHAL | 69 | 33 |
| ADEQUACY | CHISEC - PLAYA GRANDE AND CONNECTION TO SAN BENITO | 69 | 1 |
| ADEQUACY | CHISEC - PLAYA GRANDE AND CONNECTION TO YALCHACTI | 69 | 1 |
| NEW | CHITOCAN - CUXPEMECH | 69 | 36 |
| NEW | SENAHÚ - SAN FRANCISCO | 69 | 15 |
| NEW | COBÁN - SAN JUAN CHAMELCO | 69 | 13 |
| ADEQUACY | SAN JULIÁN - TELEMÁN AND CONNECTION TO TAMAHÚ | 69 | 1 |
| NEW | SAN JUAN CHAMELCO - SAN PEDRO CARCHÁ | 69 | 5 |
| NEW | SAN PEDRO CARCHÁ - LANQUÍN | 69 | 50 |
| NEW | SANTA CRUZ VERAPAZ - SAN CRISTÓBAL VERAPAZ | 69 | 9 |
| NEW | CHAHAL - LAS CONCHAS | 69 | 22 |
| ADEQUACY | SAN JULIÁN - RENACE AND CONNECTION TO CHAMIL | 69 | 1 |
| ADEQUACY | SAN PEDRO CARCHÁ - LANQUÍN AND CONNECTION TO PAJAL | 69 | 1 |
| NEW | PAJAL - FRAY BARTOLOMÉ CASAS | 69 | 49 |
| NEW | SAN CRISTÓBAL VERAPAZ - BUENA VISTA | 69 | 40 |
| NEW | SAN FRANCISCO - RENACE | 69 | 39 |

14.2. Department of Petén





14.2.1. Single-line Diagram of Petén



14.2.2. Electric Substations of Petén

| TYPE OF WORK | MUNICIPALITY | ELECTRIC SUBSTATION | SUBSTATION TYPE | VOLTAGE (kV) | CAPACITY (MVA) |
|--------------|-----------------------------|-----------------------------|-----------------|--------------|----------------|
| EXISTING | LA LIBERTAD | LA LIBERTAD I | EXPANSION | 69/34.5 | 10/14 |
| NEW | SAN LUIS | IXBOBÓ | TRANSFORMATION | 69/34.5 | 10/14 |
| NEW | LA LIBERTAD | EL CEIBO | TRANSFORMATION | 69/34.5 | 10/14 |
| NEW | MELCHOR DE MENCOS | MELCHOR DE MENCOS | TRANSFORMATION | 69/34.5 | 10/14 |
| NEW | EL CHAL | EL CHAL | TRANSFORMATION | 69/34.5 | 10/14 |
| NEW | SAYAXCHÉ | TIERRA BLANCA | TRANSFORMATION | 69/34.5 | 10/14 |
| NEW | DOLORES | GRANO DE ORO | TRANSFORMATION | 69/34.5 | 10/14 |
| NEW | SAN LUIS | LA PIMIENTA | TRANSFORMATION | 69/34.5 | 10/14 |
| NEW | SAN ANDRÉS | SAN ANDRÉS | TRANSFORMATION | 69/34.5 | 10/14 |
| NEW | FLORES | TIKAL | TRANSFORMATION | 69/34.5 | 10/14 |
| NEW | LA LIBERTAD | TAMARIS | TRANSFORMATION | 69/34.5 | 10/14 |
| NEW | SAN ANDRÉS | CARMELITA | TRANSFORMATION | 69/34.5 | 10/14 |
| NEW | EL CHAL | POXTÉ | TRANSFORMATION | 69/34.5 | 10/14 |
| EXISTING | SANTA ANA | IXPANPAJUL | EXPANSION | 69 | |
| NEW | LA LIBERTAD | PETÉN ITZÁ | 69KV BAY | 69 | |
| NEW | SANTA ANA | EL REMATE | MANEUVERS | 69 | |
| EXISTING | LA LIBERTAD | LA LIBERTAD II | 69 KV FIELD | 69 | |
| EXISTING | FRAY BARTOLOME DE LAS CASAS | FRAY BARTOLOME DE LAS CASAS | 69 KV FIELD | 69 | |
| EXISTING | SANTA ANA | IXPANPAJUL | 69 KV FIELD | 69 | |
| EXISTING | SANTA ANA | IXPANPAJUL | 69 KV FIELD | 69 | |
| NEW | MELCHOR DE MENCOS | MELCHOR DE MENCOS | 69 KV FIELD | 69 | |
| EXISTING | EL CHAL | EL CHAL | 69 KV FIELD | 69 | |
| EXISTING | SAYAXCHÉ | SAYAXCHÉ | 69 KV FIELD | 69 | |

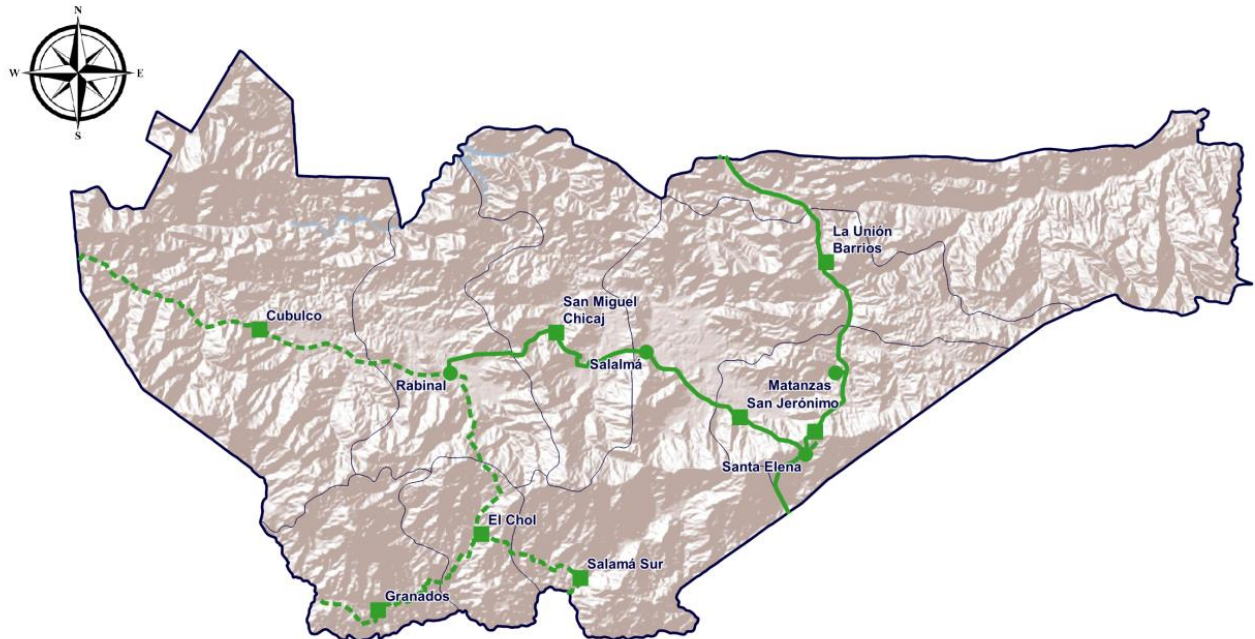
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14.2.3. Transmission Lines of Petén

| TYPE | TRANSMISSION LINE | VOLTAGE (kV) | LENGTH (km) |
|------------------------------------|---|-----------------|----------------|
| NEW | IXPANPAJUL - MELCHOR DE MENCOS (2) | 69 | 85 |
| NEW | LA LIBERTAD II - EL CEIBO | 69 | 50 |
| ADEQUACY | POPTÚN - IXPANPAJUL AND CONNECTION TO CHAL | 69 | 1 |
| ADEQUACY | RÍO DULCE -POPTÚN AND CONNECTION TO IXBOBÓ | 69 | 1 |
| NEW | EL CHAL - GRANO DE ORO | 69 | 48 |
| NEW | IXBOBÓ - LA PIMIENTA | 69 | 43 |
| NEW | SAN ANDRÉS – PETÉN ITZÁ | 69 | 35 |
| NEW | LA LIBERTAD I – PETÉN ITZÁ | 69 | 5 |
| ADEQUACY | LA LIBERTAD I - IXPANPAJUL AND CONNECTION TO PETÉN ITZÁ | 69 | 1 |
| NEW | REMATE – SAN ANDRÉS | 69 | 34 |
| ADEQUACY | IXPANPANJUL - MELCHOR DE MENCOS AND CONNECTION TO EL REMATE | 69 | 1 |
| ADEQUACY | LA LIBERTAD II - LA LIBERTAD I AND CONNECTION TO TAMARIS | 69 | 14 |
| NEW | EL REMATE - TIKAL | 69 | 16 |
| NEW | MELCHOR DE MENCOS – MELCHOR DE MENCOS II | 69 | 4 |
| NEW | GRANO DE ORO - MELCHOR DE MENCOS | 69 | 37 |
| NEW | SAN ANDRÉS - CARMELITA | 69 | 52 |
| ADEQUACY | YALCHACTI-SAYAXCHÉ AND CONNECTION TO TIERRA BLANCA | 69 | 1 |
| NEW | FRAY BARTOLOME DE LAS CASAS - LA PIMIENTA | 69 | 46 |
| NEW | EL CHAL – POXTÉ | 69 | 39 |
| NEW | POXTÉ – SAYAXCHÉ | 69 | 57 |
| (1): PREPARED TO OPERATE AT 230 KV | | | |

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14.3. Department of Baja Verapaz



- Línea de Transmisión Existente 69kV
- - - Línea de Transmisión Futura 69kV
- Subestación Existente 69kV
- Subestación Futura 69kV

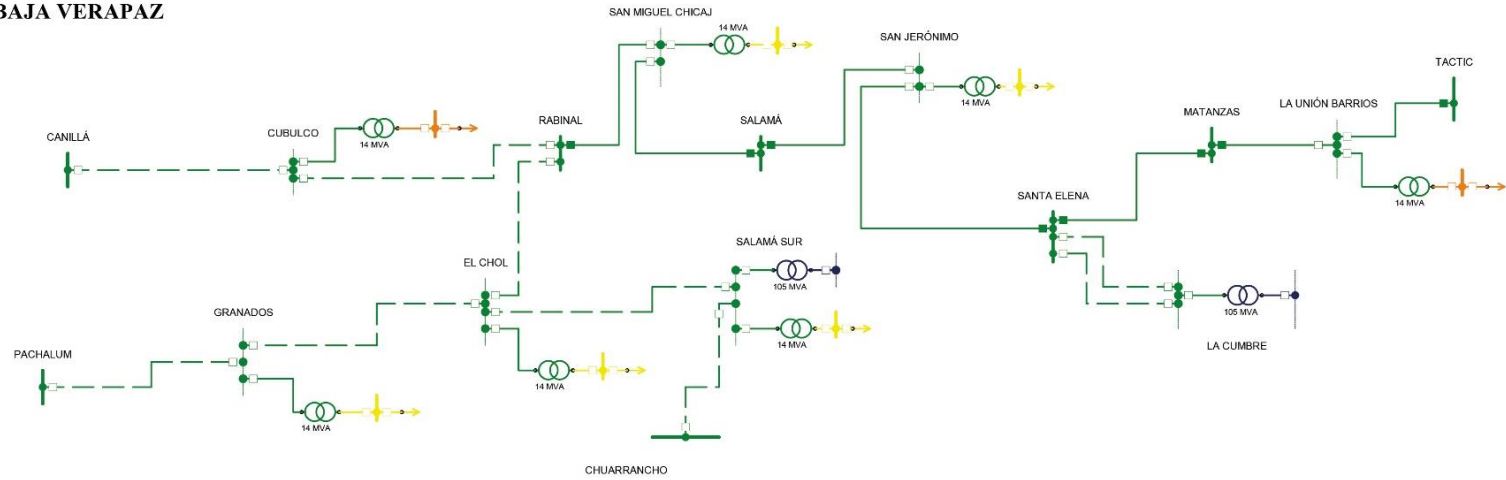
Escala del Proyecto:





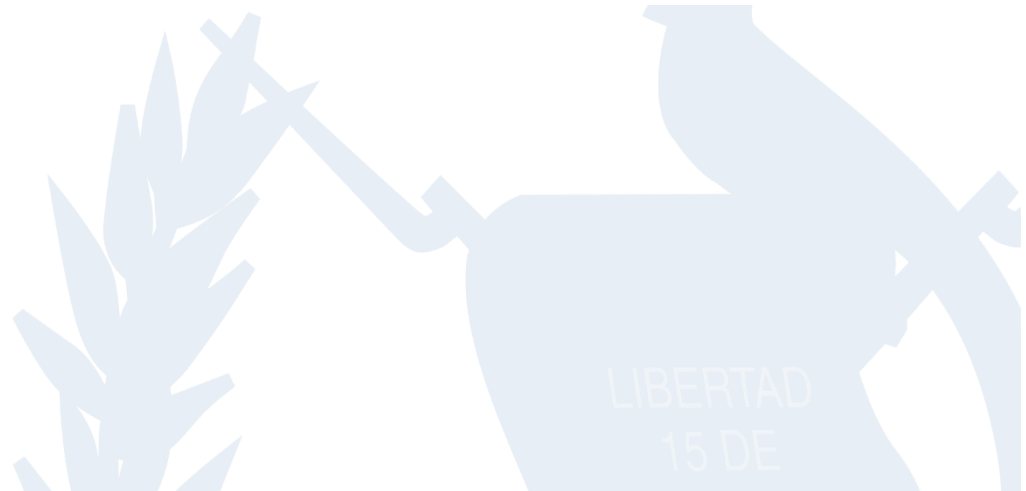
14.3.1. Single-line Diagram of Baja Verapaz

BAJA VERAPAZ



NOMENCLATURA

| | | | |
|------------------|--|---------|--|
| TRANSFORMADOR | | 400 kV | |
| SALIDA DE LÍNEA | | 230 kV | |
| LÍNEA EXISTENTE | | 138 kV | |
| LÍNEA PROYECTADA | | 69 kV | |
| NODO EXISTENTE | | 34.5 kV | |
| NODO PROYECTADO | | 13.8 kV | |



14.3.2. Electric Substations of Baja Verapaz

| TYPE OF WORK | MUNICIPALITY | ELECTRIC SUBSTATION | SUBSTATION TYPE | VOLTAGE (kV) | CAPACITY (MVA) |
|--------------|--------------------|---------------------|-----------------|--------------|----------------|
| NEW | CUBULCO | CUBULCO | TRANSFORMATION | 69/34.5 | 10/14 |
| NEW | SALAMÁ | LA UNIÓN BARRIOS | TRANSFORMATION | 69/34.5 | 10/14 |
| NEW | SANTA CRUZ EL CHOL | EL CHOL | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | SALAMÁ | SALAMÁ SUR | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | GRANADOS | GRANADOS | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | SAN MIGUEL CHICAJ | SAN MIGUEL CHICAJ | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | SAN JERÓNIMO | SAN JERÓNIMO | TRANSFORMATION | 69/13.8 | 10/14 |
| EXISTING | RABINAL | RABINAL | 69 KV FIELD | 69 | |
| EXISTING | RABINAL | RABINAL | 69 KV FIELD | 69 | |
| EXISTING | SAN JERÓNIMO | SANTA ELENA | 69 KV FIELD | 69 | |
| EXISTING | SAN JERÓNIMO | SANTA ELENA | 69 KV FIELD | 69 | |

14.3.3. Transmission Lines of Baja Verapaz

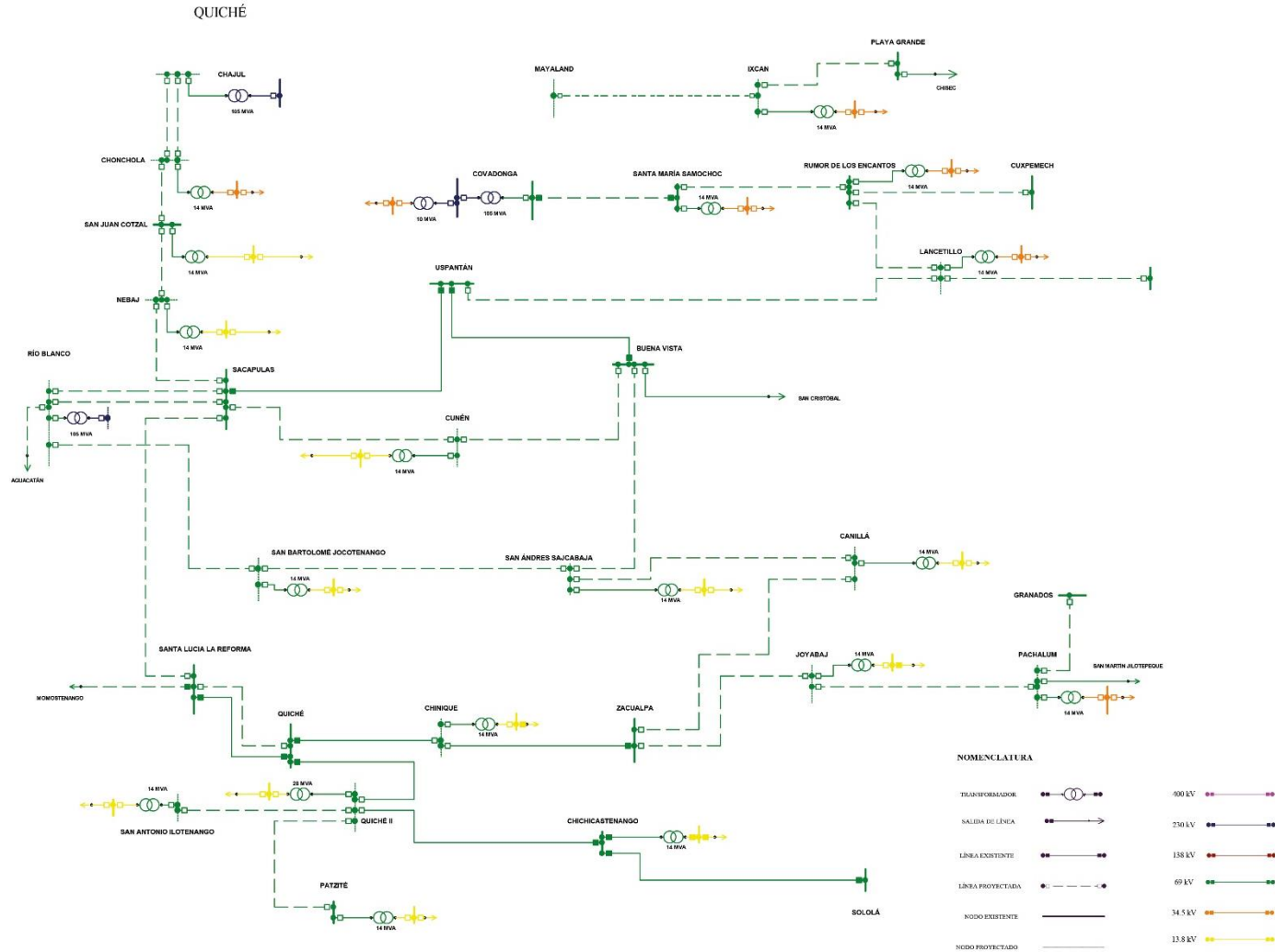
| TYPE | TRANSMISSION LINE | VOLTAGE (kV) | LENGTH (km) |
|----------|--|--------------|-------------|
| NEW | RABINAL-CUBULCO | 69 | 19 |
| ADEQUACY | MATANZAS - TACTIC AND CONNECTION TO UNIÓN BARRIOS | 69 | 1 |
| NEW | DOUBLE CIRCUIT LA CUMBRE - SANTA ELENA | 69 | 2.4 |
| NEW | RABINAL - EL CHOL | 69 | 18 |
| NEW | EL CHOL - SALAMÁ SUR | 69 | 12 |
| NEW | GRANADOS - PACHALUM | 69 | 14 |
| NEW | CUBULCO - CANILLÁ | 69 | 27 |
| NEW | EL CHOL - GRANADOS | 69 | 16 |
| ADEQUACY | RABINAL-SALAMÁ AND CONNECTION TO SAN MIGUEL CHICAJ | 69 | 1 |
| ADEQUACY | SALAMÁ-SANTA ELENA AND CONNECTION TO SAN JERÓNIMO | 69 | 1 |

14.4. Department of Quiché





14.4.1. Single-line Diagram of Quiché



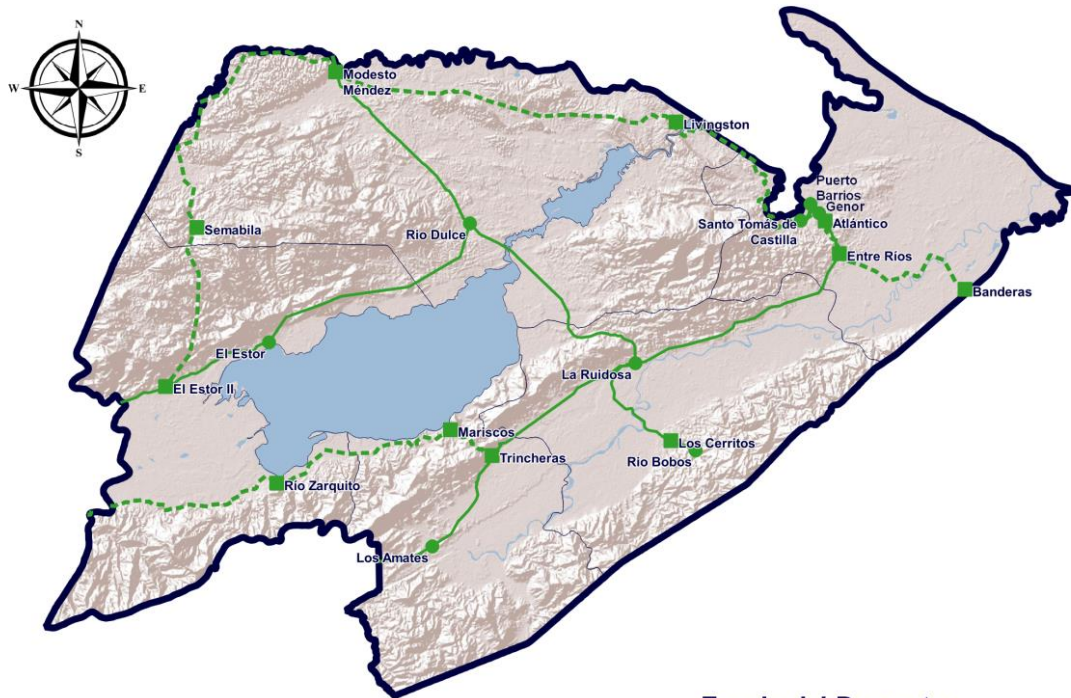
14.4.2. Electric Substations of Quiché

| TYPE OF WORK | MUNICIPALITY | ELECTRIC SUBSTATION | SUBSTATION TYPE | VOLTAGE (kV) | CAPACITY (MVA) |
|--------------|-------------------------------|------------------------------|-----------------|--------------|----------------|
| NEW | IXCÁN | IXCÁN | TRANSFORMATION | 69/34.5 | 10/14 |
| NEW | SAN BARTOLOMÉ JOCOTENANGO | SAN BARTOLOMÉ JOCOTENANGO | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | CANILLÁ | CANILLÁ | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | PACHALUM | PACHALUM | TRANSFORMATION | 69/34.5/13.8 | 10/14 |
| NEW | SANTA MARÍA NEBAJ | NEBAJ | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | IXCÁN | SANTA MARÍA SAMOCHOC | TRANSFORMATION | 69/34.5 | 10/14 |
| NEW | CHAJUL | CHONCHOLA | TRANSFORMATION | 69/34.5/13.8 | 10/14 |
| NEW | CHINIQUE | CHINIQUE | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | SAN ANDRÉS SAJCABAJÁ | SAN ANDRÉS SAJCABAJÁ | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | JOYABAJ | JOYABAJ | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | CHICAMÁN | LANCETILLO | TRANSFORMATION | 69/34.5 | 10/14 |
| NEW | SAN ANTONIO ILOTENANGO | QUICHÉ II | TRANSFORMATION | 69/13.8 | 20/28 |
| NEW | PATZITÉ | PATZITÉ | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | CUNÉN | CUNÉN | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | SAN JUAN COTZAL | SAN JUAN COTZAL | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | SAN ANTONIO ILOTENANGO | SAN ANTONIO ILOTENANGO | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | SAN MIGUEL USPANTÁN | RUMOR DE LOS ENCANTOS | TRANSFORMATION | 69/34.5 | 10/14 |
| NEW | CHAJUL | CHAJUL | 69KV BAY | 69 | |
| EXISTING | IXCÁN | PLAYA GRANDE | 69 KV FIELD | 69 | |
| EXISTING | SACAPULAS | SACAPULAS | 69 KV FIELD | 69 | |
| EXISTING | SACAPULAS | SACAPULAS | 69 KV FIELD | 69 | |
| EXISTING | ZACUALPA | ZACUALPA | 69 KV FIELD | 69 | |
| EXISTING | ZACUALPA | ZACUALPA | 69 KV FIELD | 69 | |
| EXISTING | NEBAJ | COVADONGA | 69 KV FIELD | 69 | |
| EXISTING | SAN CRISTOBAL ALTA VERAPAZ | CHIXOY | 69 KV FIELD | 69 | |
| EXISTING | CHICAMÁN | BUENA VISTA | 69 KV FIELD | 69 | |
| EXISTING | SACAPULAS | SACAPULAS | 69 KV FIELD | 69 | |
| EXISTING | SACAPULAS | SACAPULAS | 69 KV FIELD | 69 | |
| EXISTING | SAN ANTONIO ILOTENAGO | QUICHÉ | 69 KV FIELD | 69 | |
| EXISTING | CHAJUL | USPANTÁN | 69 KV FIELD | 69 | |
| EXISTING | SACAPULAS | RÍO BLANCO | 69 KV FIELD | 69 | |
| NEW | CHAJUL | CHONCHOLA | 69 KV FIELD | 69 | |
| EXISTING | CHICAMÁN | BUENA VISTA | 69 KV FIELD | 69 | |
| EXISTING | CHICAMÁN | BUENA VISTA | 69 KV FIELD | 69 | |

14.4.3. Transmission Lines of Quiché

| TYPE | TRANSMISSION LINE | VOLTAGE (kV) | LENGTH (km) |
|----------|---|-----------------|----------------|
| NEW | COVADONGA - SANTA MARIA SAMOCHOC | 69 | 26 |
| NEW | DOUBLE CIRCUIT RÍO BLANCO - SACAPULAS | 69 | 4 |
| NEW | DOUBLE CIRCUIT CHAJUL - CHONCHOLA | 69 | 4 |
| NEW | RÍO BLANCO - SAN BARTOLOMÉ JOCOTENANGO | 69 | 20 |
| NEW | CHONCHOLA - NEBAJ | 69 | 19 |
| NEW | ZACUALPA - PACHALUM | 69 | 33 |
| NEW | ZACUALPA - CANILLÁ | 69 | 20 |
| NEW | PLAYA GRANDE - IXCÁN | 69 | 26 |
| NEW | MAYALAND - IXCÁN | 69 | 30 |
| NEW | CHIXOY - LANCETILLO | 69 | 21 |
| NEW | USPANTÁN - LANCETILLO | 69 | 25 |
| NEW | SAN BARTOLOMÉ JOCOTENANGO - SAN ANDRÉS SAJCABAJÁ | 69 | 23 |
| NEW | CUXPEMECH - SANTA MARÍA SAMOCHOC | 69 | 35 |
| ADEQUACY | PACHALUM-ZACUALPA AND CONNECTION TO JOYABAJ | 69 | 1 |
| ADEQUACY | QUICHÉ-ZACUALPA AND CONNECTION TO CHINIQUE | 69 | 1 |
| NEW | NEBAJ - SACAPULAS | 69 | 27 |
| NEW | QUICHÉ II – PATZITÉ | 69 | 9 |
| ADEQUACY | QUICHÉ-CHICHICASTENANGO AND CONNECTION TO QUICHÉ II | 69 | 1 |
| NEW | SACAPULAS - CUNÉN | 69 | 20 |
| NEW | BUENA VISTA - SAN ANDRÉS SAJCABAJÁ | 69 | 19 |
| NEW | QUICHÉ II - SAN ANTONIO ILOTENANGO | 69 | 11 |
| NEW | LANCETILLO - RUMOR DE LOS ENCANTOS | 69 | 22 |
| NEW | SAN ANDRÉS SAJCABAJÁ – CANILLÁ | 69 | 19 |
| NEW | CUNÉN-BUENA VISTA | 69 | 1 |
| NEW | QUICHÉ – SACAPULAS | 69 | 48 |
| ADEQUACY | QUICHÉ – SACAPULAS AND CONNECTION TO SANTA LUCÍA LA REFORMA | 69 | 4 |
| ADEQUACY | NEBAJ -CHONCHOLA AND CONNECTION TO SAN JUAN COTZAL | 69 | 10 |
| ADEQUACY | CUXPEMECH – SANTA MARÍA SAMOCHOC CONNECTION TO RUMOR DE LOS ENCANTOS | 69 | 1 |

14.5. Department of Izabal



Escala del Proyecto:

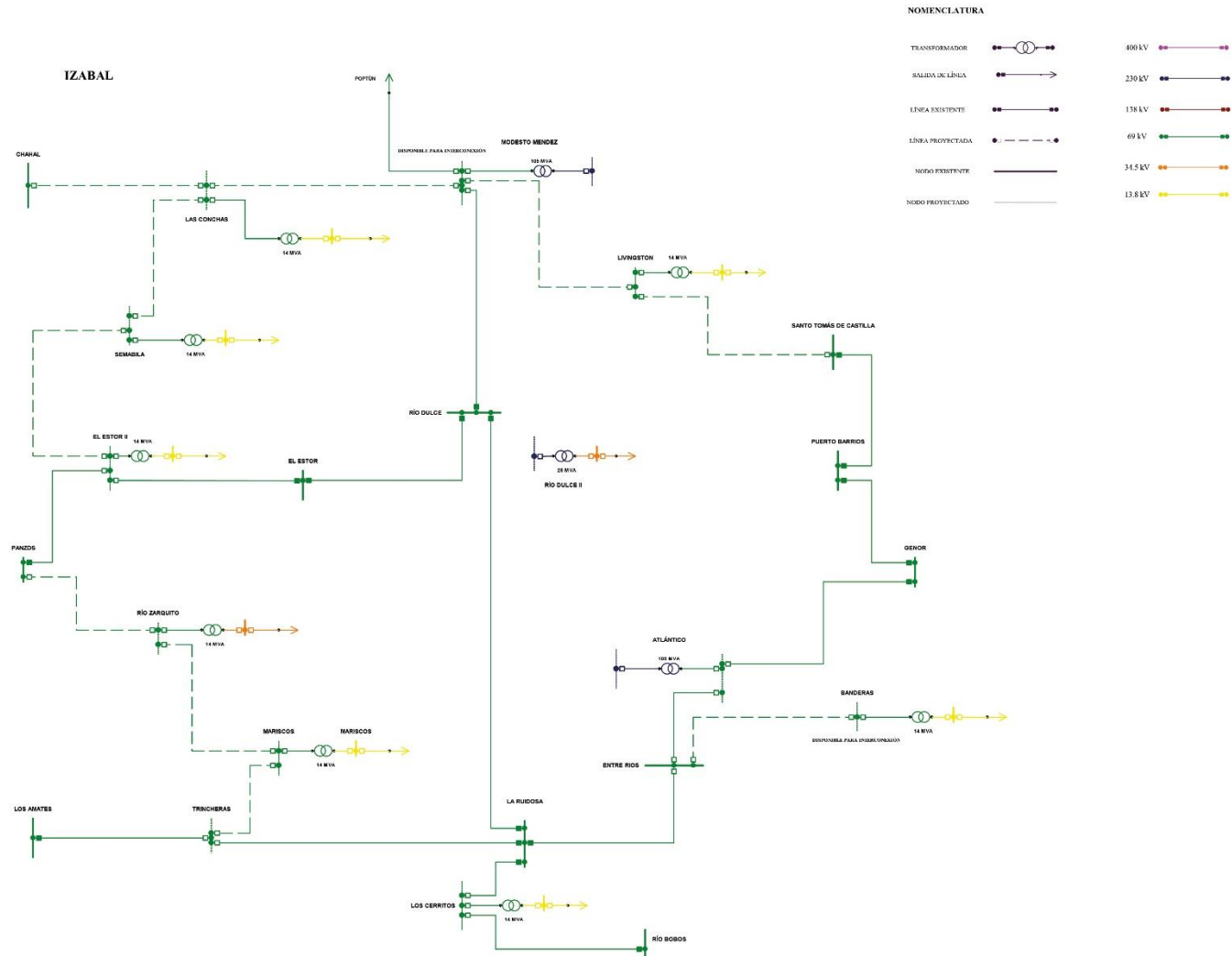
0 10 20 30 40 km



- Subestación Existente 69kV
- Subestación Futura 69kV
- Línea de Transmisión 69kV
- - - Línea de Transmisión Furura 69kV



14.5.1. Single-line Diagram of Izabal



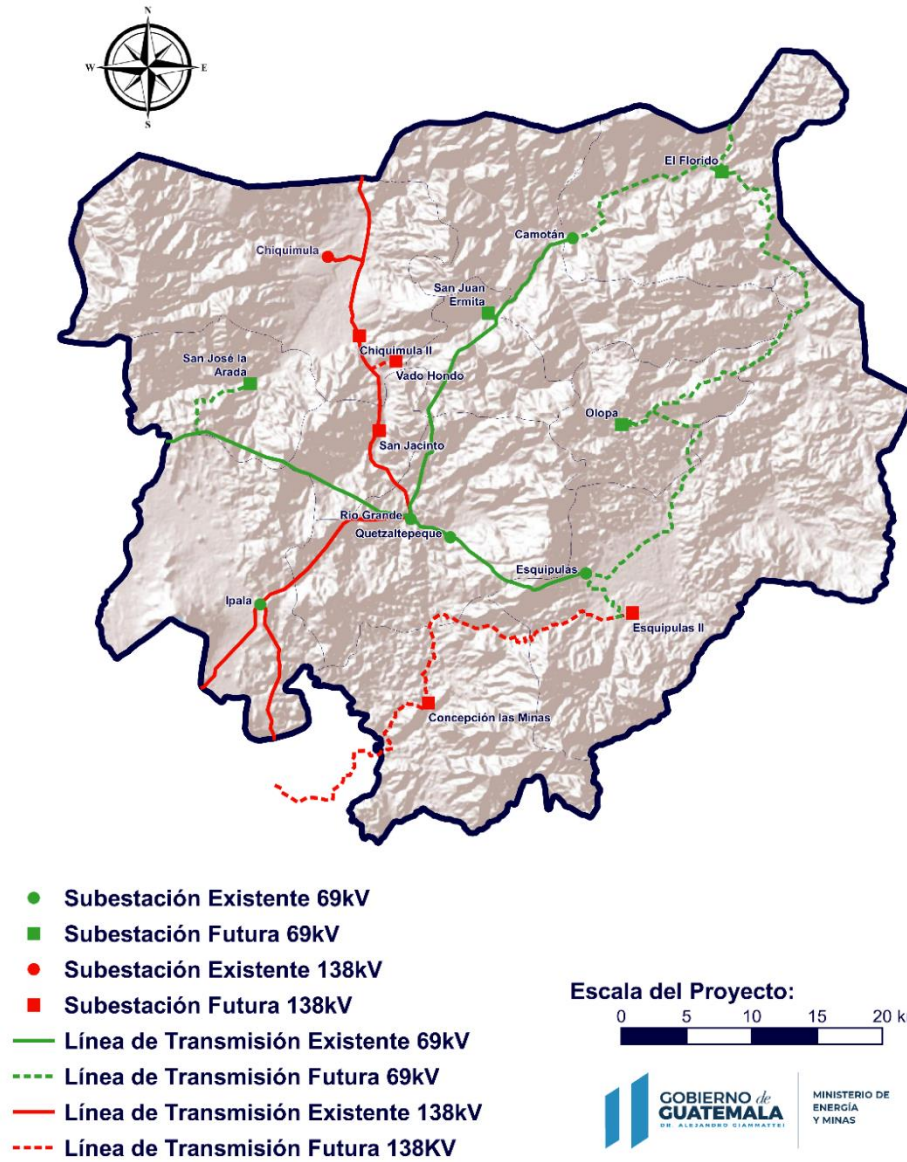
14.5.2. Electric Substations of Izabal

| TYPE OF WORK | MUNICIPALITY | ELECTRIC SUBSTATION | SUBSTATION TYPE | VOLTAGE (kV) | CAPACITY (MVA) |
|--------------|----------------|-------------------------|-----------------|--------------|----------------|
| NEW | LIVINGSTON | LIVINGSTON | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | MORALES | LOS CERRITOS | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | EL ESTOR | EL ESTOR II | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | LIVINGSTON | SEMABILA | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | LOS AMATES | TRINCHERAS | MANEUVERS | 69 | |
| NEW | LOS AMATES | MARISCOS | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | EL ESTOR | RÍO ZARQUITO | TRANSFORMATION | 69/34.5 | 10/14 |
| NEW | PUERTO BARRIOS | BANDERAS | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | PUERTO BARRIOS | ENTRE RÍOS | MANEUVERS | 69 | |
| NEW | PUERTO BARRIOS | ATLÁNTICO | 69KV BAY | 69 | |
| NEW | LIVINGSTON | MODESTO MÉNDEZ | 69KV BAY | 69 | |
| EXISTING | PUERTO BARRIOS | SANTO TOMÁS DE CASTILLA | 69 KV FIELD | 69 | |
| NEW | LIVINGSTON | MODESTO MÉNDEZ | 69 KV FIELD | 69 | |
| NEW | LIVINGSTON | MODESTO MÉNDEZ | 69 KV FIELD | 69 | |

14.5.3. Transmission Lines of Izabal

| TYPE | TRANSMISSION LINE | VOLTAGE (kV) | LENGTH (km) |
|----------|---|--------------|-------------|
| NEW | SANTO TOMÁS DE CASTILLA-LIVINGSTON | 69 | 36 |
| ADEQUACY | LA RUIDOSA - RÍO BOBOS AND CONNECTION TO LOS CERRITOS | 69 | 1 |
| ADEQUACY | LA RUIDOSA - GENOR AND CONNECTION TO ATLÁNTICO | 69 | 1 |
| NEW | EL ESTOR II - SEMABILA | 69 | 27 |
| NEW | MODESTO MÉNDEZ - LAS CONCHAS | 69 | 30 |
| NEW | TRINCHERAS - MARISCOS | 69 | 8 |
| ADEQUACY | EL ESTOR - PANZOS AND CONNECTION TO EL ESTOR II | 69 | 1 |
| ADEQUACY | LOS AMATES - LA RUIDOSA AND CONNECTION TO TRINCHERAS | 69 | 1 |
| ADEQUACY | RÍO DULCE-POPTÚN AND CONNECTION TO MODESTO MÉNDEZ | 69 | 1 |
| NEW | PANZOS- RÍO ZARQUITO | 69 | 55 |
| NEW | ENTRE RÍOS - BANDERAS | 69 | 25 |
| ADEQUACY | LA RUIDOSA - GENOR AND CONNECTION TO ENTRE RÍOS | 69 | 1 |
| NEW | LIVINGSTON - MODESTO MÉNDEZ | 69 | 50 |
| NEW | SEMABILA - LAS CONCHAS | 69 | 23 |
| NEW | RÍO ZARQUITO - MARISCOS | 69 | 31 |

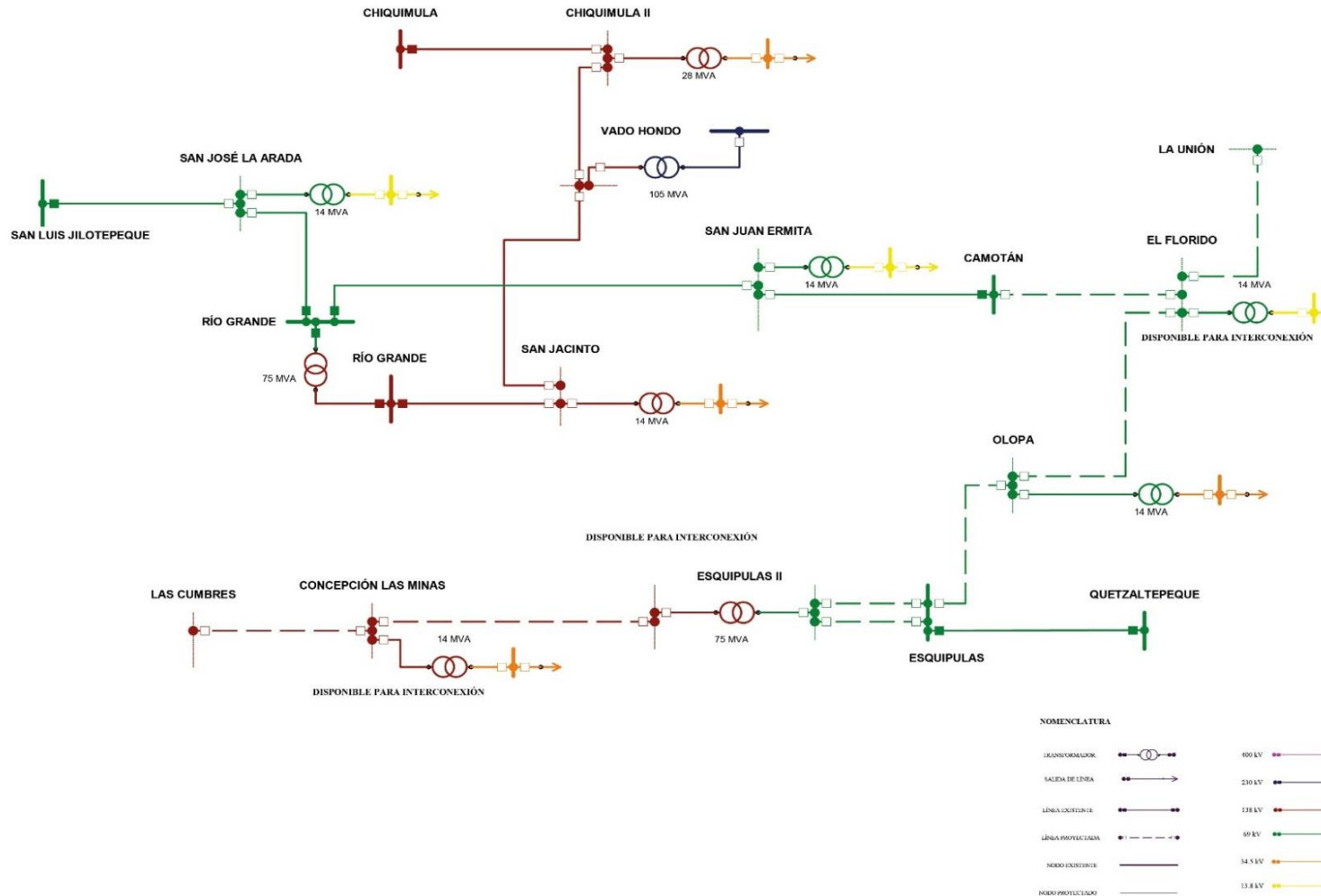
14.6. Department of Chiquimula





14.6.1. Single-line Diagram of Chiquimula

CHIQUIMULA



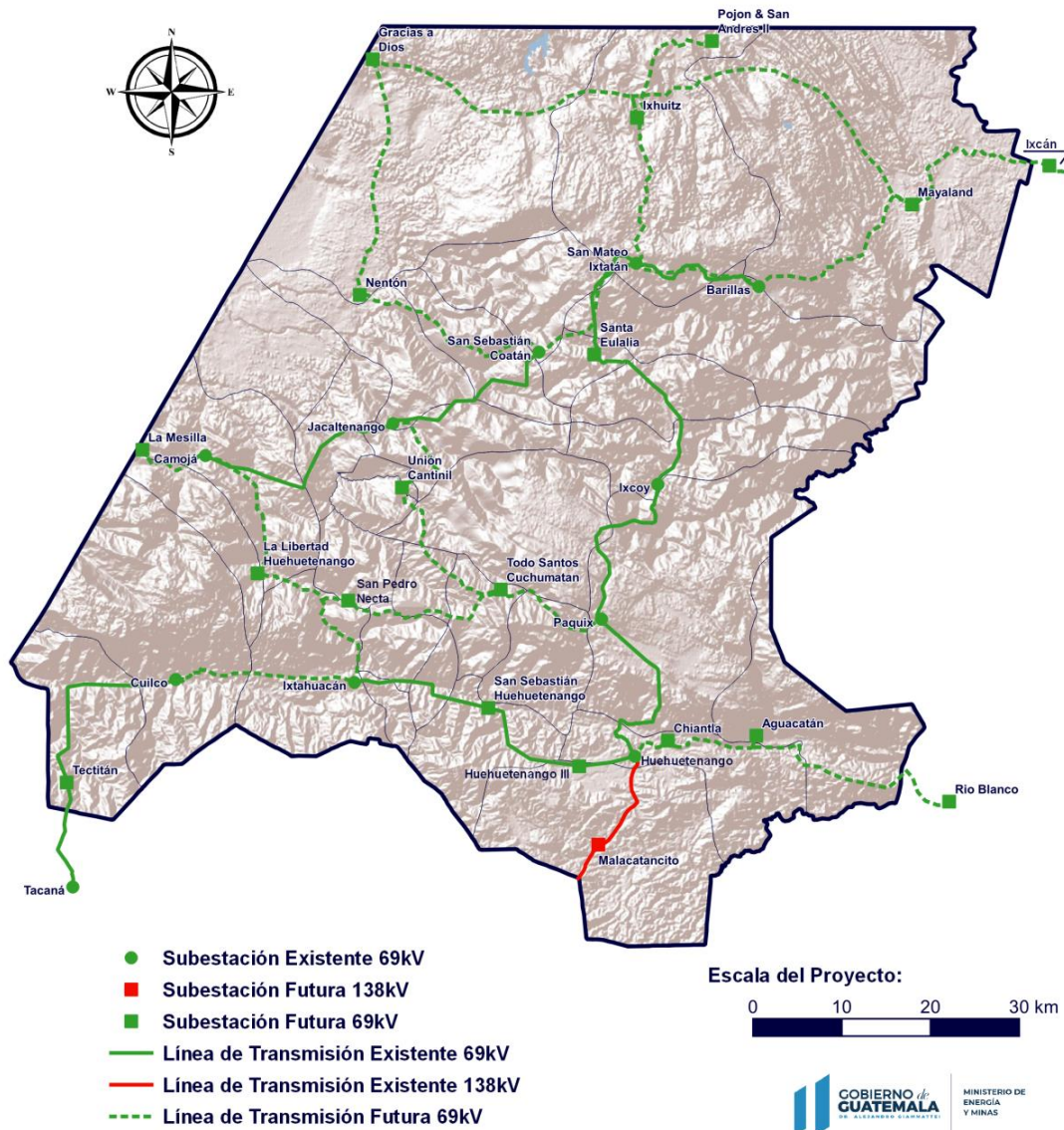
14.6.2. Electric Substations of Chiquimula

| TYPE OF WORK | MUNICIPALITY | ELECTRIC SUBSTATION | SUBSTATION TYPE | VOLTAGE (kV) | CAPACITY (MVA) |
|--------------|----------------------|----------------------|-----------------|--------------|----------------|
| NEW | CONCEPCIÓN LAS MINAS | CONCEPCIÓN LAS MINAS | TRANSFORMATION | 138/34.5 | 10/14 |
| NEW | CHIQUIMULA | CHIQUIMULA II | TRANSFORMATION | 138/13.8 | 20/28 |
| NEW | OLOPA | OLOPA | TRANSFORMATION | 69/34.5 | 10/14 |
| NEW | CAMOTÁN | EL FLORIDO | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | ESQUIPULAS | ESQUIPULAS II | TRANSFORMATION | 138/69 | 75 |
| NEW | SAN JUAN ERMITA | SAN JUAN ERMITA | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | SAN JACINTO | SAN JACINTO | TRANSFORMATION | 138/34.5 | 10/14 |
| NEW | SAN JOSÉ LA ARADA | SAN JOSÉ LA ARADA | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | CHIQUIMULA | VADO HONDO | 138KV BAY | 138 | |
| EXISTING | ESQUIPULAS | ESQUIPULAS | 69 KV FIELD | 69 | |
| EXISTING | ESQUIPULAS | ESQUIPULAS | 69 KV FIELD | 69 | |
| EXISTING | ESQUIPULAS | ESQUIPULAS | 69 KV FIELD | 69 | |
| EXISTING | CAMOTÁN | CAMOTÁN | 69 KV FIELD | 69 | |

14.6.3. Transmission Lines of Chiquimula

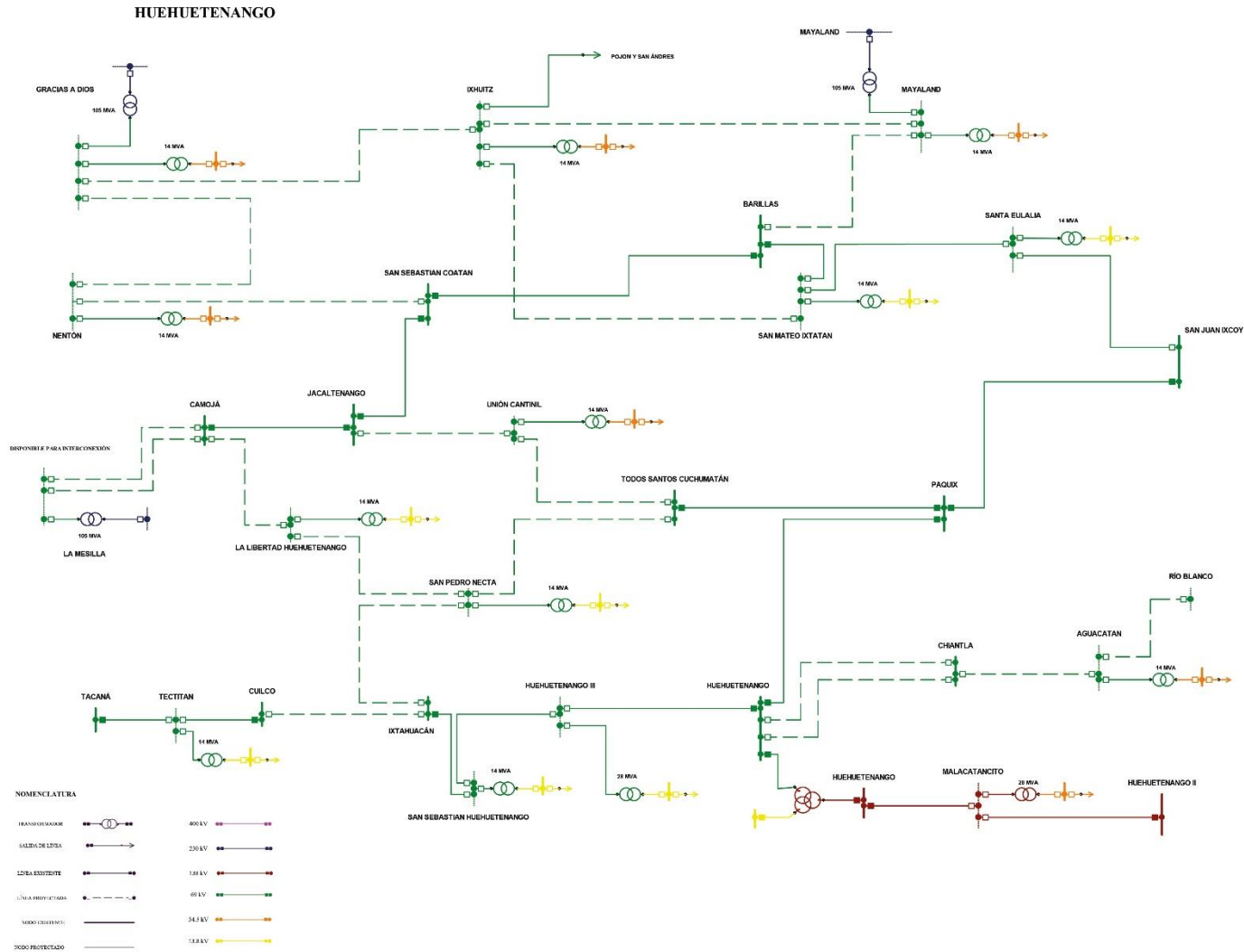
| TYPE | TRANSMISSION LINE | VOLTAGE (kV) | LENGTH (km) |
|----------|---|--------------|-------------|
| NEW | LAS CUMBRES - CONCEPCIÓN LAS MINAS | 138 | 19 |
| NEW | ESQUIPULAS - OLOPA | 69 | 25 |
| NEW | CAMOTÁN - LA UNIÓN | 69 | 30 |
| ADEQUACY | RÍO GRANDE - CHIQUIMULA AND CONNECTION TO CHIQUIMULA II | 138 | 1 |
| NEW | CONCEPCIÓN LAS MINAS - ESQUIPULAS II | 138 | 26 |
| ADEQUACY | CAMOTÁN - LA UNIÓN AND CONNECTION TO EL FLORIDO | 69 | 1 |
| NEW | DOUBLE CIRCUIT ESQUIPULAS II - ESQUIPULAS | 69 | 7 |
| NEW | OLOPA - EL FLORIDO | 69 | 36 |
| ADEQUACY | RÍO GRANDE - CAMOTÁN AND CONNECTION TO SAN JUAN ERMITA | 69 | 1 |
| ADEQUACY | CHIQUIMULA-RÍO GRANDE AND CONNECTION TO VADO HONDO | 138 | 2 |
| ADEQUACY | RÍO GRANDE - CHIQUIMULA AND CONNECTION TO SAN JACINTO | 138 | 1 |
| ADEQUACY | JALAPA-RÍO GRANDE AND DOUBLE CIRCUIT CONNECTION SAN JOSÉ LA ARADA | 69 | 8 |

14.7. Department of Huehuetenango





14.7.1. Single-line Diagram of Huehuetenango



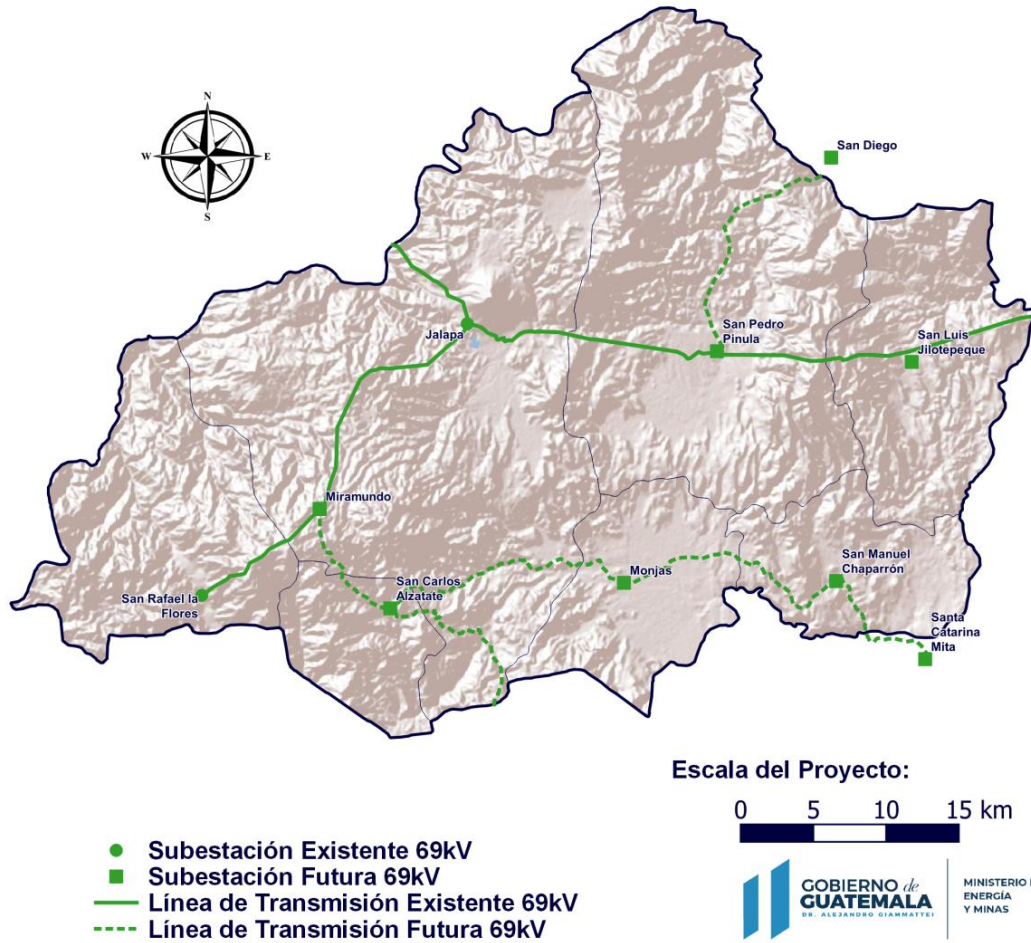
14.7.2. Electric Substations of Huehuetenango

| TYPE OF WORK | MUNICIPALITY | ELECTRIC SUBSTATION | SUBSTATION TYPE | VOLTAGE (kV) | CAPACITY (MVA) |
|--------------|-----------------------------|--------------------------------|-----------------|--------------|----------------|
| NEW | AGUACATÁN | AGUACATÁN | TRANSFORMATION | 69/34.5 | 10/14 |
| NEW | LA LIBERTAD | LA LIBERTAD HUEHUETENANGO | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | SAN MATEO IXTATÁN | IXHUITZ | TRANSFORMATION | 69/34.5 | 10/14 |
| NEW | MALACATANCITO | HUEHUETENANGO III | TRANSFORMATION | 69/13.8 | 20/28 |
| NEW | NENTÓN | NENTÓN | TRANSFORMATION | 69/34.5 | 10/14 |
| NEW | NENTÓN | GRACIAS A DIOS | TRANSFORMATION | 69/34.5 | 10/14 |
| NEW | SANTA CRUZ BARILLAS | MAYALAND | TRANSFORMATION | 69/34.5 | 10/14 |
| NEW | MALACATANCITO | MALACATANCITO | TRANSFORMATION | 138/34.5 | 20/28 |
| NEW | SANTA EULALIA | SANTA EULALIA | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | UNIÓN CANTIL | UNIÓN CANTINIL | TRANSFORMATION | 69/34.5 | 10/14 |
| NEW | TECTITÁN | TECTITÁN | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | SANTA BÁRBARA | SAN SEBASTIÁN HUEHUETENANGO | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | SAN PEDRO NECTA | SAN PEDRO NECTA | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | HUEHUETENANGO | CHIANTLA | 69KV BAY | 69 | |
| NEW | SANTA CRUZ BARILLAS | MAYALAND | 69KV BAY | 69 | |
| NEW | LA DEMOCRACIA | LA MESILLA | 69KV BAY | 69 | |
| NEW | CUILCO | CUILCO | 69 KV FIELD | 69 | |
| NEW | HUEHUETENANGO | CHIANTLA | 69 KV FIELD | 69 | |
| EXISTING | SAN IDELFONSO IXTAHUACÁN | IXTAHUACÁN | 69 KV FIELD | 69 | |
| EXISTING | LA DEMOCRACIA | CAMOJÁ | 69 KV FIELD | 69 | |
| EXISTING | LA DEMOCRACIA | CAMOJÁ | 69 KV FIELD | 69 | |
| EXISTING | SAN SEBASTIÁN COATÁN | SAN SEBASTIÁN COATÁN | 69 KV FIELD | 69 | |
| EXISTING | LA DEMOCRACIA | CAMOJÁ | 69 KV FIELD | 69 | |
| EXISTING | JACALTENANGO | JACALTENANGO | 69 KV FIELD | 69 | |
| EXISTING | SAN JUAN ATITÁN | TODOS SANTOS CUCHUMATÁN | 69 KV FIELD | 69 | |
| EXISTING | SAN JUAN ATITÁN | TODOS SANTOS CUCHUMATÁN | 69 KV FIELD | 69 | |
| NEW | SANTA EULALIA | BARILLAS | 69 KV FIELD | 69 | |
| EXISTING | SAN IDELFONSO IXTAHUACÁN | IXTAHUACÁN | 69 KV FIELD | 69 | |

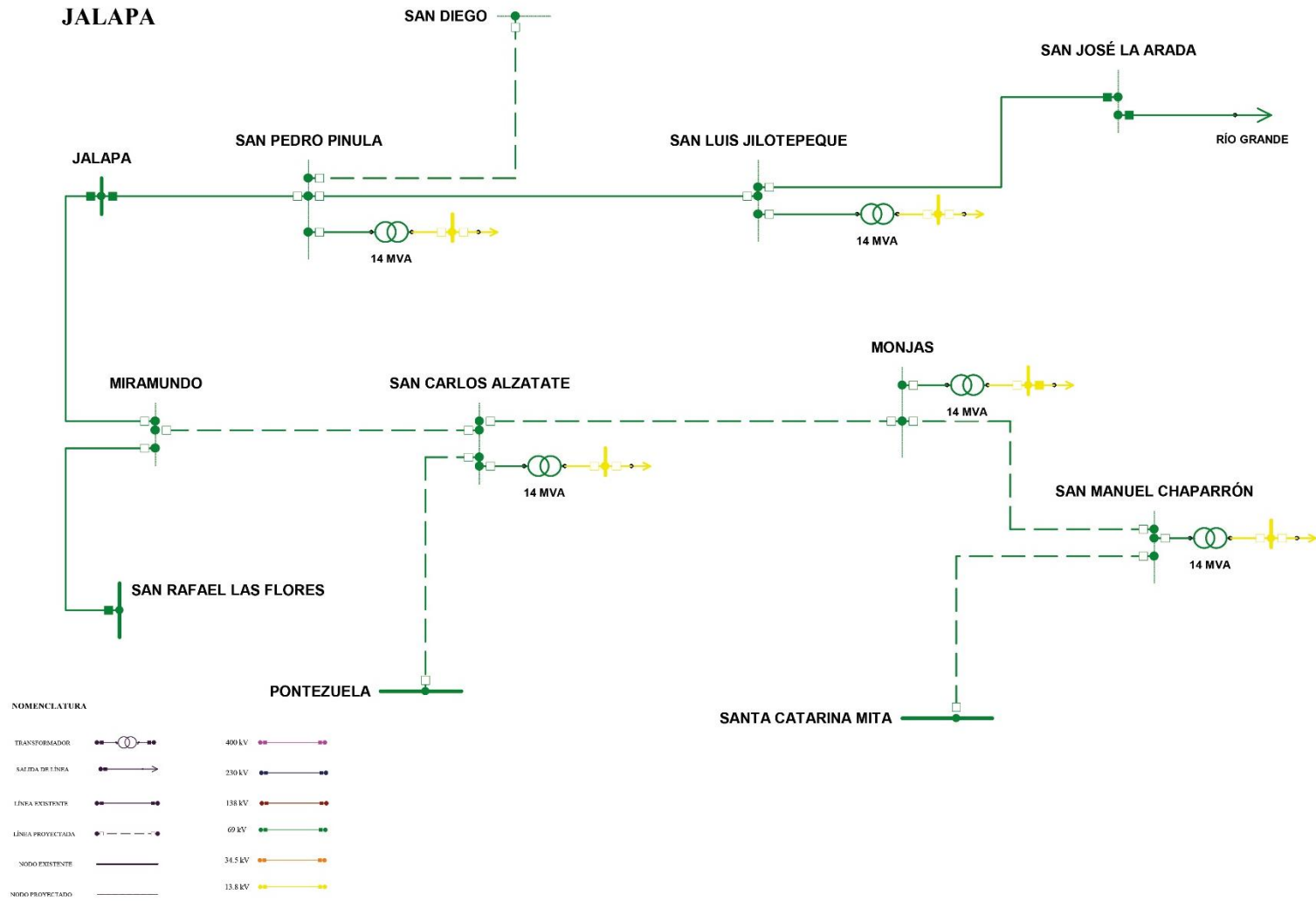
14.7.3. Transmission Lines of Huehuetenango

| TYPE | TRANSMISSION LINE | VOLTAGE (kV) | LENGTH (km) |
|----------|---|-----------------|----------------|
| NEW | CAMOJÁ - LA LIBERTAD HUEHUETENANGO | 69 | 17 |
| NEW | CHIANTLA - AGUACATÁN | 69 | 14 |
| NEW | DOUBLE CIRCUIT CHIANTLA - HUEHUEHUETENANGO | 69 | 6 |
| ADEQUACY | SAN JUAN IXCOY - BARILLAS AND CONNECTION TO SAN MATEO IXTATÁN | 69 | 1 |
| ADEQUACY | POJOM - SAN MATEO IXTATÁN AND CONNECTION TO IXHUITZ | 69 | 1 |
| NEW | BARILLAS - MAYALAND | 69 | 24 |
| NEW | SAN SEBASTIÁN COATÁN - NENTÓN | 69 | 25 |
| NEW | GRACIAS A DIOS - IXHUITZ | 69 | 35 |
| NEW | IXTAHUACÁN - LA LIBERTAD HUEHUETENANGO | 69 | 21 |
| ADEQUACY | HUEHUETENANGO - IXTAHUACÁN AND CONNECTION TO HUEHUETENANGO III | 69 | 1 |
| NEW | CUILCO - IXTAHUACÁN | 69 | 22 |
| NEW | RÍO BLANCO - AGUACATÁN | 69 | 33 |
| ADEQUACY | HUEHUETENANGO - HUEHUETENANGO II AND CONNECTION TO MALACATANCITO | 138 | 1 |
| ADEQUACY | SAN JUAN IXCOY - BARILLAS AND CONNECTION TO SANTA EULALIA | 69 | 1 |
| NEW | DOUBLE CIRCUIT LA MESILLA - CAMOJÁ | 69 | 8 |
| NEW | MAYALAND - IXHUITZ | 69 | 43 |
| NEW | JACALTENANGO - UNIÓN CANTINIL | 69 | 14 |
| NEW | UNIÓN CANTINIL - TODOS SANTOS CUCHUMATÁN | 69 | 20 |
| NEW | NENTÓN - GRACIAS A DIOS | 69 | 28 |
| ADEQUACY | LA LIBERTAD HUEHUETENANGO - IXTAHUACAN AND CONNECTION TO SAN PEDRO NECTA | 69 | 3.4 |
| NEW | TODOS SANTOS CUCHUMATÁN - SAN PEDRO NECTA | 69 | 21 |
| ADEQUACY | IXTAHUACÁN - HUEHUETENANGO III AND CONNECTION TO SAN SEBASTIÁN HUEHUETENANGO | 69 | 1 |
| ADEQUACY | TACANA - CUILCO AND CONNECTION TO TECTITÁN | 69 | 1 |

14.8. Department of Jalapa



14.8.1. Single-line Diagram of Jalapa



14.8.2. Electric Substations of Jalapa

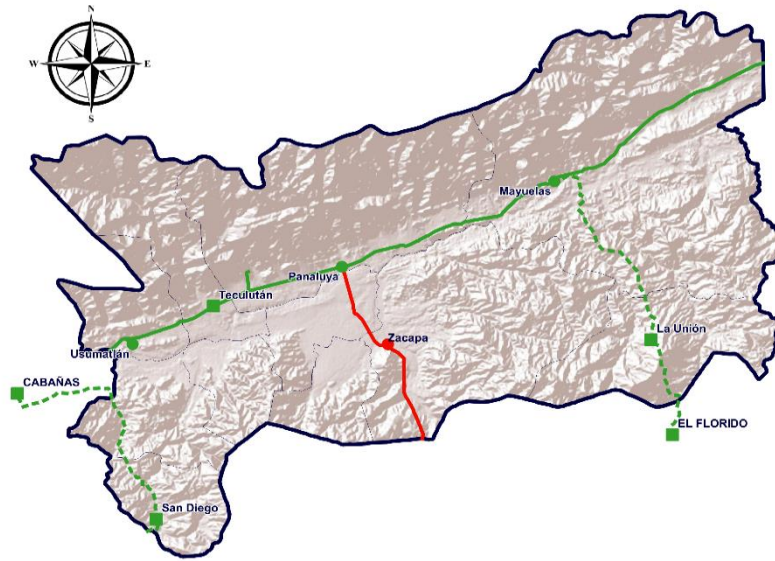
| TYPE OF WORK | MUNICIPALITY | ELECTRIC SUBSTATION | SUBSTATION TYPE | VOLTAGE (kV) | CAPACITY (MVA) |
|--------------|-----------------------|----------------------|-----------------|--------------|----------------|
| NEW | MONJAS | MONJAS | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | SAN PEDRO PINULA | SAN PEDRO PINULA | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | SAN LUIS JILOTEPEQUE | SAN LUIS JILOTEPEQUE | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | SAN MANUEL CHAPARRÓN | SAN MANUEL CHAPARRÓN | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | SAN CARLOS ALZATATE | SAN CARLOS ALZATATE | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | SAN RAFAEL LAS FLORES | MIRAMUNDO | MANEUVERS | 69 | |

14.8.3. Transmission Lines of Jalapa

| TYPE | TRANSMISSION LINE | VOLTAGE (kV) | LENGTH (km) |
|----------|---|--------------|-------------|
| NEW | SANTA CATARINA MITA - MONJAS | 69 | 29 |
| ADEQUACY | JALAPA-RÍO GRANDE AND CONNECTION TO SAN PEDRO PINULA | 69 | 1 |
| ADEQUACY | JALAPA-RÍO GRANDE AND CONNECTION TO SAN LUIS JILOTEPEQUE | 69 | 1 |
| NEW | SAN CARLOS ALZATATE - MONJAS | 69 | 21 |
| ADEQUACY | MONJAS-SANTA CATARINA MITA AND CONNECTION TO SAN MANUEL CHAPARRÓN | 69 | 1 |
| NEW | PONTEZUELA - SAN CARLOS ALZATATE | 69 | 20 |
| NEW | MIRAMUNDO - SAN CARLOS ALZATATE | 69 | 11 |

LIBERTAD
15 DE
SEPTIEMBRE
DE 1821

14.9. Department of Zacapa



- Subestación Existente 69kV
- Subestación Existente 138kV
- Subestación Futura 69kV
- Línea de Transmisión Existente 69kV
- Línea de Transmisión Existente 138kV
- - - Línea de Transmisión Futura 69kV

Escala del Proyecto:

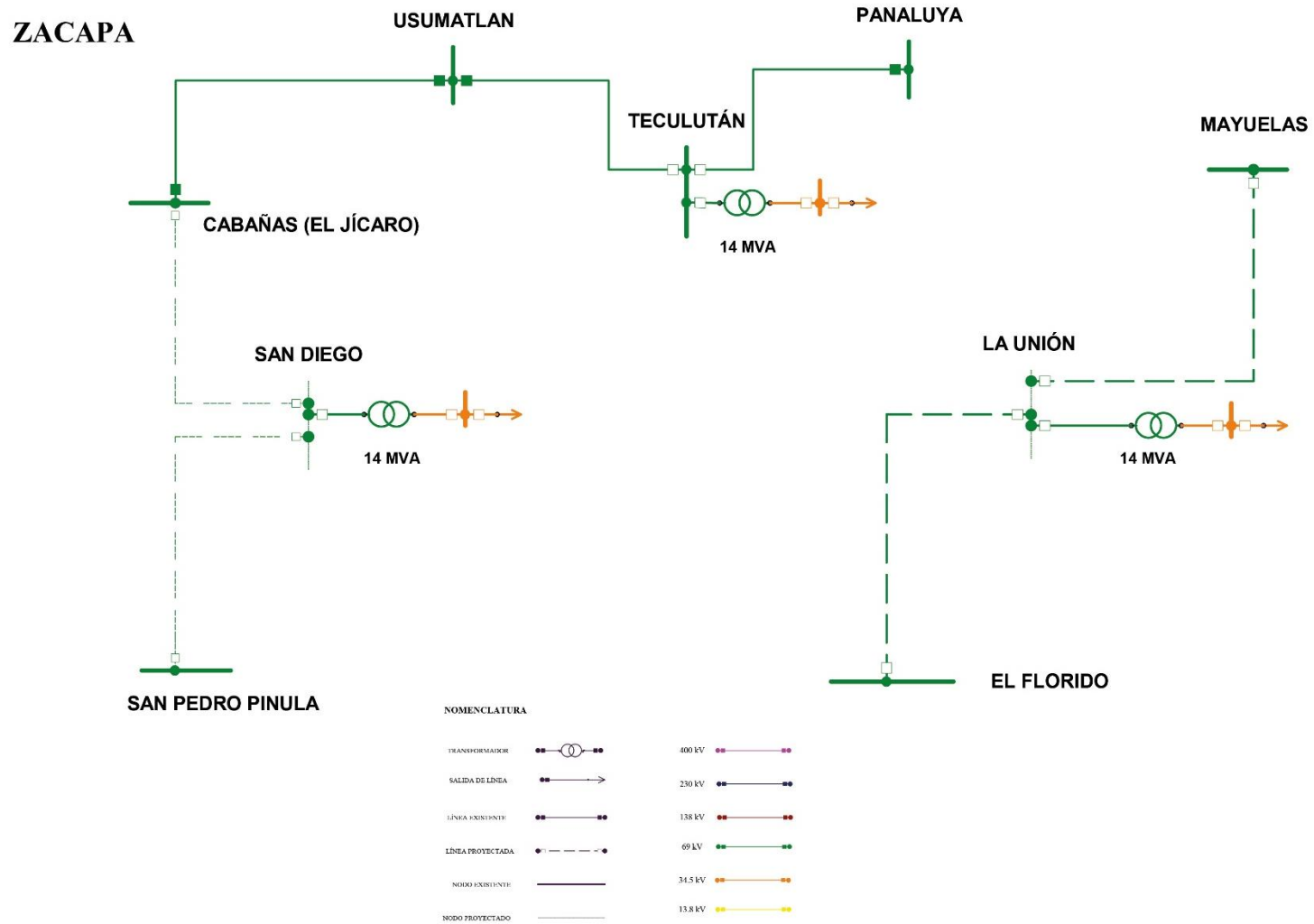
0 5 10 15 20 km



LIBERTAD
15 DE
SEPTIEMBRE
DE 1821



14.9.1. Single-line Diagram of Zacapa



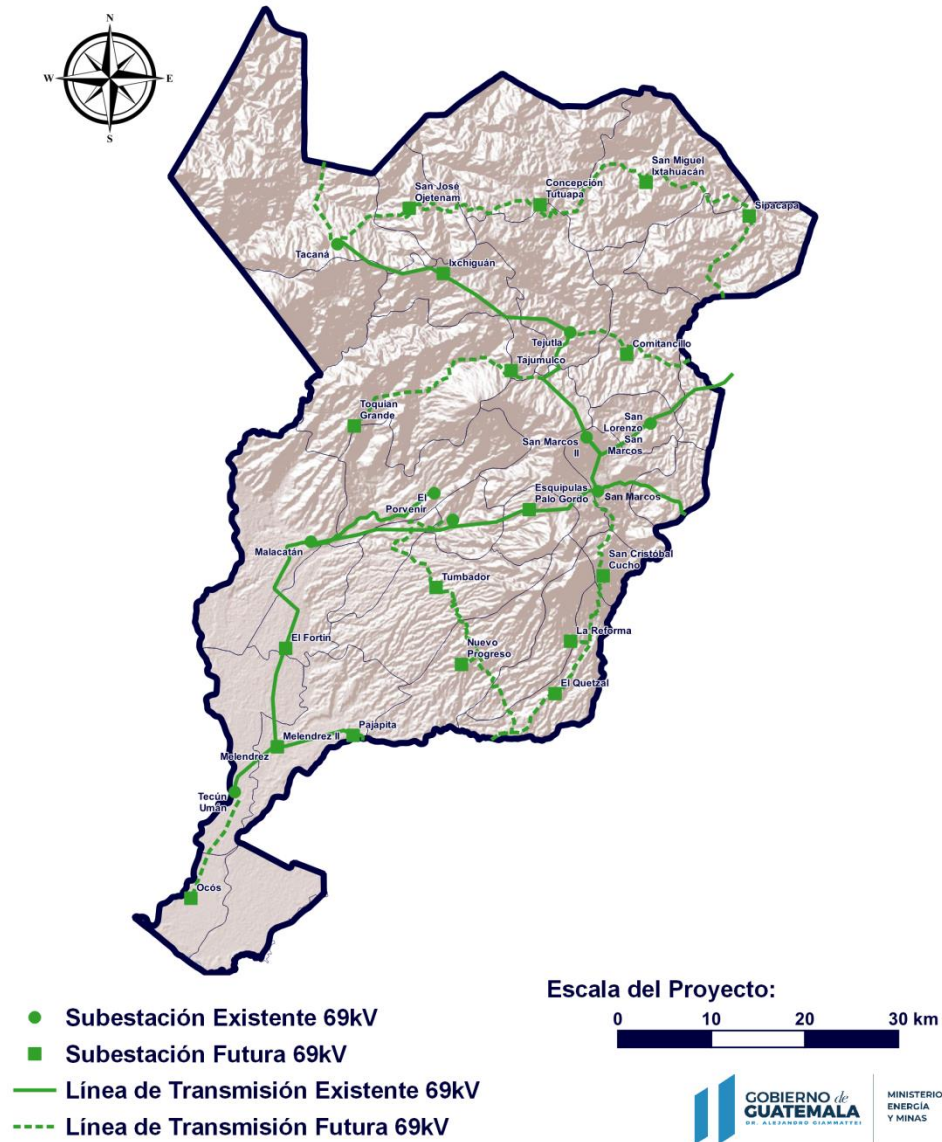
14.9.2. Electric Substations of Zacapa

| TYPE OF WORK | MUNICIPALITY | ELECTRIC SUBSTATION | SUBSTATION TYPE | VOLTAGE (kV) | CAPACITY (MVA) |
|--------------|------------------|---------------------|-----------------|--------------|----------------|
| NEW | TECULUTÁN | TECULUTÁN | TRANSFORMATION | 69/34.5 | 10/14 |
| NEW | LA UNIÓN | LA UNIÓN | TRANSFORMATION | 69/34.5 | 10/14 |
| NEW | SAN DIEGO | SAN DIEGO | TRANSFORMATION | 69/34.5 | 10/14 |
| EXISTING | GUALÁN | MAYUELAS | 69 KV FIELD | 69 | |
| EXISTING | EL JICARO | CABAÑAS (EL JICARO) | 69 KV FIELD | 69 | |
| EXISTING | SAN PEDRO PINULA | SAN PEDRO PINULA | 69 KV FIELD | 69 | |

14.9.3. Transmission Lines of Zacapa

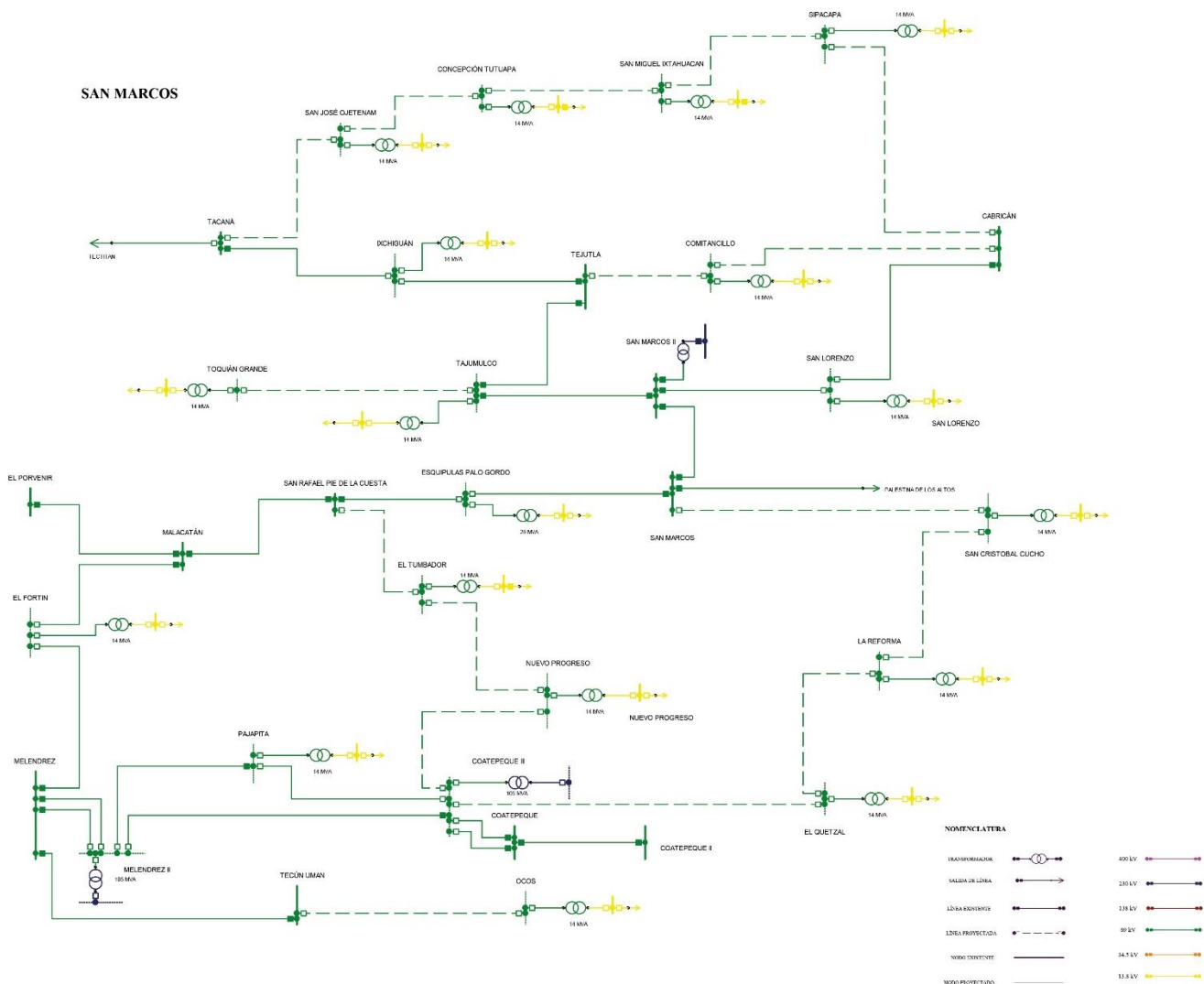
| TYPE | TRANSMISSION LINE | VOLTAGE (kV) | LENGTH (km) |
|----------|--|--------------|-------------|
| NEW | SAN PEDRO PINULA - SAN DIEGO | 69 | 19 |
| NEW | LA UNIÓN - MAYUELAS | 69 | 26 |
| NEW | SAN DIEGO – CABAÑAS (EL JICARO) | 69 | 28.5 |
| ADEQUACY | USUMATLÁN – PANALUYA AND CONNECTION TO TECULUTÁN | 69 | 1 |

14.10. Department of San Marcos





14.10.1. Single-line Diagram of San Marcos



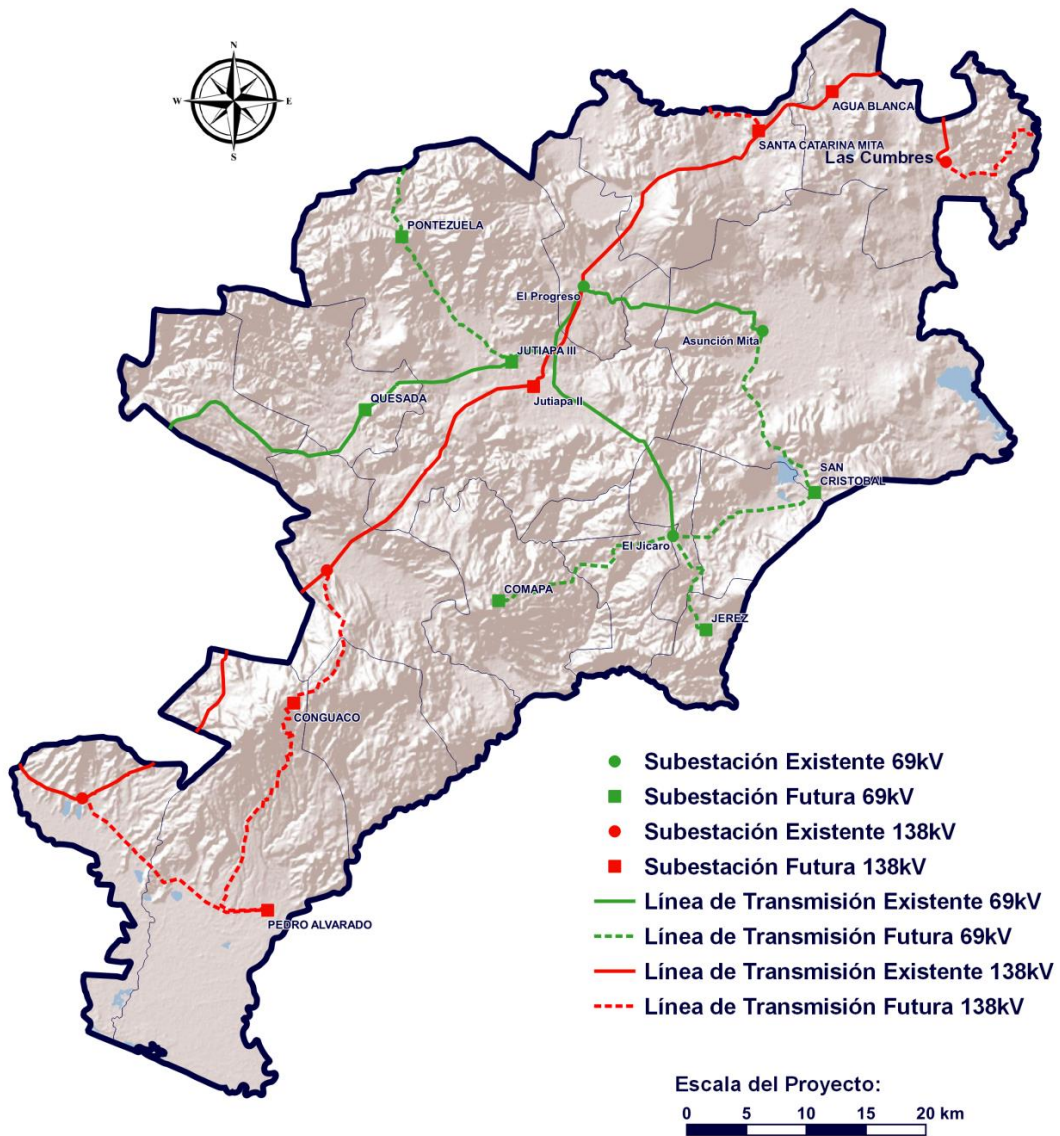
14.10.2. Electric Substations of San Marcos

| TYPE OF WORK | MUNICIPALITY | ELECTRIC SUBSTATION | SUBSTATION TYPE | VOLTAGE (kV) | CAPACITY (MVA) |
|--------------|-----------------------------|-----------------------------|-----------------|--------------|----------------|
| NEW | COMITANCILLO | COMITANCILLO | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | TAJUMULCO | TAJUMULCO | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | NUEVO PROGRESO | NUEVO PROGRESO | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | OCÓS | OCÓS | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | CONCEPCIÓN TUTUAPA | CONCEPCIÓN TUTUAPA | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | SAN CRISTÓBAL CUCHO | SAN CRISTÓBAL CUCHO | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | SIPACAPA | SIPACAPA | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | SAN MIGUEL IXTAHUACÁN | SAN MIGUEL IXTAHUACÁN | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | LA REFORMA | LA REFORMA | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | IXCHIGUÁN | IXCHIGUÁN | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | SAN JOSÉ OJETENAM | SAN JOSÉ OJETENAM | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | EL TUMBADOR | EL TUMBADOR | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | CATARINA | EL FORTIN | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | PAJAPITA | PAJAPITA | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | EL QUETZAL | EL QUETZAL | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | TAJUMULCO | TOQUIAN GRANDE | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | ESQUIPULAS PALO GORDO | ESQUIPULAS PALO GORDO | TRANSFORMATION | 69/13.8 | 20/28 |
| NEW | SAN LORENZO | SAN LORENZO SAN MARCOS | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | PAJAPITA | MELENDREZ II | 69KV BAY | 69 | |
| EXISTING | TEJUTLA | TEJUTLA | 69 KV FIELD | 69 | |
| EXISTING | CABRICÁN | CABRICÁN | 69 KV FIELD | 69 | |
| EXISTING | COATEPEQUE | COATEPEQUE | 69 KV FIELD | 69 | |
| EXISTING | AYUTLA | TECÚN UMÁN | 69 KV FIELD | 69 | |
| EXISTING | TACANÁ | TACANÁ | 69 KV FIELD | 69 | |
| EXISTING | SAN PEDRO SACATEPEQUEZ | SAN MARCOS | 69 KV FIELD | 69 | |
| EXISTING | CABRICÁN | CABRICÁN | 69 KV FIELD | 69 | |
| EXISTING | SAN RAFAEL PIE DE LA CUESTA | SAN RAFAEL PIE DE LA CUESTA | 69 KV FIELD | 69 | |
| EXISTING | COATEPEQUE | COATEPEQUE | 69 KV FIELD | 69 | |

14.10.3. Transmission Lines of San Marcos

| TYPE | TRANSMISSION LINE | VOLTAGE (kV) | LENGTH (km) |
|----------|---|-----------------|----------------|
| NEW | COMITANCILLO-TEJUTLA | 69 | 8 |
| NEW | TACANÁ - CONCEPCIÓN TUTUAPA | 69 | 30 |
| NEW | TECÚN UMÁN- OCÓS | 69 | 13 |
| ADEQUACY | SAN MARCOS II - TEJUTLA AND CONNECTION TO TAJUMULCO | 69 | 4 |
| NEW | COATEPEQUE III - NUEVO PROGRESO | 69 | 20 |
| NEW | CONCEPCIÓN TUTUAPA - SAN MIGUEL IXTAHUACÁN | 69 | 17 |
| NEW | SAN MIGUEL IXTAHUACÁN - SIPACAPA | 69 | 16 |
| NEW | SAN MARCOS - SAN CRISTOBAL CUCHO | 69 | 11 |
| NEW | NUEVO PROGRESO - TUMBADOR | 69 | 17 |
| NEW | SAN CRISTÓBAL CUCHO - LA REFORMA | 69 | 12 |
| NEW | CABRICÁN - SIPACAPA | 69 | 16 |
| NEW | CABRICÁN - COMITANCILLO | 69 | 15 |
| ADEQUACY | TEJUTLA-TACANÁ AND CONNECTION TO IXCHIGUÁN | 69 | 1 |
| ADEQUACY | TACANÁ - CONCEPCIÓN TUTUAPA AND CONNECTION TO SAN JOSÉ OJETENAM | 69 | 1 |
| ADEQUACY | MALACATÁN - MELENDREZ AND CONNECTION TO EL FORTIN | 69 | 1 |
| ADEQUACY | MELENDREZ II – COATEPEQUE AND CONNECTION TO COATEPEQUE III (DOUBLE CIRCUIT) | 69 | 1 |
| ADEQUACY | MELENDREZ II - COATEPEQUE AND CONNECTION TO PAJAPITA | 69 | 1 |
| NEW | TAJUMULCO - TOQUIAN GRANDE | 69 | 22 |
| NEW | COATEPEQUE III - EL QUETZAL | 69 | 13.5 |
| ADEQUACY | SAN MARCOS II - CABRICÁN AND CONNECTION TO SAN LORENZO SAN MARCOS | 69 | 1 |
| NEW | EL TUMBADOR - SAN RAFAEL PIE DE LA CUESTA | 69 | 18 |
| ADEQUACY | MELENDREZ – COATEPEQUE AND CONNECTION TO MELENDREZ II (DOUBLE CIRCUIT) | 69 | 1 |
| ADEQUACY | SAN RAFAEL PIE DE LA CUESTA - SAN MARCOS AND CONNECTION TO ESQUIPULAS PALO GORDO | 69 | 1 |
| NEW | LA REFORMA – EL QUETZAL | 69 | 9 |

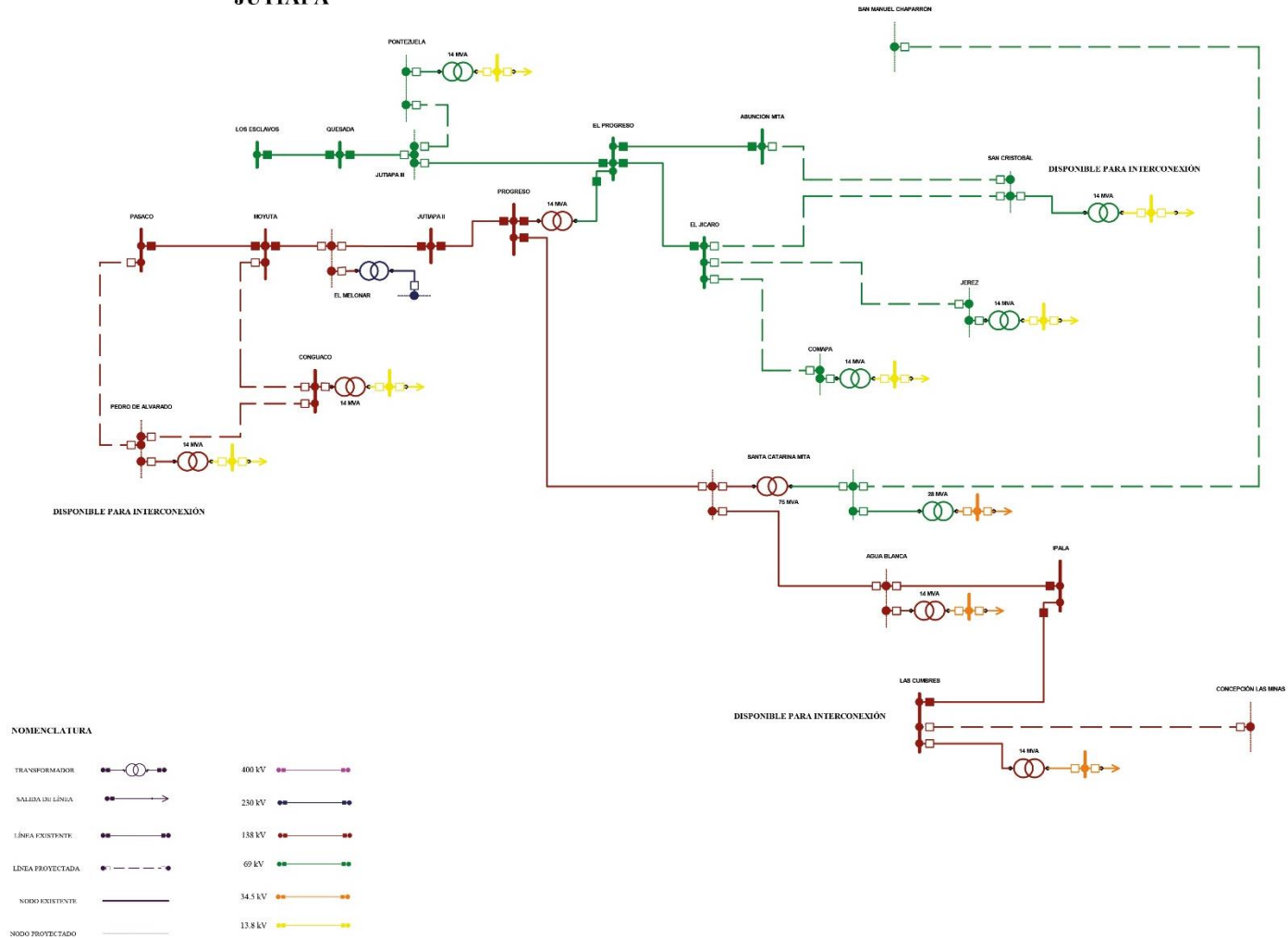
14.11. Department of Jutiapa





14.11.1. Single-line Diagram of Jutiapa

JUTIAPA



LIBERTAD 15 DE



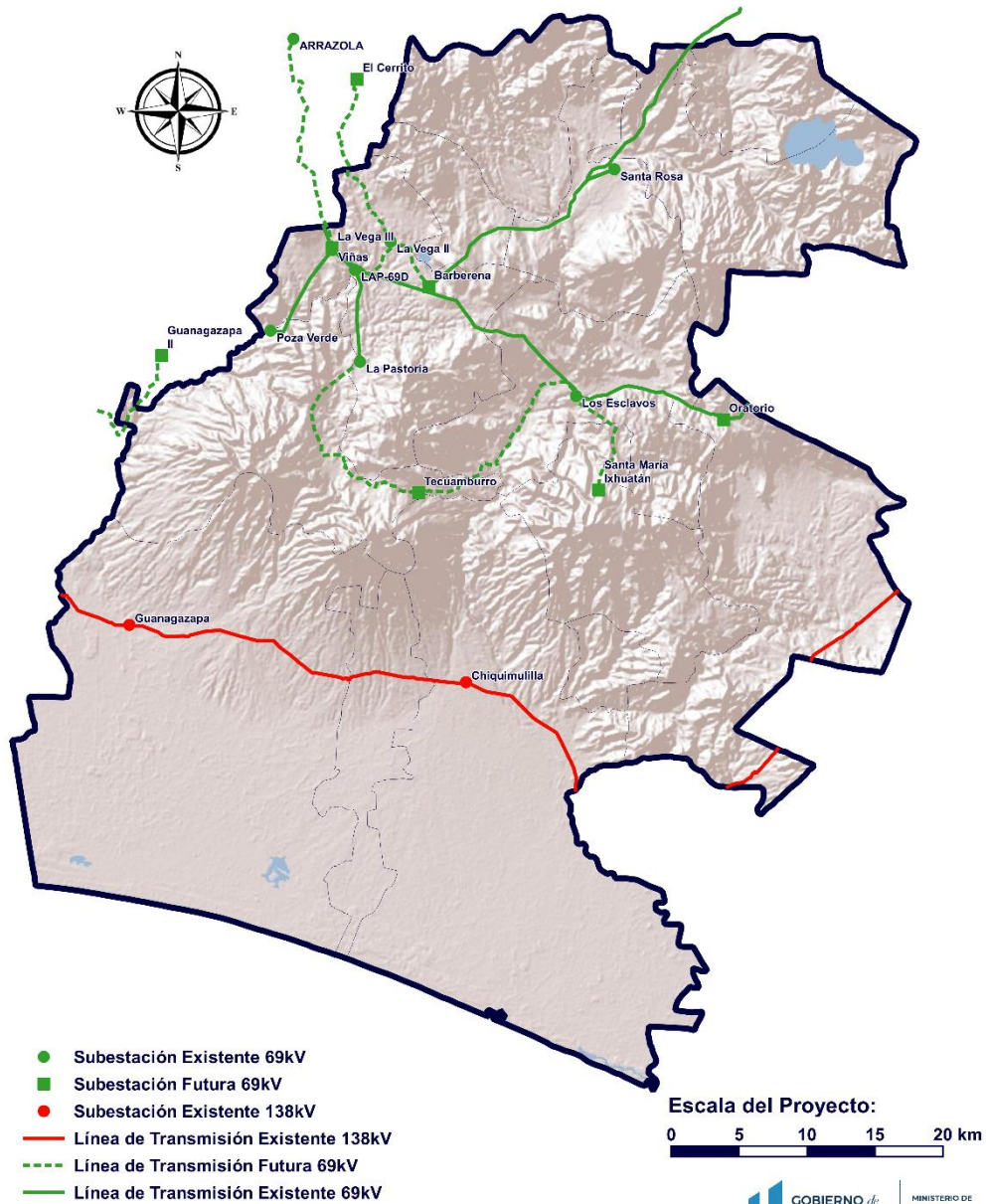
14.11.2. Electric Substations of Jutiapa

| TYPE OF WORK | MUNICIPALITY | ELECTRIC SUBSTATION | SUBSTATION TYPE | VOLTAGE (kV) | CAPACITY (MVA) |
|--------------|---------------------|---------------------|-----------------|--------------|----------------|
| NEW | SANTA CATARINA MITA | SANTA CATARINA MITA | TRANSFORMATION | 138/69 | 75 |
| NEW | SANTA CATARINA MITA | SANTA CATARINA MITA | TRANSFORMATION | 69/13.8 | 20/28 |
| NEW | COMAPA | COMAPA | TRANSFORMATION | 69/13.8 | 14 |
| NEW | MOYUTA | CONGUACO | TRANSFORMATION | 138/13.8 | 10/14 |
| EXISTING | AGUA BLANCA | LAS CUMBRES | TRANSFORMATION | 138/34.5 | 10/14 |
| NEW | ATESCATEMPA | SAN CRISTOBAL | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | MOYUTA | PEDRO DE ALVARADO | TRANSFORMATION | 138/13.8 | 10/14 |
| NEW | JEREZ | JEREZ | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | JUTIAPA | PONTEZUELA | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | AGUA BLANCA | AGUA BLANCA | TRANSFORMATION | 138/34.5 | 10/14 |
| EXISTING | AGUA BLANCA | LAS CUMBRES | EXPANSION | 138 | |
| NEW | JUTIAPA | JUTIAPA III | MANEUVERS | 69 | |
| EXISTING | YUPILTEPEQUE | EL JICARO | 69 KV FIELD | 69 | |
| EXISTING | MOYUTA | MOYUTA | 138 KV FIELD | 138 | |
| EXISTING | YUPILTEPEQUE | EL JICARO | 69 KV FIELD | 69 | |
| EXISTING | ASUNCIÓN MITA | ASUNCION MITA | 69 KV FIELD | 69 | |
| EXISTING | YUPILTEPEQUE | EL JICARO | 69 KV FIELD | 69 | |
| EXISTING | JUTIAPA | EL PROGRESO | 69 KV FIELD | 69 | |
| EXISTING | AGUA BLANCA | LAS CUMBRES | 138 KV FIELD | 138 | |
| EXISTING | PASACO | PASACO | 138 KV FIELD | 138 | |

14.11.3. Transmission Lines of Jutiapa

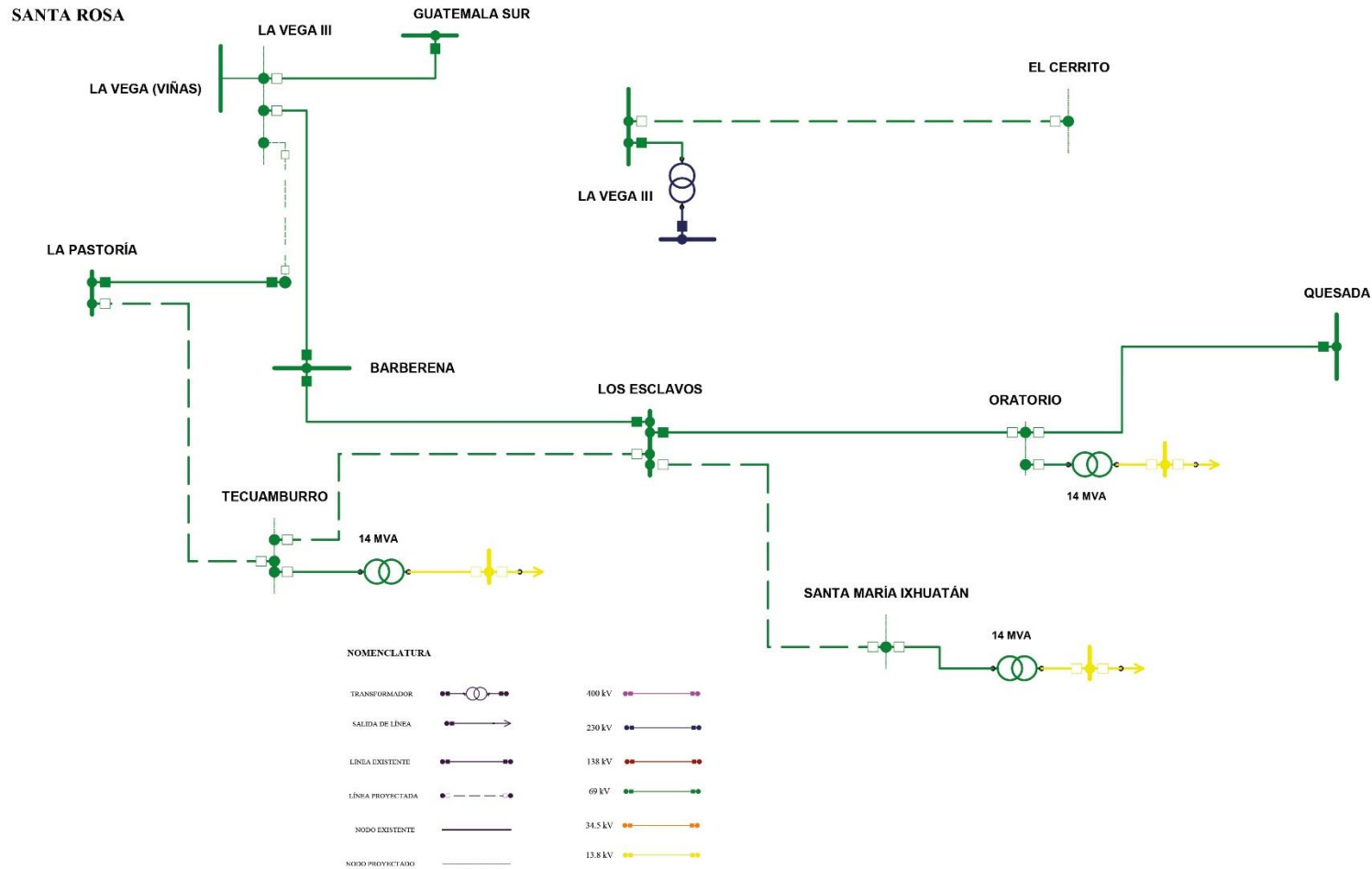
| TYPE | TRANSMISSION LINE | VOLTAGE (kV) | LENGTH (km) |
|----------|---|--------------|-------------|
| NEW | COMAPA - EL JICARO | 69 | 18 |
| ADEQUACY | EL PROGRESO-IPALA AND CONNECTION TO SANTA CATARINA MITA | 138 | 1 |
| ADEQUACY | MOYUTA – JUTIAPA II AND CONNECTION TO MELONAR | 138 | 1 |
| NEW | MOYUTA - CONGUACO | 138 | 14 |
| NEW | EL JICARO - SAN CRISTOBAL | 69 | 13 |
| ADEQUACY | EL PROGRESO-IPALA AND CONNECTION TO AGUA BLANCA | 138 | 1 |
| NEW | PASACO - PEDRO DE ALVARADO | 138 | 20 |
| NEW | CONGUACO – PEDRO DE ALVARADO | 138 | 27 |
| NEW | ASUNCION MITA - SAN CRISTOBAL | 69 | 16 |
| NEW | EL JICARO - JEREZ | 69 | 11 |
| NEW | JUTIAPA III - PONTEZUELA | 69 | 15 |
| ADEQUACY | QUESADA – PROGRESO AND CONNECTION TO JUTIAPA III | 69 | 1 |

14.12. Department of Santa Rosa





14.12.1. Single-line Diagram of Santa Rosa



14.12.2. Electric Substations of Santa Rosa

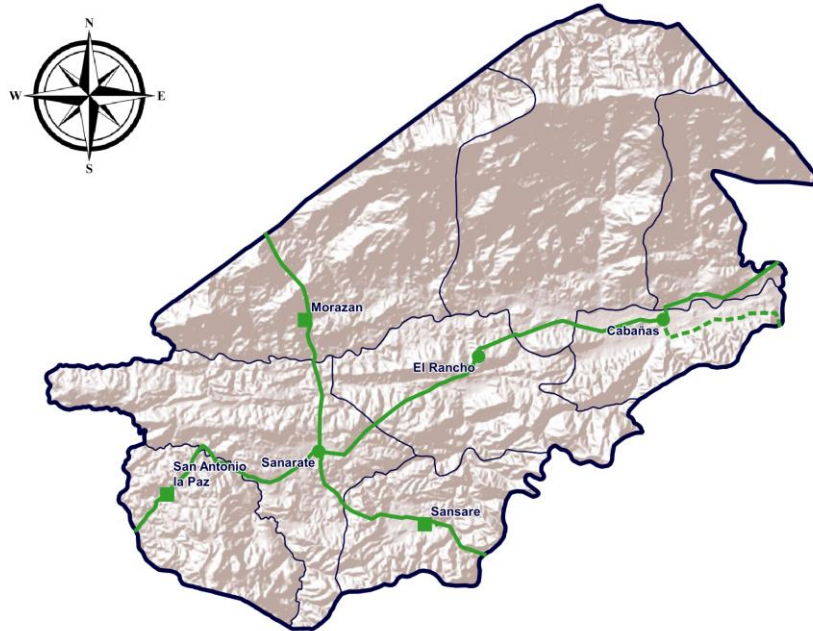
| TYPE OF WORK | MUNICIPALITY | ELECTRIC SUBSTATION | SUBSTATION TYPE | VOLTAGE (kV) | CAPACITY (MVA) |
|--------------|----------------------|----------------------|-----------------|--------------|----------------|
| NEW | BARBERENA | LA VEGA III | MANEUVERS | 69/13.8 | 10/14 |
| NEW | PUEBLO NUEVO VIÑAS | TECUAMBURRO | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | ORATORIO | ORATORIO | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | SANTA MARÍA IXHUATÁN | SANTA MARIA IXHUATÁN | TRANSFORMATION | 69/13.8 | 10/14 |
| EXISTING | CUILAPA | LOS ESCLAVOS | 69 KV FIELD | 69 | |
| EXISTING | CUILAPA | LOS ESCLAVOS | 69 KV FIELD | 69 | |
| NEW | BARBERENA | LA PASTORIA | 69 KV FIELD | 69 | |

14.12.3. Transmission Lines of Santa Rosa

| TYPE | TRANSMISSION LINE | VOLTAGE (kV) | LENGTH (km) |
|----------|---|--------------|-------------|
| NEW | LA VEGA III – ANTIGUA DERIVACIÓN LA PASTORIA | 69 | 1 |
| ADEQUACY | GUATEMALA SUR - BARBERENA AND CONNECTION TO LA VEGA III | 69 | 1 |
| NEW | LA PASTORIA - TECUAMBURRO | 69 | 19 |
| ADEQUACY | LOS ESCLAVOS – QUESADA AND CONNECTION TO ORATORIO | 69 | 1 |
| NEW | TECUAMBURRO - LOS ESCLAVOS | 69 | 18 |
| NEW | LOS ESCLAVOS - SANTA MARIA IXHUATÁN | 69 | 10 |

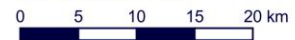
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14.13. Department of El Progreso

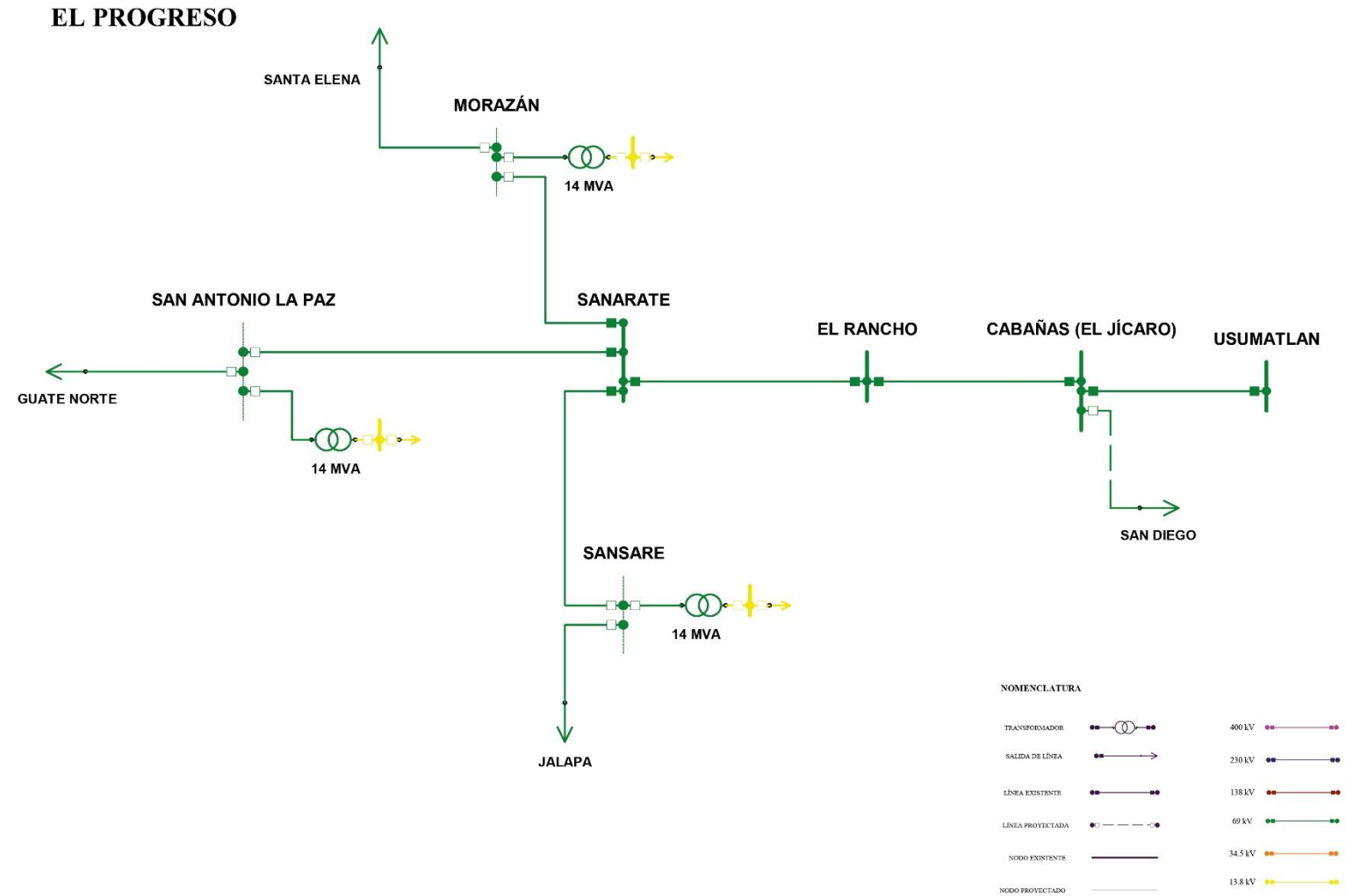


- Subestación Existente 69kV
- Subestación Futura 69kV
- Línea de Transmisión Existente 69kV
- - - Línea de Transmisión Futura 69kV

Escala del Proyecto:



14.13.1. Single-line Diagram of El Progreso

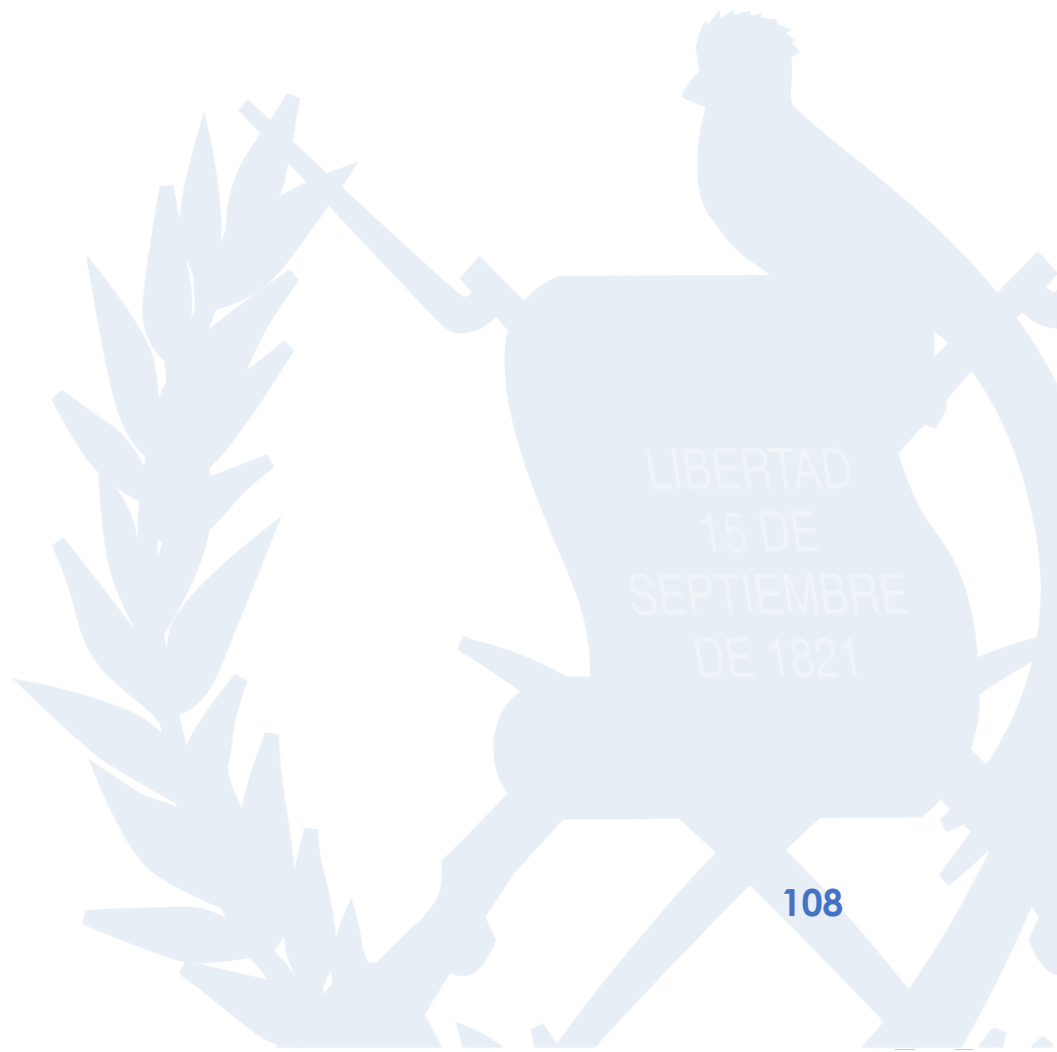


14.13.2. Electric Substations of El Progreso

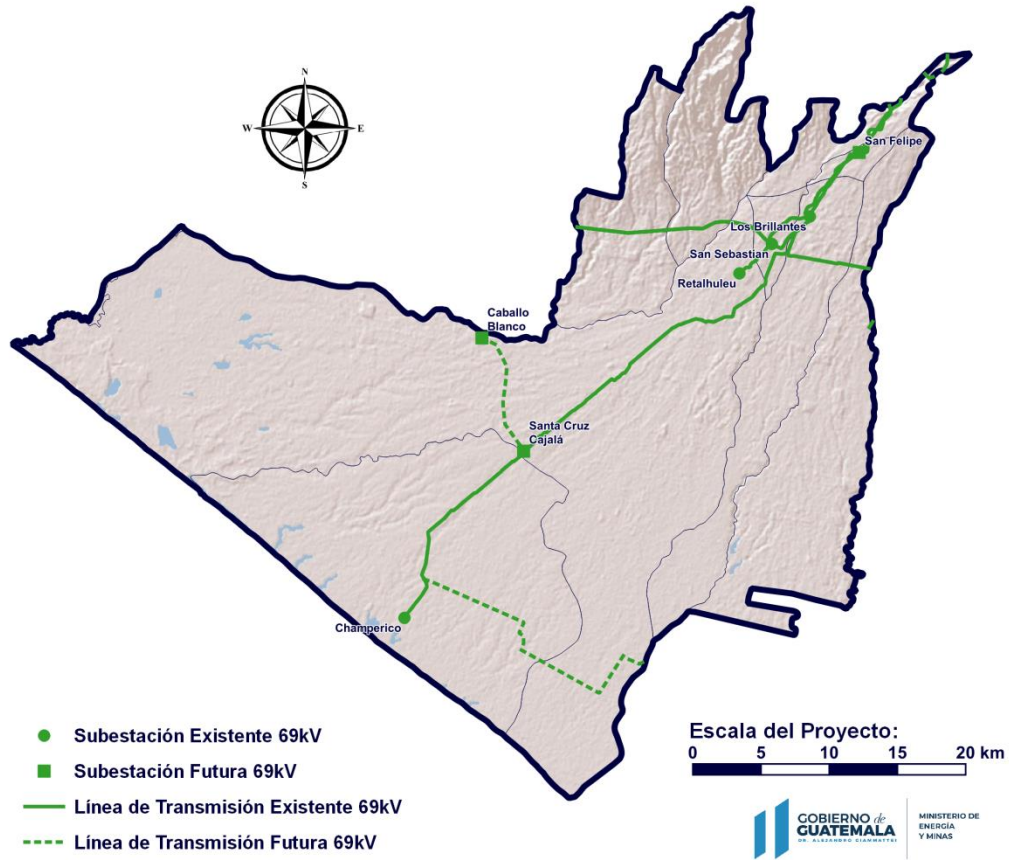
| TYPE OF WORK | MUNICIPALITY | ELECTRIC SUBSTATION | SUBSTATION TYPE | VOLTAGE (kV) | CAPACITY (MVA) |
|--------------|--------------------|---------------------|-----------------|--------------|----------------|
| NEW | MORAZAN | MORAZAN | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | SANSARE | SANSARE | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | SAN ANTONIO LA PAZ | SAN ANTONIO LA PAZ | TRANSFORMATION | 69/13.8 | 10/14 |

14.13.3. Transmission Lines of El Progreso

| TYPE | TRANSMISSION LINE | VOLTAGE (kV) | LENGTH (km) |
|----------|---|--------------|-------------|
| ADEQUACY | SANARATE-SANTA ELENA AND CONNECTION TO MORAZAN | 69 | 1 |
| ADEQUACY | SANARATE-JALAPA AND CONNECTION TO SANSARE | 69 | 2 |
| ADEQUACY | GUATE NORTE - SANARATE AND CONNECTION TO SAN ANTONIO LA PAZ | 69 | 1 |

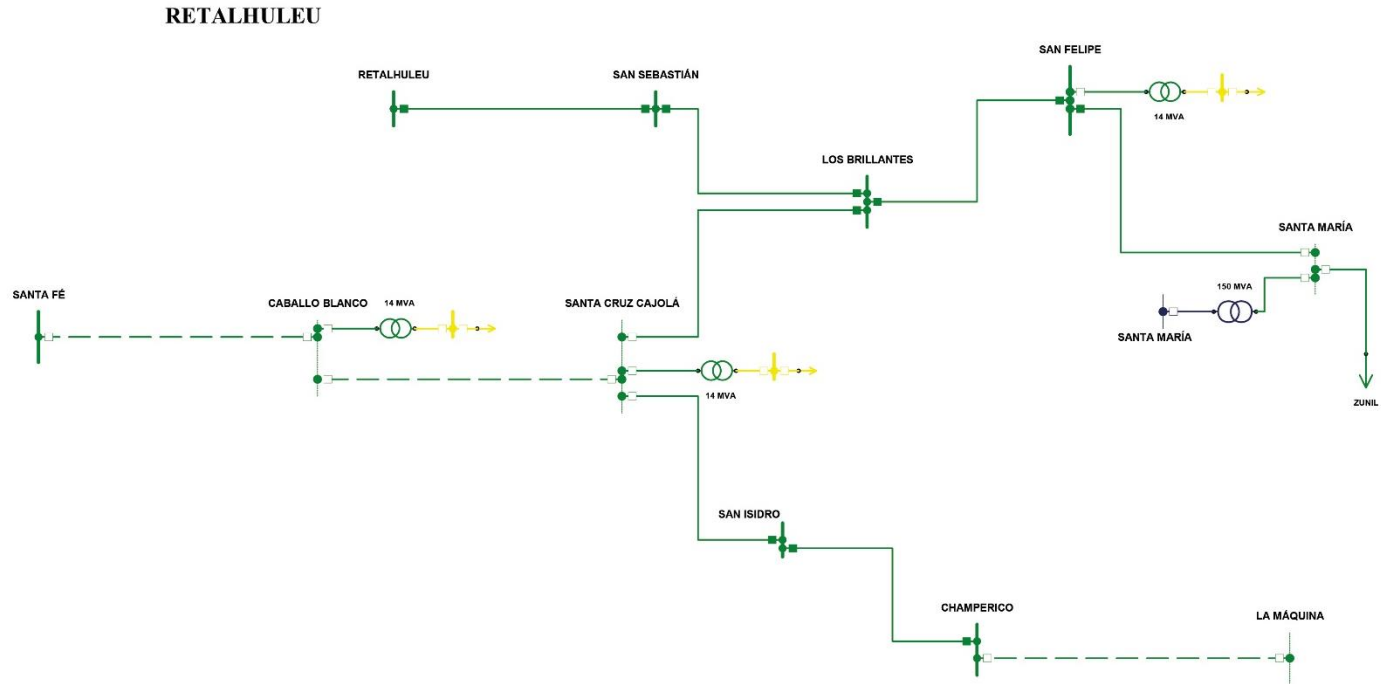


14.14. Department of Retalhuleu





14.14.1. Single-line Diagram of Retalhuleu



NOMENCLATURA

| | | | |
|------------------|--|---------|--|
| TRANSFORMADOR | | 400 kV | |
| SALIDA DE LÍNEA | | 230 kV | |
| LÍNEA EXISTENTE | | 138 kV | |
| LÍNEA PROYECTADA | | 69 kV | |
| NODO EXISTENTE | | 34.5 kV | |
| NODO PROYECTADO | | 13.8 kV | |

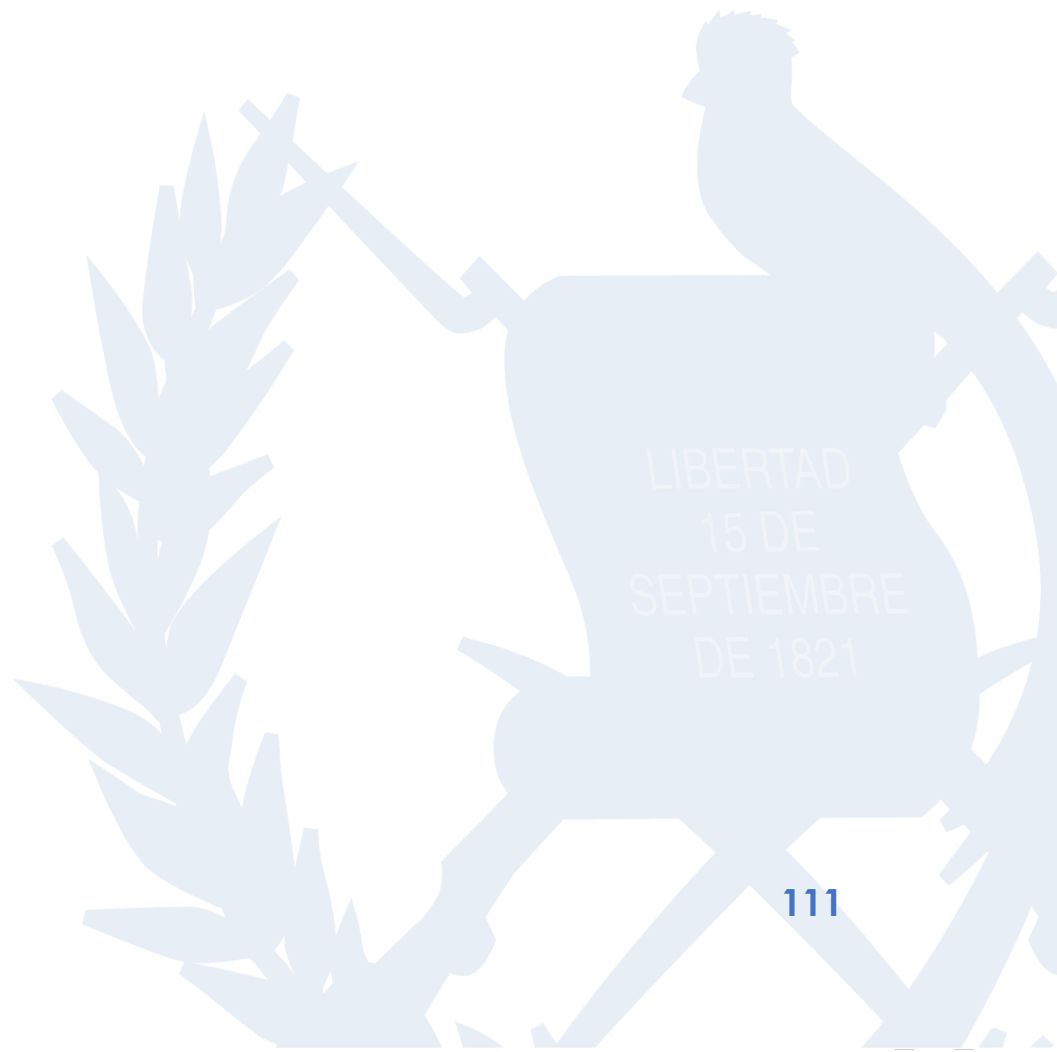


14.14.2. Electric Substations of Retalhuleu

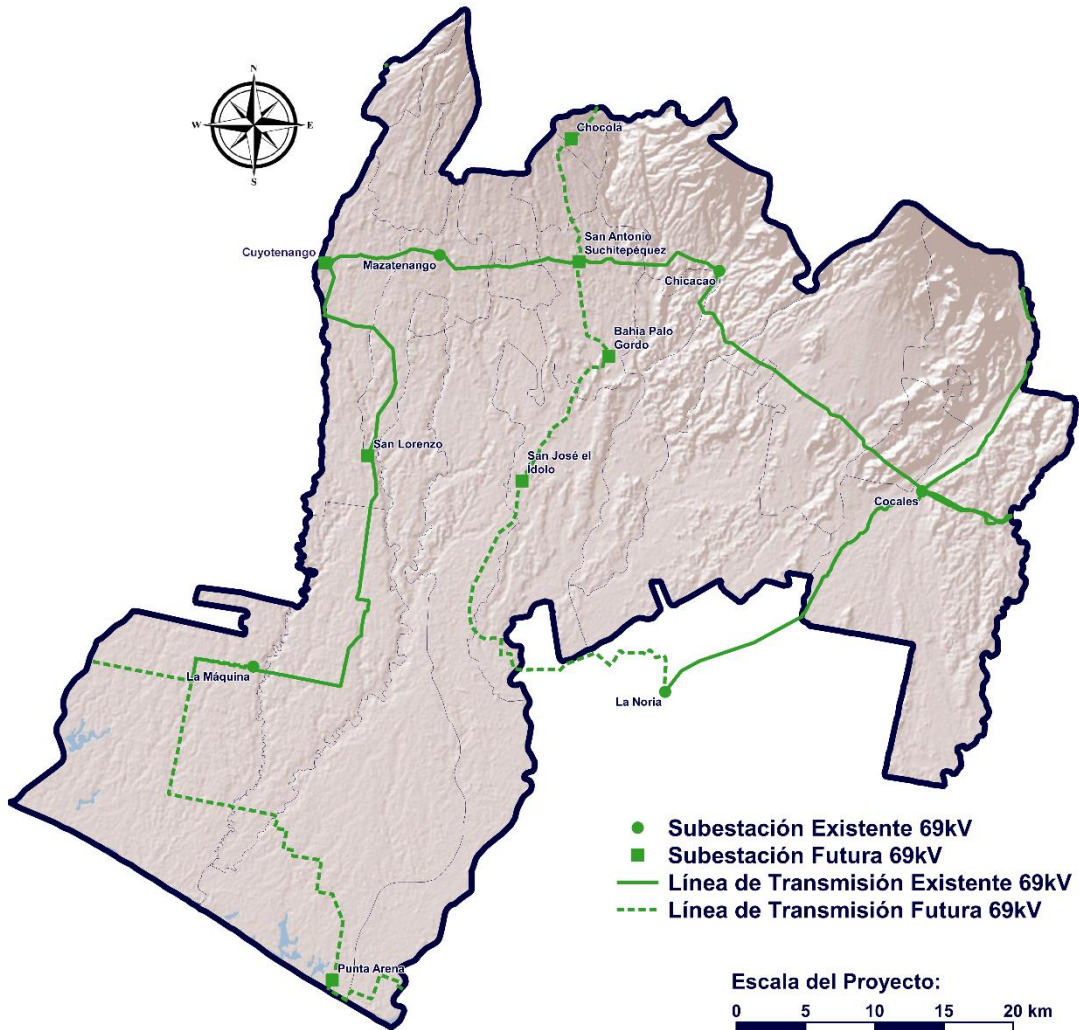
| TYPE OF WORK | MUNICIPALITY | ELECTRIC SUBSTATION | SUBSTATION TYPE | VOLTAGE (kV) | CAPACITY (MVA) |
|--------------|--------------|---------------------|-----------------|--------------|----------------|
| NEW | SAN FELIPE | SANTA MARIA | 69KV BAY | 69 | |
| NEW | SAN FELIPE | SAN FELIPE | EXPANSION | 69/13.8 | 10/14 |
| NEW | CHAMPERICO | SANTA CRUZ CAJOLÁ | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | RETAHULEU | CABALLO BLANCO | TRANSFORMATION | 69/13.8 | 10/14 |

14.14.3. Transmission Lines of Retalhuleu

| TYPE | TRANSMISSION LINE | VOLTAGE (kV) | LENGTH (km) |
|----------|---|--------------|-------------|
| NEW | LA MAQUINA - CHAMPERICO | 69 | 39 |
| ADEQUACY | LOS BRILLANTES - SAN ISIDRO AND CONNECTION TO SANTA CRUZ CAJOLÁ | 69 | 1 |
| NEW | CABALLO BLANCO - SANTA FE | 69 | 21 |
| NEW | SANTA CRUZ CAJOLÁ - CABALLO BLANCO | 69 | 11 |



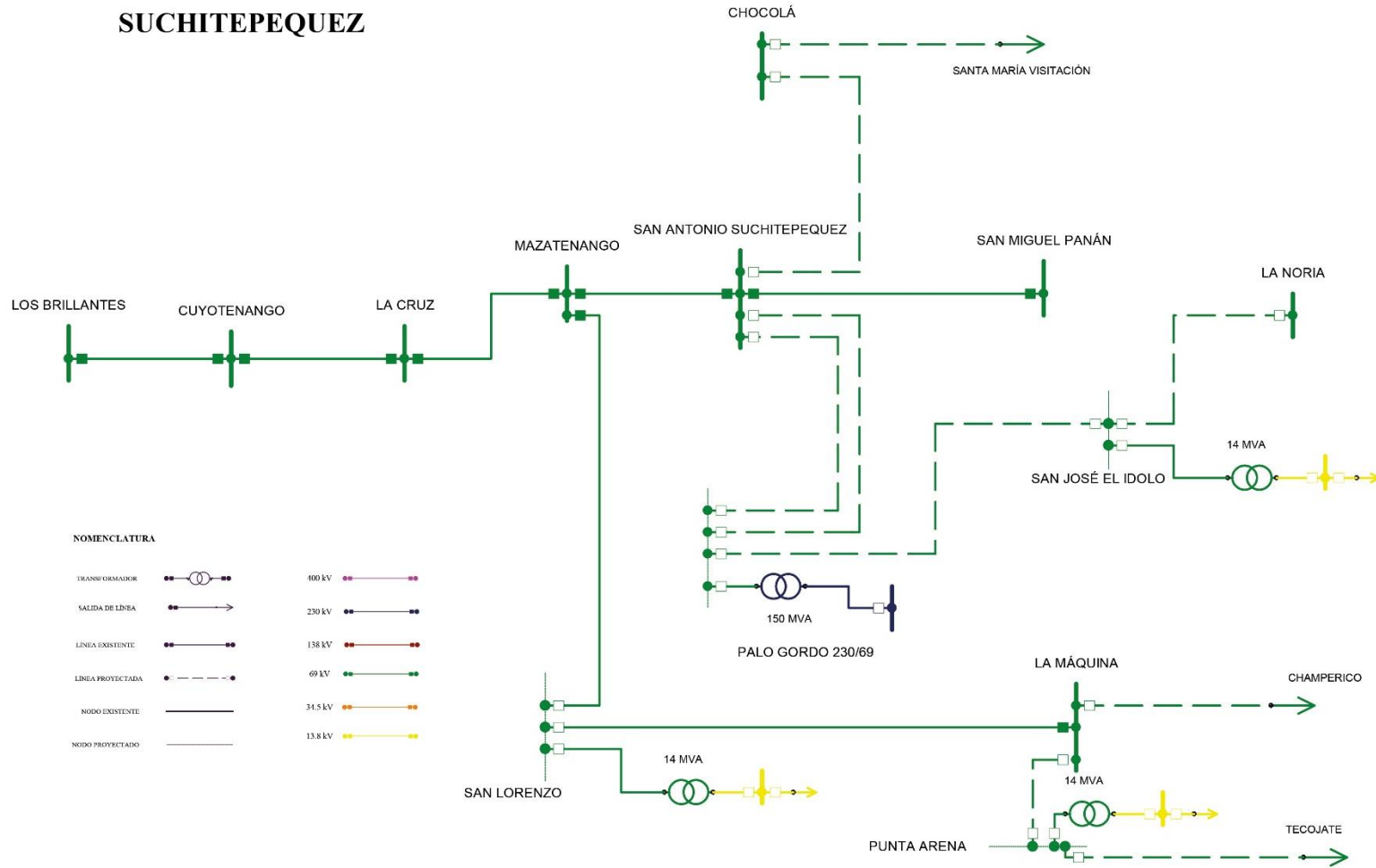
14.15. Department of Suchitepéquez



13 DE SEPTIEMBRE DE 1821



14.15.1. Single-line Diagram of Suchitepéquez



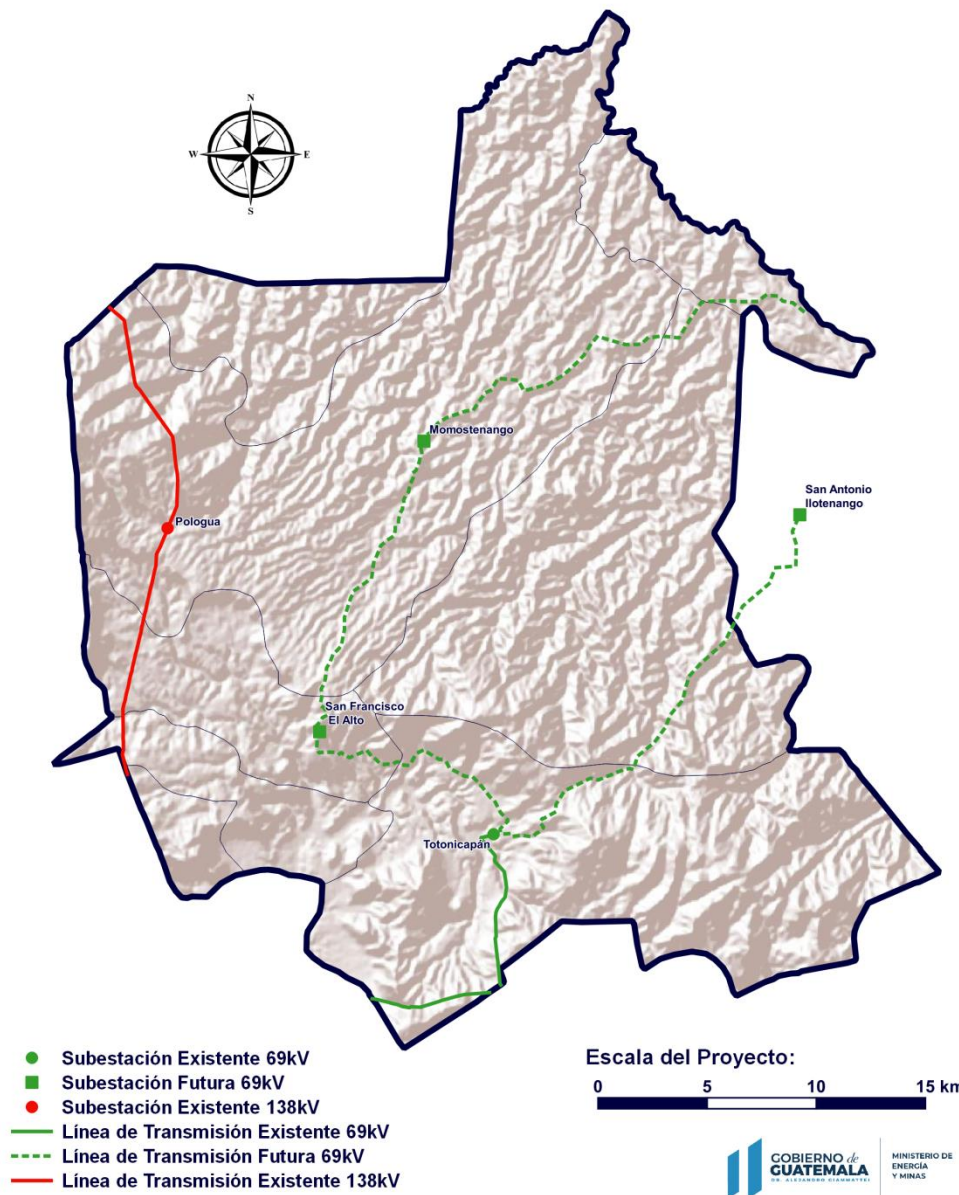
14.15.2. Electric Substations of Suchitepéquez

| TYPE OF WORK | MUNICIPALITY | ELECTRIC SUBSTATION | SUBSTATION TYPE | VOLTAGE (kV) | CAPACITY (MVA) |
|--------------|-----------------------------|---------------------|-----------------|--------------|----------------|
| NEW | SAN JOSÉ EL IDOLO | SAN JOSÉ EL IDOLO | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | SAN LORENZO | SAN LORENZO | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | SANTO DOMINGO SUCHITEPÉQUEZ | PUNTA ARENA | TRANSFORMATION | 69/13.8 | 14 |
| EXISTING | SAN ANTONIO SUCHITEPÉQUEZ | PALO GORDO | 69KV BAY | 69 | 150 |
| EXISTING | SAN ANTONIO SUCHITEPÉQUEZ | PALO GORDO | 69 KV FIELD | 69 | 150 |
| EXISTING | SAN ANDRÉS VILLA SECA | LA MAQUINA | 69 KV FIELD | 69 | |

14.15.3. Transmission Lines of Suchitepéquez

| TYPE | TRANSMISSION LINE | VOLTAGE (kV) | LENGTH (km) |
|----------|--|--------------|-------------|
| NEW | SAN ANTONIO SUCHITEPÉQUEZ – CHOCOLÁ | 69 | 10 |
| NEW | DOUBLE CIRCUIT PALO GORDO - SAN ANTONIO SUCHITEPÉQUEZ | 69 | 9 |
| ADEQUACY | LOS BRILLANTES - LA CRUZ AND CONNECTION TO CUYOTENANGO | 69 | 1 |
| ADEQUACY | MAZATENANGO – SAN MIGUEL PANÁN AND CONNECTION TO SAN ANTONIO SUCHITEPÉQUEZ | 69 | 1 |
| NEW | PALO GORDO - SAN JOSÉ EL IDOLO | 69 | 8 |
| ADEQUACY | MAZATENANGO -LA MÁQUINA AND CONNECTION TO SAN LORENZO | 69 | 1 |
| NEW | PUNTA ARENA – LA MAQUINA | 69 | 39 |
| NEW | SAN JOSÉ EL IDOLO – LA NORIA | 69 | 32 |

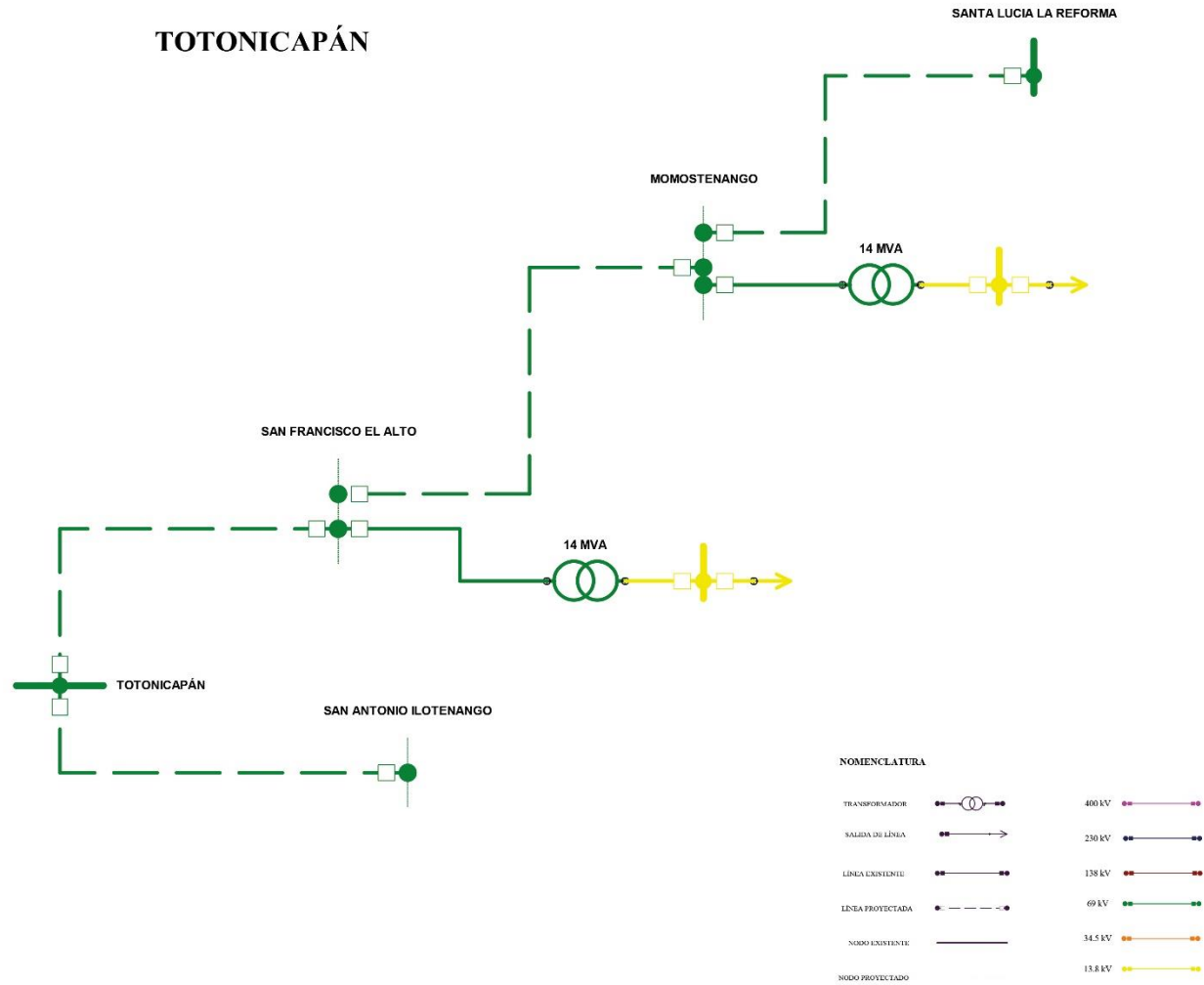
14.16. Department of Totonicapán



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14.16.1. Single-line Diagram of Totonicapán



14.16.2. Electric Substations of Totonicapán

| TYPE OF WORK | MUNICIPALITY | ELECTRIC SUBSTATION | SUBSTATION TYPE | VOLTAGE (kV) | CAPACITY (MVA) |
|--------------|------------------------|------------------------|-----------------|--------------|----------------|
| NEW | SAN FRANCISCO EL ALTO | SAN FRANCISCO EL ALTO | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | MOMOSTENANGO | MOMOSTENANGO | TRANSFORMATION | 69/13.8 | 10/14 |
| EXISTING | TOTONICAPÁN | TOTONICAPÁN | 69 KV FIELD | 69 | |
| EXISTING | SANTA LUCÍA LA REFORMA | SANTA LUCÍA LA REFORMA | 69 KV FIELD | 69 | |
| EXISTING | TOTONICAPÁN | TOTONICAPÁN | 69 KV FIELD | 69 | |
| EXISTING | SANTA LUCÍA LA REFORMA | SANTA LUCÍA LA REFORMA | 69 KV FIELD | 69 | |

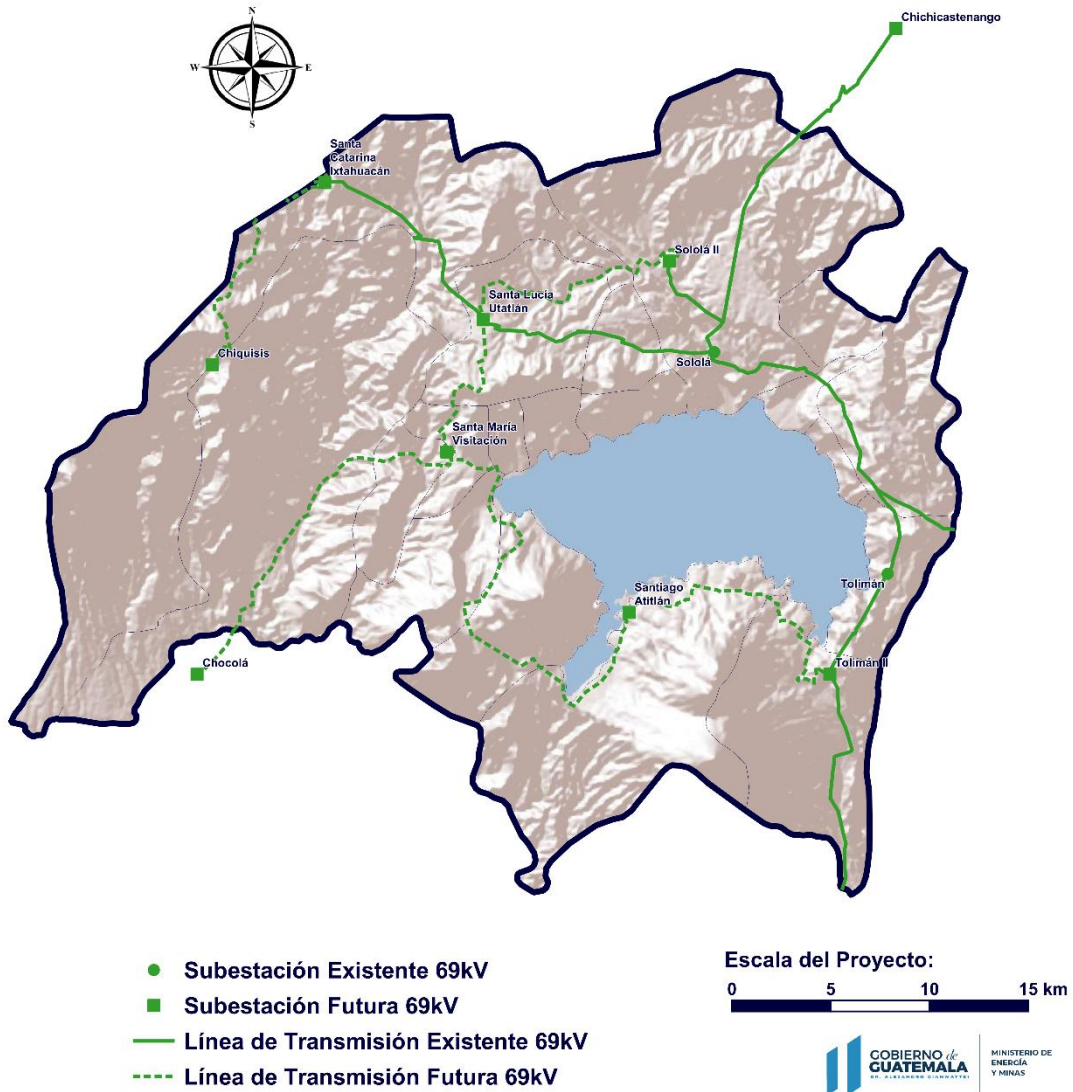
14.16.3. Transmission Lines of Totonicapán

| TYPE | TRANSMISSION LINE | VOLTAGE (kV) | LENGTH (km) |
|------|---------------------------------------|--------------|-------------|
| NEW | TOTONICAPÁN - SAN FRANCISCO ALTO | 69 | 13 |
| NEW | SAN FRANCISCO EL ALTO - MOMOSTENANGO | 69 | 15 |
| NEW | MOMOSTENANGO - SANTA LUCÍA LA REFORMA | 69 | 21 |
| NEW | SAN ANTONIO ILOTENANGO - TOTONICAPÁN | 69 | 24 |

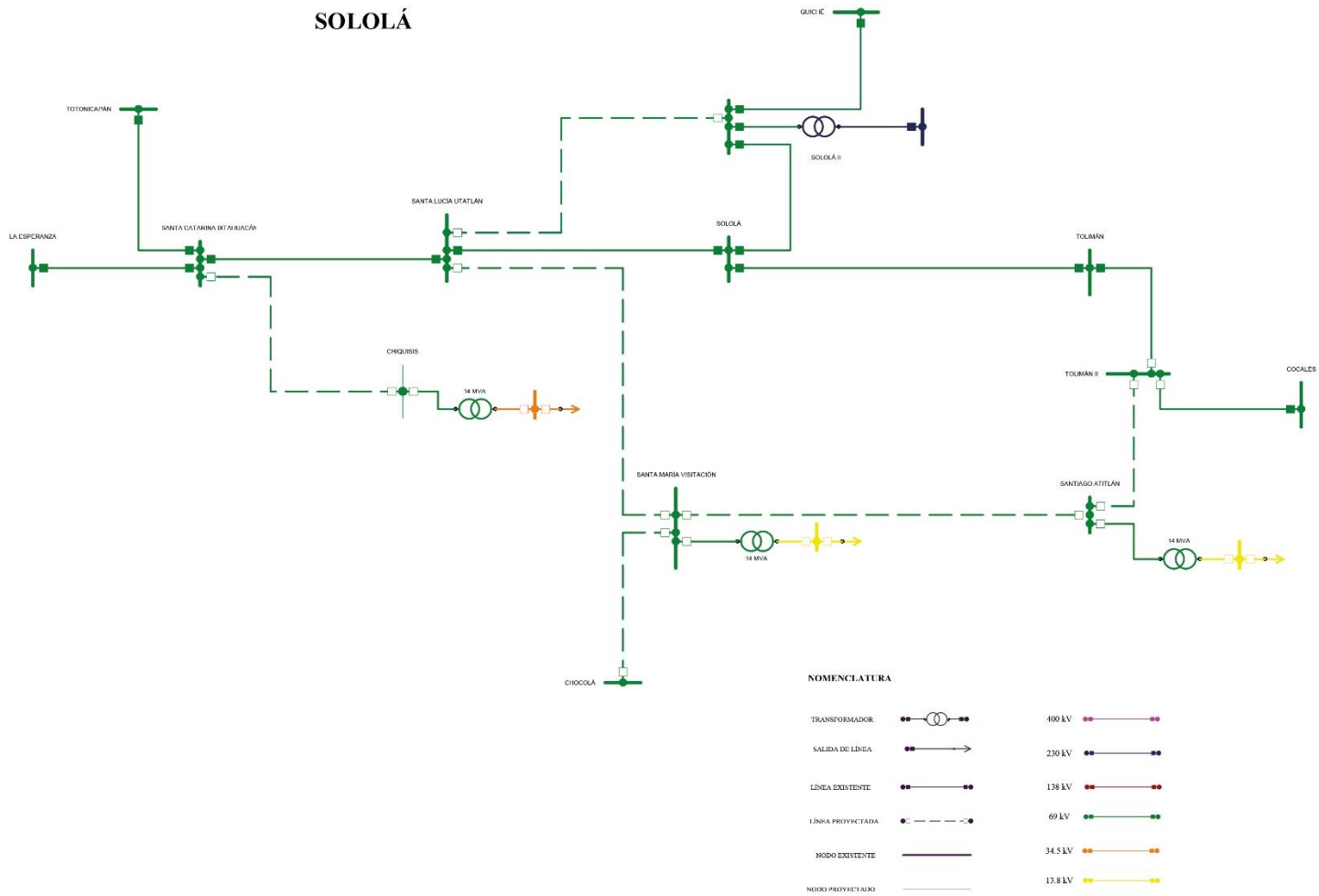


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14.17. Department of Sololá



14.17.1. Single-line Diagram of Sololá



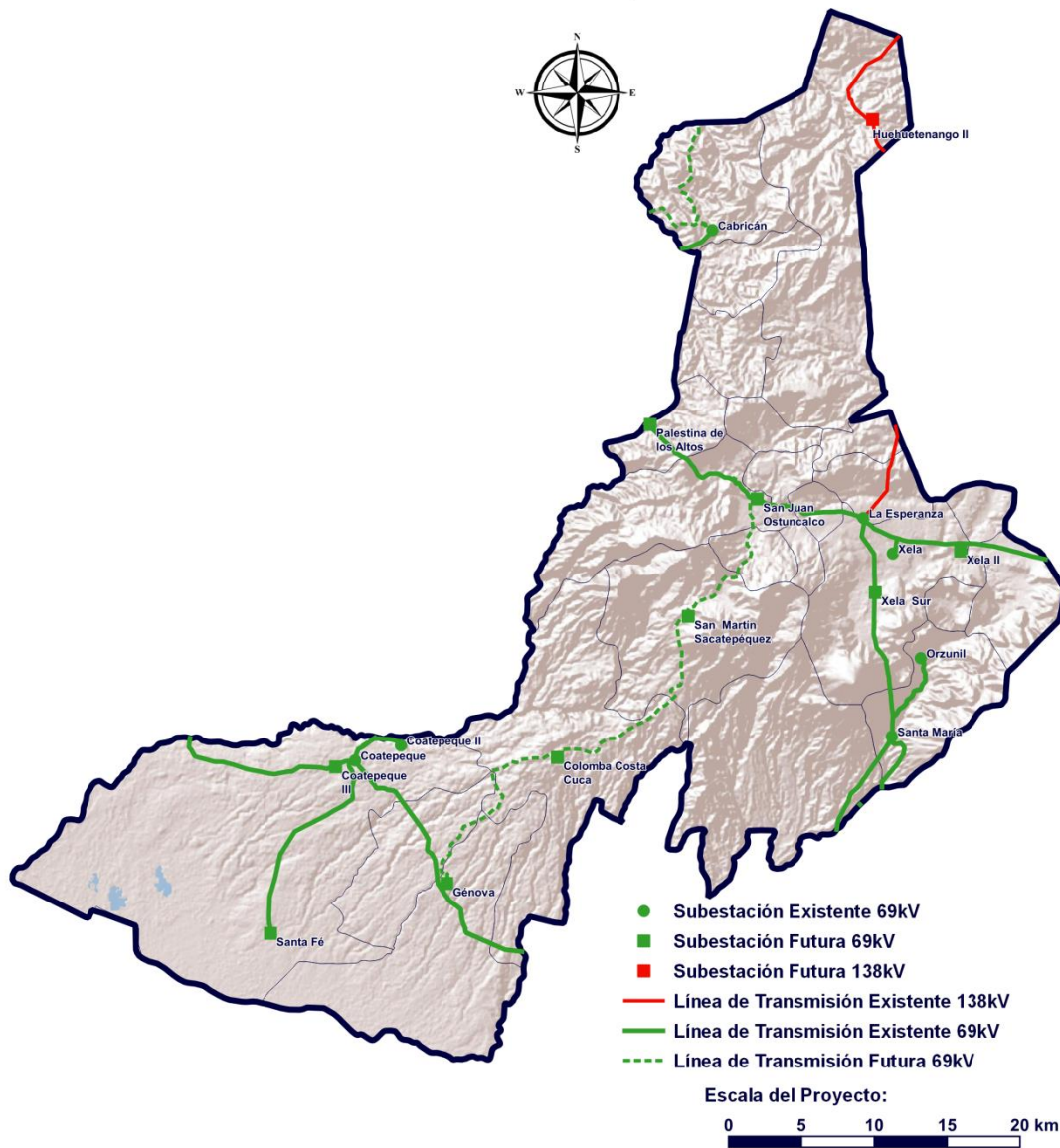
14.17.2. Electric Substations of Sololá

| TYPE OF WORK | MUNICIPALITY | ELECTRIC SUBSTATION | SUBSTATION TYPE | VOLTAGE (kV) | CAPACITY (MVA) |
|--------------|---------------------------|---------------------------|-----------------|--------------|----------------|
| NEW | SANTA MARÍA VISITACIÓN | SANTA MARÍA VISITACIÓN | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | SANTIAGO ATITLÁN | SANTIAGO ATITLÁN | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | SANTA CATARINA IXTAHUACÁN | CHIQUISIS | TRANSFORMATION | 69/34.5 | 10/14 |
| NEW | SANTA LUCÍA UTATLÁN | SANTA LUCÍA UTATLÁN | MANEUVERS | 69 | |
| NEW | SAN LUCAS TOLIMÁN | TOLIMÁN II | MANEUVERS | 69 | |
| EXISTING | SOLOLÁ | SOLOLÁ | 69 KV FIELD | 69 | |
| EXISTING | SANTO TOMÁS LA UNIÓN | CHOCOLÁ | 69 KV FIELD | 69 | |
| EXISTING | SANTA CATARINA IXTAHUACÁN | SANTA CATARINA IXTAHUACÁN | 69 KV FIELD | 69 | |

14.17.3. Transmission Lines of Sololá

| TYPE | TRANSMISSION LINE | VOLTAGE (kV) | LENGTH (km) |
|----------|--|--------------|-------------|
| NEW | SANTA LUCÍA UTATLÁN - SANTA MARÍA VISITACIÓN | 69 | 9 |
| ADEQUACY | SANTA CATARINA IXTAHUACÁN - SOLOLÁ Y CONEXÓN SANTA LUCÍA UTATLÁN | 69 | 1 |
| NEW | SANTA LUCÍA UTATLÁN - SOLOLÁ II | 69 | 11 |
| NEW | SANTA MARÍA VISITACIÓN - CHOCOLÁ | 69 | 21 |
| NEW | TOLIMÁN II - SANTIAGO ATITLÁN | 69 | 22 |
| ADEQUACY | TOLIMÁN - COCALES AND CONNECTION TO TOLIMÁN II | 69 | 1 |
| NEW | SANTA CATARINA IXTAHUACÁN - CHIQUISIS | 69 | 14 |
| NEW | SANTIAGO ATITLÁN - SANTA MARÍA VISITACIÓN | 69 | 26 |

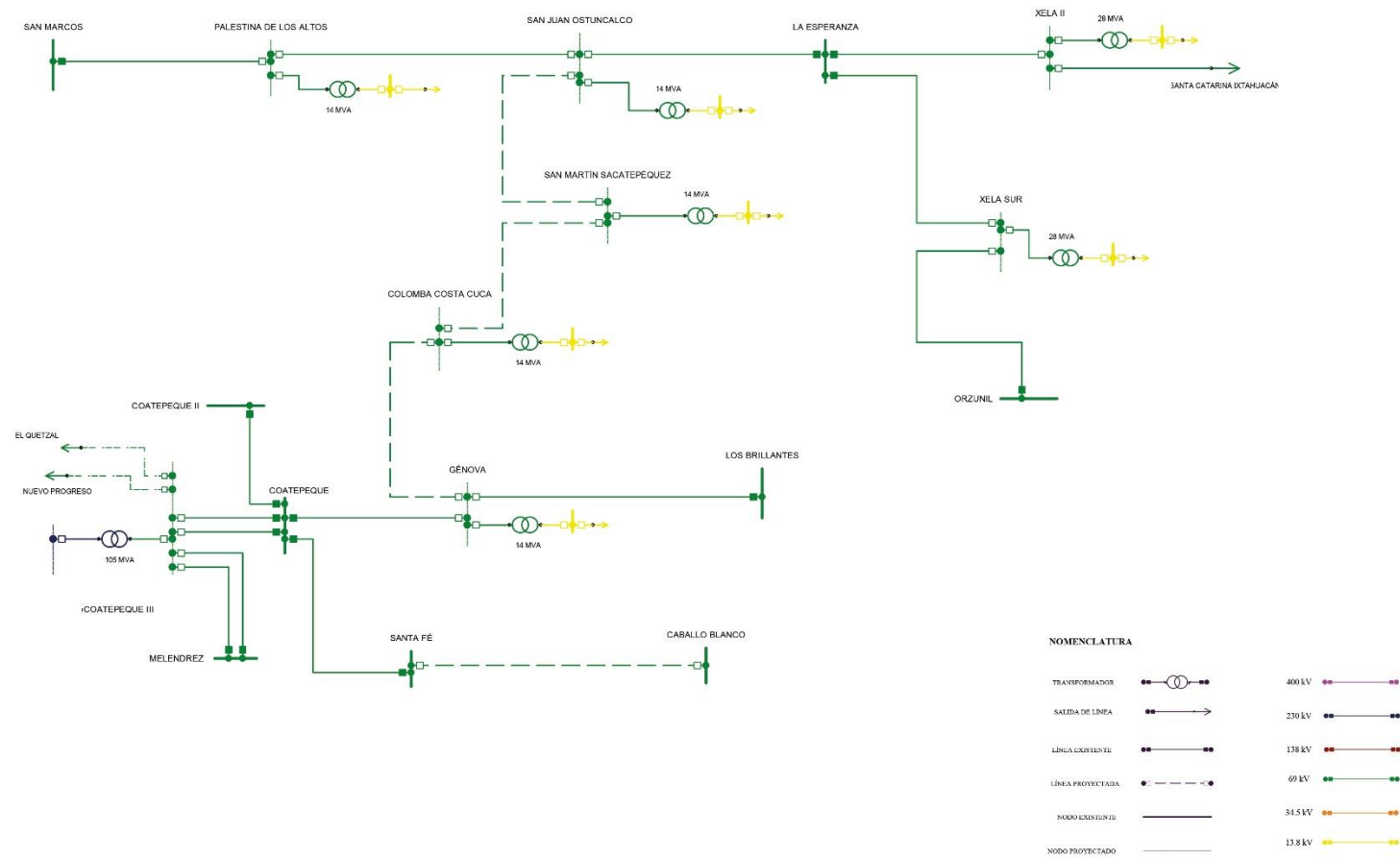
14.18. Department of Quetzaltenango





14.18.1. Single-line Diagram of Quetzaltenango

QUETZALTENANGO



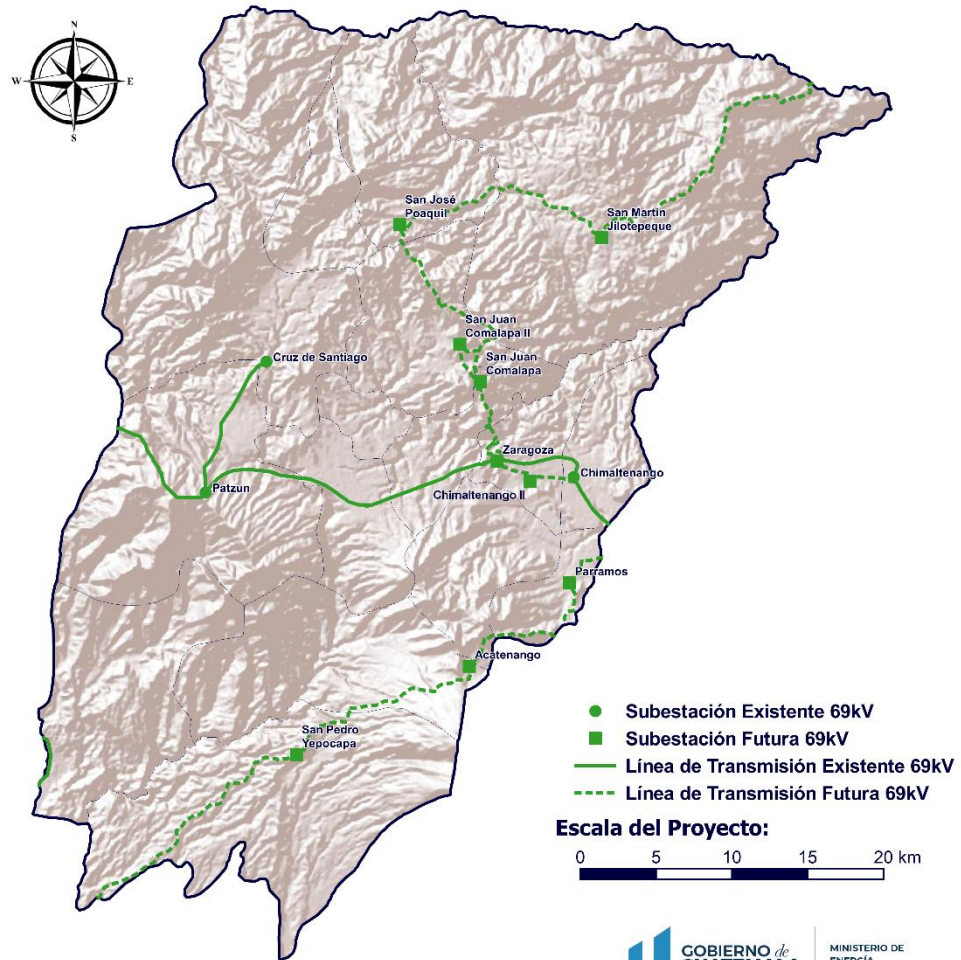
14.18.2. Electric Substations of Quetzaltenango

| TYPE OF WORK | MUNICIPALITY | ELECTRIC SUBSTATION | SUBSTATION TYPE | VOLTAGE (kV) | CAPACITY (MVA) |
|--------------|-------------------------|-------------------------|-----------------|--------------|----------------|
| EXISTING | SAN CARLOS SIJA | HUEHUETENANGO II | EXPANSION | 138/13.8 | 10/14 |
| NEW | QUETZALTENANGO | XELA SUR | TRANSFORMATION | 69/13.8 | 20/28 |
| NEW | SAN JUAN OSTUNCALCO | SAN JUAN OSTUNCALCO | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | QUETZALTENANGO | XELA II | TRANSFORMATION | 69/13.8 | 20/28 |
| NEW | SAN MARTÍN SACATEPÉQUEZ | SAN MARTÍN SACATEPÉQUEZ | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | PALESTINA DE LOS ALTOS | PALESTINA DE LOS ALTOS | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | COLOMBA COSTA CUCA | COLOMBA COSTA CUCA | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | GÉNOVA | GÉNOVA | TRANSFORMATION | 69/13.8 | 10/14 |
| EXISTING | COATEPEQUE | COATEPEQUE II | 69 KV FIELD | 69 | |
| EXISTING | COATEPEQUE | COATEPEQUE II | 69 KV FIELD | 69 | |
| NEW | COATEPEQUE | SANTA FÉ | 69 KV FIELD | 69 | |

14.18.3. Transmission Lines of Quetzaltenango

| TYPE | TRANSMISSION LINE | VOLTAGE (kV) | LENGTH (km) |
|----------|--|--------------|-------------|
| ADEQUACY | LA ESPERANZA - SAN MARCOS AND CONNECTION TO SAN JUAN OSTUNCALCO | 69 | 1 |
| ADEQUACY | LA ESPERANZA- ORZUNIL AND CONNECTION TO XELA SUR | 69 | 1 |
| NEW | SAN JUAN OSTUNCALCO - SAN MARTÍN SACATEPÉQUEZ | 69 | 14 |
| NEW | SAN MARTÍN SACATEPÉQUEZ - COLOMBA COSTA CUCA | 69 | 19 |
| ADEQUACY | LA ESPERANZA - SAN MARCOS AND CONNECTION TO PALESTINA DE LOS ALTOS | 69 | 1 |
| ADEQUACY | LOS BRILLANTES-COATEPEQUE AND CONNECTION TO GÉNOVA | 69 | 1 |
| NEW | COLOMBA COSTA CUCA - GÉNOVA | 69 | 18 |
| ADEQUACY | LA ESPERANZA - SANTA CATARINA IXTAHUACÁN AND CONNECTION TO XELA II | 69 | 1 |

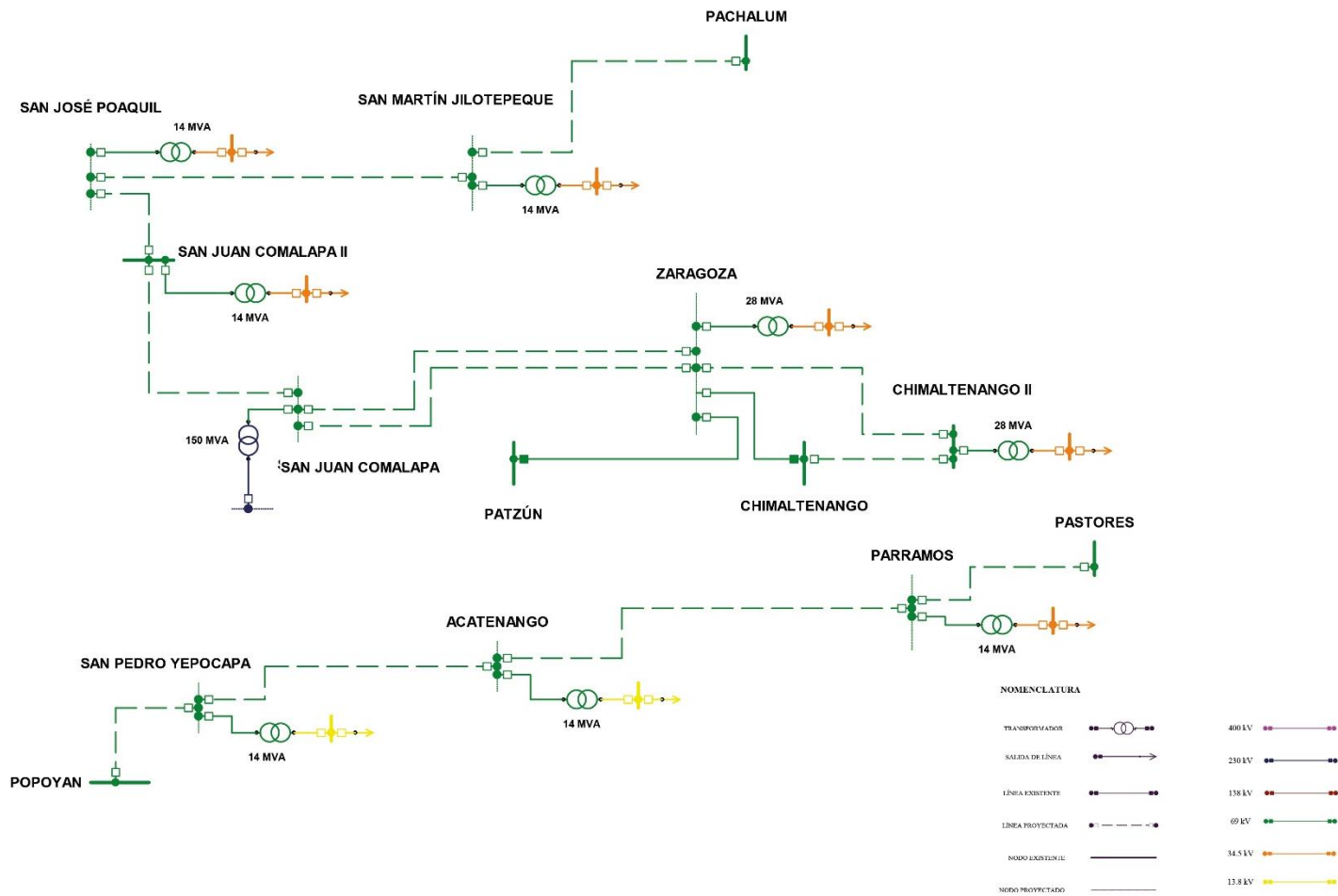
14.19. Department of Chimaltenango





14.19.1. Single-line Diagram of Chimaltenango

CHIMALTENANGO



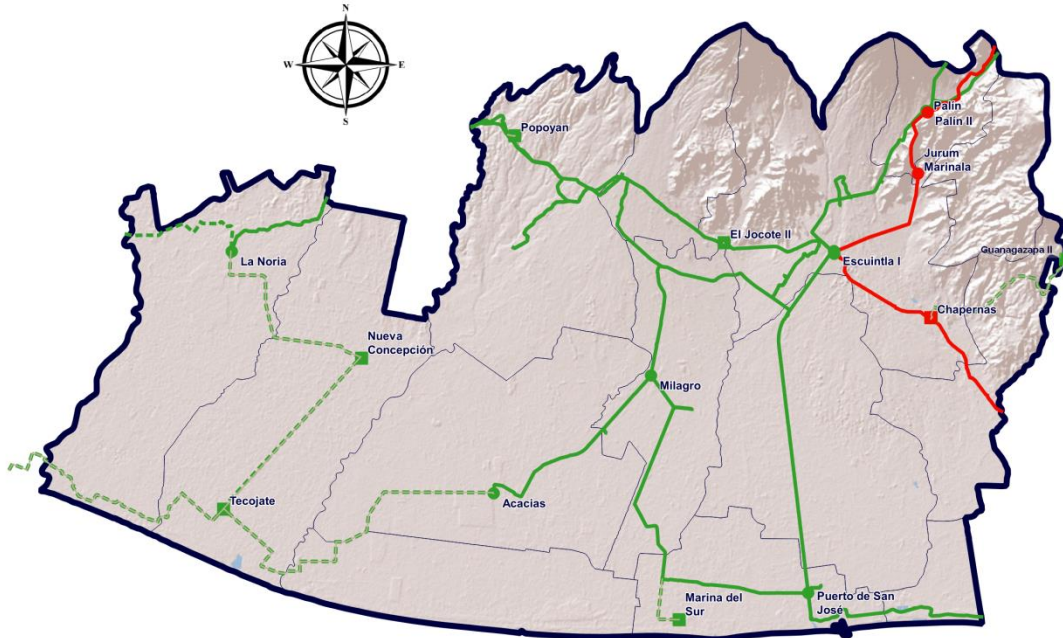
14.19.2. Electric Substations of Chimaltenango

| TYPE OF WORK | MUNICIPALITY | ELECTRIC SUBSTATION | SUBSTATION TYPE | VOLTAGE (kV) | CAPACITY (MVA) |
|--------------|------------------------|------------------------|-----------------|--------------|----------------|
| NEW | CHIMALTENANGO | ZARAGOZA | TRANSFORMATION | 69/34.5 | 20/28 |
| NEW | SAN PEDRO YEPOCAPA | SAN PEDRO YEPOCAPA | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | PARRAMOS | PARRAMOS | TRANSFORMATION | 69/34.5 | 10/14 |
| NEW | SAN JUAN COMALAPA | SAN JUAN COMALAPA II | TRANSFORMATION | 69/34.5 | 10/14 |
| NEW | SAN JOSÉ POAQUIL | SAN JOSÉ POAQUIL | TRANSFORMATION | 69/34.5 | 10/14 |
| NEW | ACATENANGO | ACATENANGO | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | SAN MARTÍN JILOTEPEQUE | SAN MARTÍN JILOTEPEQUE | TRANSFORMATION | 69/34.5 | 10/14 |
| NEW | SAN JUAN COMALAPA | SAN JUAN COMALAPA II | 69 KV FIELD | | |
| NEW | SAN JUAN COMALAPA | SAN JUAN COMALAPA II | 69 KV FIELD | | |

14.19.3. Transmission Lines of Chimaltenango

| TYPE | TRANSMISSION LINE | VOLTAGE (kV) | LENGTH (km) |
|----------|---|--------------|-------------|
| NEW | CHIMALTENANGO - CHIMALTENANGO II | 69 | 3 |
| NEW | CHIMALTENANGO II - ZARAGOZA | 69 | 3 |
| NEW | SAN JUAN COMALAPA – SAN JUAN COMALAPA II | 69 | 4 |
| NEW | DOUBLE CIRCUIT SAN JUAN COMALAPA II – ZARAGOZA | 69 | 9 |
| NEW | PASTORES – PARRAMOS | 69 | 9 |
| NEW | POPOYAN - SAN PEDRO YEPOCAPA | 69 | 24 |
| ADEQUACY | PATZUN-CHIMALTENANGO AND CONNECTION TO ZARAGOZA | 69 | 1 |
| NEW | SAN JUAN COMALAPA II - SAN JOSÉ POAQUIL | 69 | 15 |
| NEW | PARRAMOS – ACATENANGO | 69 | 13 |
| NEW | SAN JOSÉ POAQUIL - SAN MARTÍN JILOTEPEQUE | 69 | 16 |
| NEW | ACATENANGO - SAN PEDRO YEPOCAPA | 69 | 15 |
| NEW | SAN MARTÍN JILOTEPEQUE - PACHALUM | 69 | 27 |

14.20. Department of Escuintla



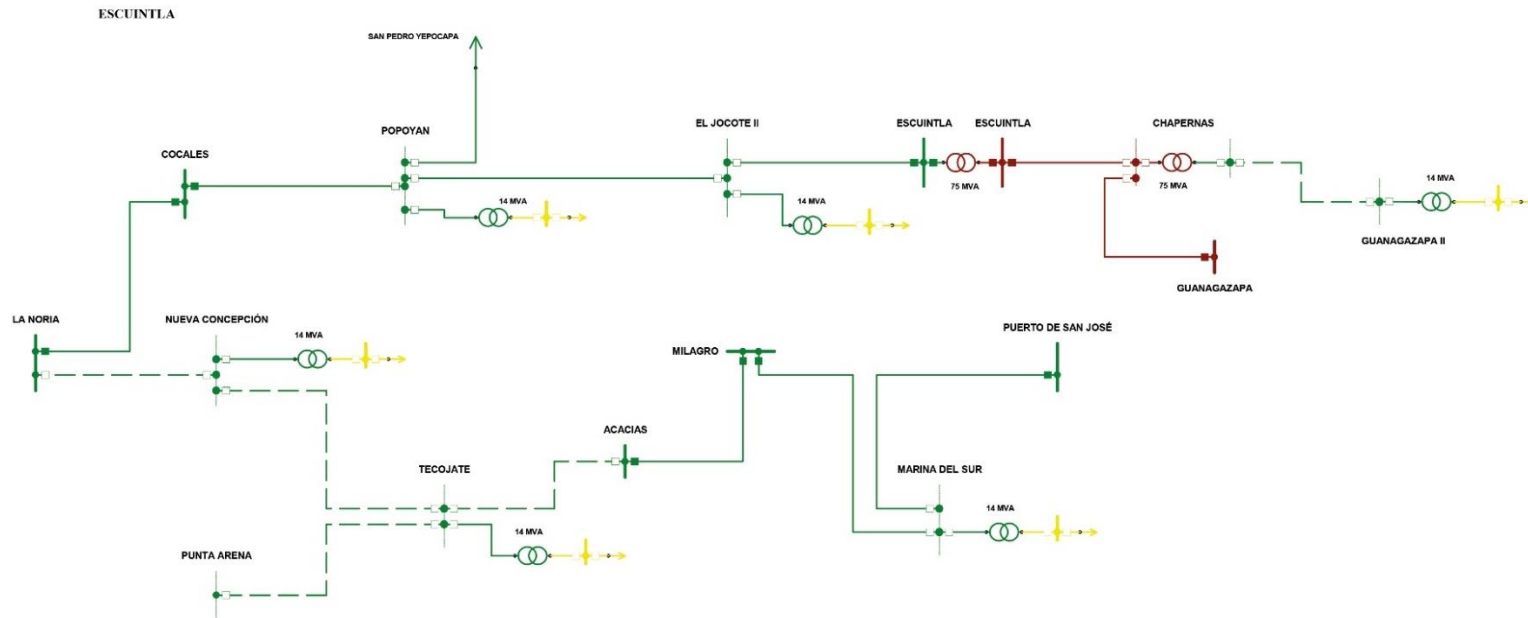
- Subestación Existente 69kV
- Subestación Futura 69kV
- Subestación Futura 138kV
- Subestación Existente 138kV
- Línea de Transmisión Existente 69kV
- - - Línea de Transmisión Futura 69kV
- Línea de Transmisión Existente 138kV
- - - Línea de Transmisión Futura 69kV

Escala del Proyecto:





14.20.1. Single-line Diagram of Escuintla



NOMENCLATURA

| | | | |
|------------------|--|---------|--|
| TRANSFORMADOR | | 400 kV | |
| SALIDA DE LÍNEA | | 230 kV | |
| LÍNEA EXISTENTE | | 138 kV | |
| LÍNEA PROYECTADA | | 69 kV | |
| NODO EXISTENTE | | 34.5 kV | |
| NODO PROYECTADO | | 13.8 kV | |



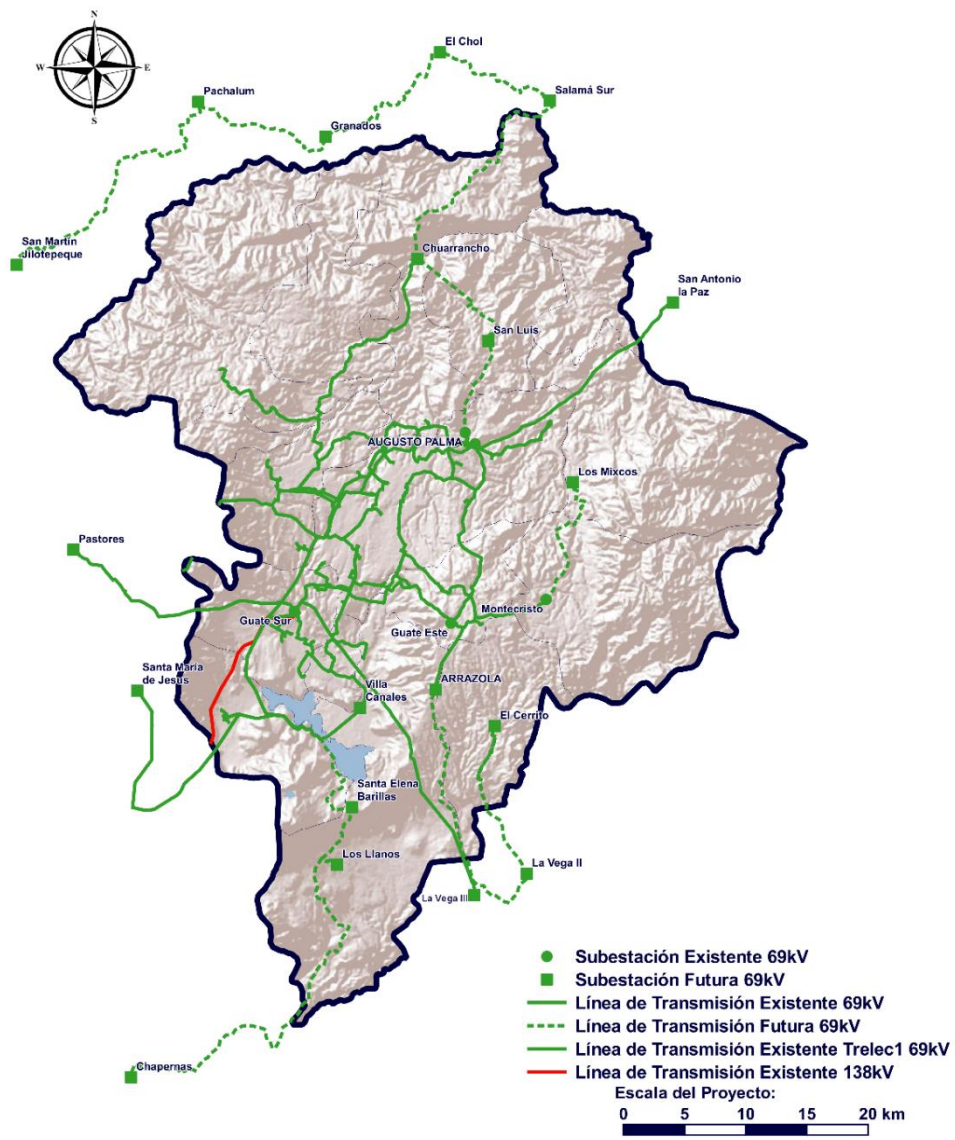
14.20.2. Electric Substations of Escuintla

| TYPE OF WORK | MUNICIPALITY | ELECTRIC SUBSTATION | SUBSTATION TYPE | VOLTAGE (kV) | CAPACITY (MVA) |
|--------------|------------------|---------------------|-----------------|--------------|----------------|
| NEW | SAN JOSÉ | MARINA DEL SUR | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | SANTA LUCÍA | POPOYAN | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | COTZUMALGUAPA | EL JOCOTE II | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | ESCUINTLA | EL JOCOTE II | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | NUEVA CONCEPCIÓN | NUEVA CONCEPCIÓN | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | NUEVA CONCEPCIÓN | TECOJATE | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | GUANAGAZAPA | GUANAGAZAPA II | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | ESCUINTLA | CHAPERNAS | TRANSFORMATION | 138/69 | 75 |
| EXISTING | NUEVA CONCEPCIÓN | LA NORIA | 69 KV FIELD | 69 | |
| EXISTING | LA GOMERA | ACACIAS | 69 KV FIELD | 69 | |
| NEW | SANTA LUCÍA | POPOYAN | 69 KV FIELD | 69 | |
| EXISTING | COTZUMALGUAPA | LA NORIA | 69 KV FIELD | 69 | |
| EXISTING | NUEVA CONCEPCIÓN | LA NORIA | 69 KV FIELD | 69 | |

14.20.3. Transmission Lines of Escuintla

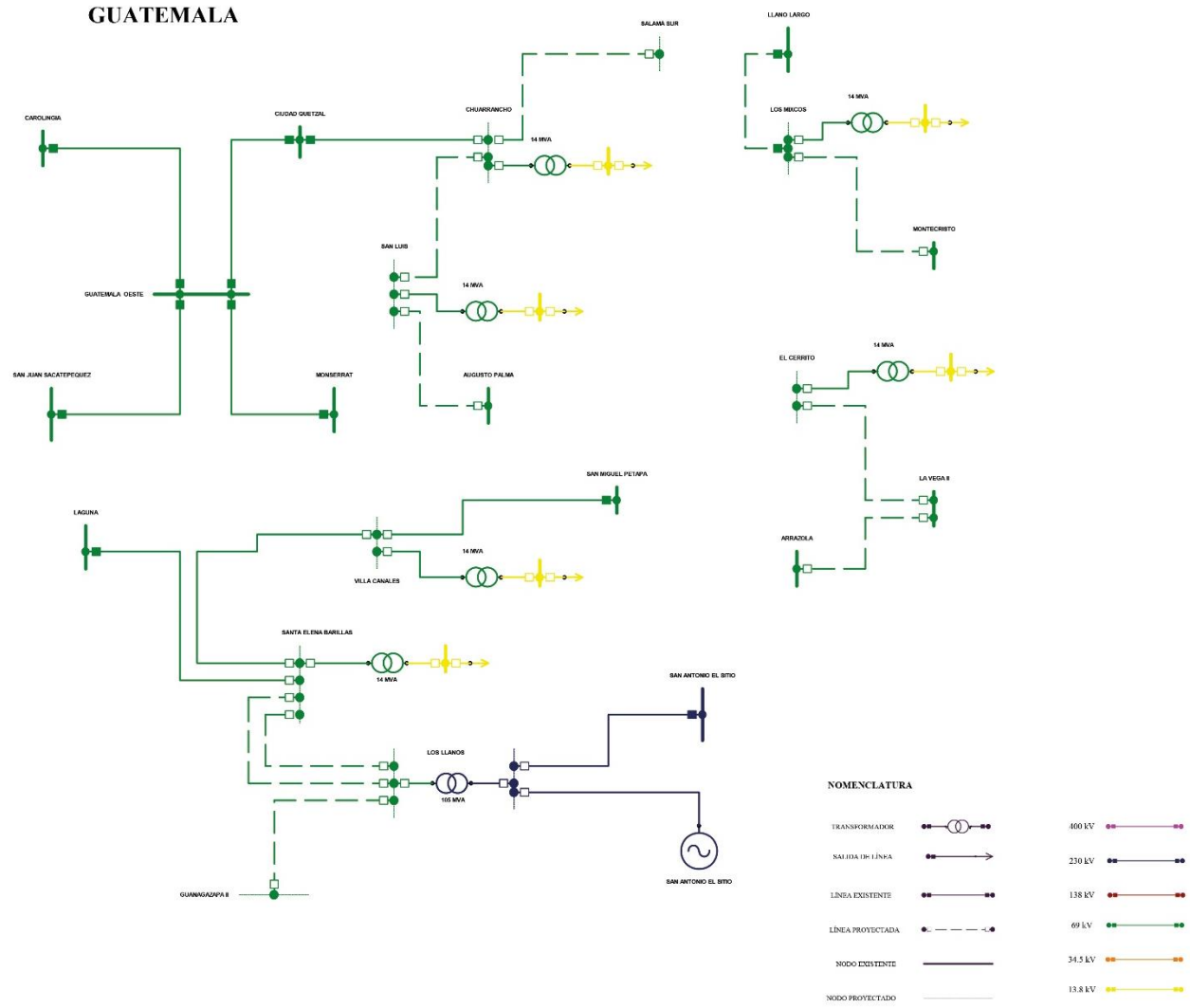
| TYPE | TRANSMISSION LINE | VOLTAGE (kV) | LENGTH (km) |
|----------|--|--------------|-------------|
| ADEQUACY | MILAGRO-PUERTO SAN JOSÉ AND CONNECTION TO MARINA DEL SUR | 69 | 6 |
| ADEQUACY | COCALES-ESCUINTLA AND CONNECTION TO POPOYAN | 69 | 1 |
| NEW | LA NORIA - NUEVA CONCEPCIÓN | 69 | 22 |
| ADEQUACY | COCALES - ESCUINTLA AND CONNECTION TO EL JOCOTE II | 69 | 1 |
| NEW | ACACIAS - TECOJATE | 69 | 39 |
| NEW | NUEVA CONCEPCIÓN- TECOJATE | 69 | 21 |
| NEW | TECOJATE - PUNTA ARENA | 69 | 32 |
| NEW | CHAPERNAS - GUANAGAZAPA II | 69 | 24 |
| ADEQUACY | ESCUINTLA - GUANAGAZAPA AND CONNECTION TO LAS CHAPERNAS | 138 | 1 |

14.21. Department of Guatemala





14.21.1. Single-line Diagram of Guatemala



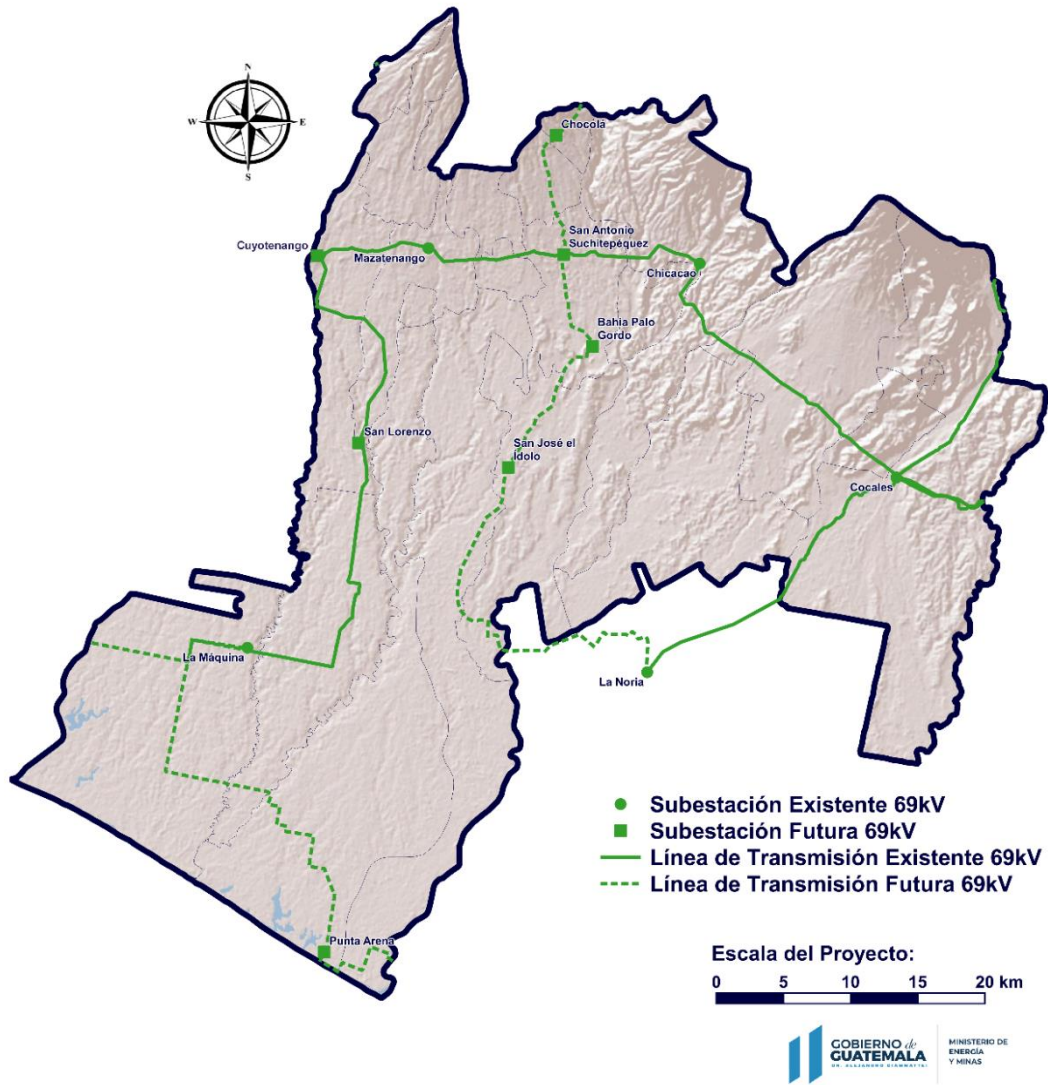
14.21.2. Electric Substations of Guatemala

| TYPE OF WORK | MUNICIPALITY | ELECTRIC SUBSTATION | SUBSTATION TYPE | VOLTAGE (kV) | CAPACITY (MVA) |
|--------------|-------------------|----------------------|-----------------|--------------|----------------|
| NEW | VILLA CANALES | SANTA ELENA BARILLAS | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | FRAIJANES | EL CERRITO | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | SAN PEDRO AYAMPUC | SAN LUIS | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | VILLA CANALES | VILLA CANALES | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | PALENCIA | LOS MIXCOS | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | CHUARRANCHO | CHUARRANCHO | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | VILLA CANALES | LOS LLANOS | 69 KV BAY | 69 | |
| EXISTING | SANTA ROSA | LA VEGA II | 69 KV FIELD | 69 | |
| EXISTING | GUATEMALA | AUGUSTO PALMA | 69 KV FIELD | 69 | |
| EXISTING | SAN JOSÉ PINULA | MONTECRISTO | 69 KV FIELD | 69 | |
| EXISTING | VILLA CANALES | SANTA ELENA BARILLAS | 69 KV FIELD | 69 | |
| EXISTING | VILLA CANALES | SANTA ELENA BARILLAS | 69 KV FIELD | 69 | |

14.21.3. Transmission Lines of Guatemala

| TYPE | TRANSMISSION LINE | VOLTAGE (kV) | LENGTH (km) |
|----------|--|--------------|-------------|
| NEW | LA VEGA II – EL CERRITO | 69 | 14 |
| ADEQUACY | LAGUNA - SAN MIGUEL PETAPA AND DOUBLE CIRCUIT CONNECTION TO SANTA ELENA BARILLAS | 69 | 11 |
| ADEQUACY | LAGUNA - SAN MIGUEL PETAPA AND CONNECTION TO VILLA CANALES | 69 | 1 |
| NEW | MONTECRISTO - LOS MIXCOS | 69 | 14 |
| NEW | LOS MIXCOS – LLANO LARGO | 69 | 6 |
| NEW | AUGUSTO PALMA - SAN LUIS | 69 | 8 |
| NEW | DOUBLE CIRCUIT LOS LLANOS - SANTA ELENA BARILLAS | 69 | 9 |
| NEW | CHUARRANCHO - SAN LUIS | 69 | 11 |
| NEW | LOS LLANOS - GUANAGAZAPA II | 69 | 18 |
| NEW | CHUARRANCHO - SALAMA SUR | 69 | 20 |
| NEW | LA VEGA II – ARRAZOLA | 69 | 25 |

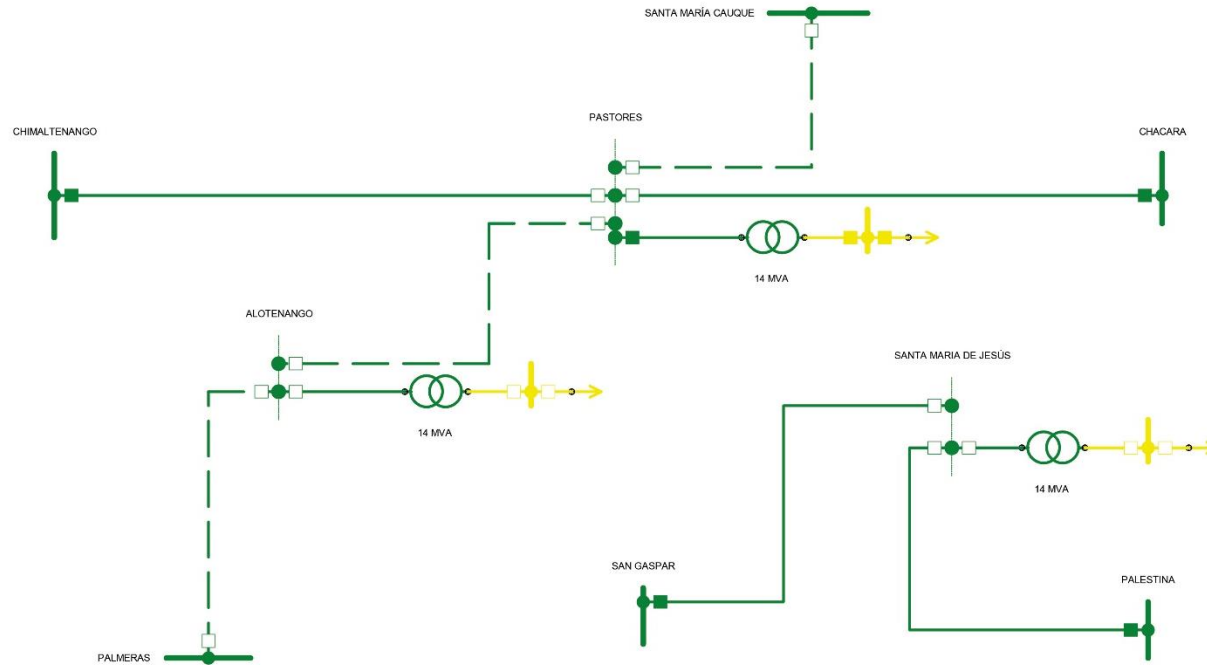
14.22. Department of Sacatepéquez



LIBERTAD
15 DE
SEPTIEMBRE
DE 1821

14.22.1. Single-line Diagram of Sacatepéquez

SACATEPÉQUEZ



NOMENCLATURA

| | | | |
|------------------|--|---------|--|
| TRANSFORMADORE | | 400 kV | |
| SALIDA DE LÍNEA | | 230 kV | |
| LÍNEA EXISTENTE | | 138 kV | |
| LÍNEA PROTECTADA | | 69 LV | |
| NODO EXISTENTE | | 34.5 kV | |
| NODO PROTECTADO | | 13.8 kV | |



14.22.2. Electric Substations of Sacatepéquez

| TYPE OF WORK | MUNICIPALITY | ELECTRIC SUBSTATION | SUBSTATION TYPE | VOLTAGE (kV) | CAPACITY (MVA) |
|--------------|----------------------|----------------------|-----------------|--------------|----------------|
| NEW | PASTORES | PASTORES | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | ALOTENANGO | ALOTENANGO | TRANSFORMATION | 69/13.8 | 10/14 |
| NEW | SANTA MARÍA DE JESUS | SANTA MARÍA DE JESUS | TRANSFORMATION | 69/13.8 | 10/14 |
| EXISTING | SANTA MARÍA DE JESUS | SANTA MARÍA CAUQUE | 69 KV FIELD | 69 | |
| EXISTING | ESCUINTLA | PALMERAS | 69 KV FIELD | 69 | |

14.22.3. Transmission Lines of Sacatepéquez

| TYPE | TRANSMISSION LINE | VOLTAGE (kV) | LENGTH (km) |
|----------|---|--------------|-------------|
| ADEQUACY | CHIMALTENANGO - CHACARÁ AND CONNECTION TO PASTORES | 69 | 1 |
| NEW | PASTORES - ALOTENANGO | 69 | 16 |
| ADEQUACY | PALESTINA - SAN GASPAR AND CONNECTION TO SANTA MARÍA DE JESUS | 69 | 1 |
| NEW | PASTORES - SANTA MARIA CAUQUE | 69 | 13 |
| NEW | ALOTENANGO - PALMERAS | 69 | 27 |

LIBERTAD
15 DE
SEPTIEMBRE
DE 1821

15. REINFORCEMENTS IN THE ELECTRIC TRANSMISSION NETWORK 230 kV-400kV

The addition of works that could strengthen the 230 kV transmission network was considered, providing reliability to the transmission system in the event of failures, providing a 230 kV ring around the entire country, a 400 kV backbone network was also designed to guarantee the supply of electricity in the long term, with an approximate transport capacity between 2700 MW - 3000 MW due to environmental conditions of the location of the transmission lines, connecting the two largest generation poles in the country in Escuintla and Alta Verapaz with the largest consumption center in Guatemala and the energy exchanges with Mexico and neighboring countries.

Initially for phase 1, the construction of a 400 kV main network from the Melendrez substation in double circuit to the Tactic electrical substation, passing through the Puerto San José II electrical substation and the Guatemala electrical substation is proposed. It is proposed the construction of an electrical transmission line from the Puerto San Jose II - El Melonar - Vado Hondo substation, initially built for 400 kV, and energized at 230 kV during phase 1. Likewise, the construction of a double circuit line from the Tactic - Yalchacti - Petén Itza substation, initially built for 400 kV, and energized at 230 kV, is proposed.

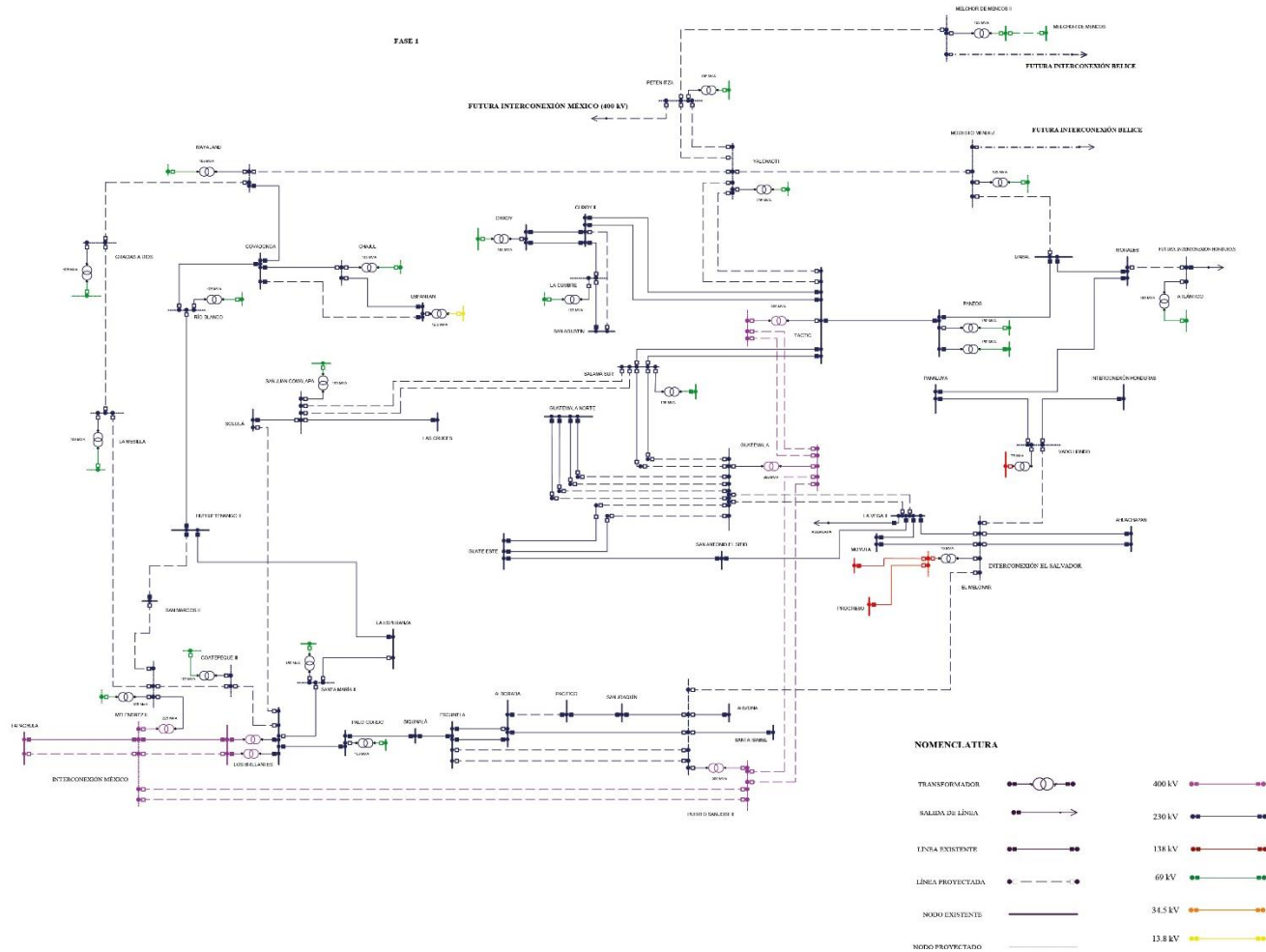
Phase 2 will require the voltage reconversion from 230 to 400 kV and the expansion of the existing substations El Melonar, Vado Hondo, Yalchacti and Petén Itza, at which time the second interconnection with Mexico at 400 kV can be closed.

The capacity of the Tactic, Guatemala and Puerto San Jose II electrical substations is considered as 900 MVA, since they will be used to evacuate water and thermal generation; and through the Guatemala electrical substation this energy will be delivered to the country's largest consumption center.

The construction of the second circuit from the Chixoy II substation to the San Agustín substation is conditioned to the construction of the second circuit between Guatemala Norte and San Agustín by Company owner of the Network Company -EPR- (for its acronym in Spanish).



15.1. Single-line Diagram 230-400 kV Phase 1



Note:

- ✓ A second interconnection with Mexico from the Petén Itzá substation is being considered; this will have to be confirmed if it is technically and economically feasible for both Guatemala and Mexico. Another option considered is the interconnection with Mexico from the Yalchacti substation.
- ✓ One more interconnection with Honduras from the Entre Rios substation is contemplated; this will have to be confirmed if it is technically and economically feasible, both for Guatemala and Honduras. An interconnection with Honduras, from the Morales substation, is considered as another option."

15.3. Electric Substations 230-400 kV

| TYPE OF WORK | DEPARTMENT | MUNICIPALITY | ELECTRIC SUBSTATION | VOLTAGE (KV) | SECONDARY VOLTAGE | SUBSTATION TYPE | CAPACITY |
|--------------|----------------|-------------------------------|-------------------------|--------------|-------------------|-----------------|----------|
| EXISTING | ALTA VERAPAZ | TACTIC | TACTIC | 230 | | EXPANSION | |
| EXISTING | ALTA VERAPAZ | SAN CRISTÓBAL ALTA VERAPAZ | CHIXOY II | 230 | 34 | EXPANSION | 14 |
| NEW | ALTA VERAPAZ | CHISEC | YALCHACTI | 230 | 69 | TRANSFORMATION | 105 |
| NEW | CHIMALTENANGO | SAN JUAN COMALAPA | SAN JUAN COMALAPA | 230 | 69 | TRANSFORMATION | 150 |
| NEW | IZABAL | PUERTO BARRIOS | ATLÁNTICO | 230 | 69 | TRANSFORMATION | 150 |
| NEW | PETÉN | LA LIBERTAD | PETÉN ITZÁ | 230 | 69 | TRANSFORMATION | 105 |
| NEW | QUETZALTENANGO | ZUNIL | SANTA MARÍA II | 230 | 69 | TRANSFORMATION | 150 |
| NEW | QUICHÉ | CHAJUL | CHAJUL | 230 | 69 | TRANSFORMATION | 105 |
| EXISTING | QUICHÉ | NEBAJ | COVADONGA | 230 | 69 | TRANSFORMATION | 105 |
| EXISTING | QUICHÉ | NEBAJ | COVADONGA | 230 | 34.5 | TRANSFORMATION | 10 |
| EXISTING | SUCHITEPÉQUEZ | SAN ANTONIO SUCHITEPÉQUEZ | PALO GORDO | 230 | 69 | EXPANSION | 150 |
| NEW | QUICHÉ | SACAPULAS | RÍO BLANCO | 230 | 69 | TRANSFORMATION | 105 |
| EXISTING | QUICHÉ | USPANTÁN | USPANTÁN | 230 | 13.8 | EXPANSION | 12.5 |
| NEW | IZABAL | LIVINGSTON | RÍO DULCE II | 230 | 34 | TRANSFORMATION | 28 |
| EXISTING | ALTA VERAPAZ | PANZÓS | PANZÓS | 230 | 69 | EXPANSION | 150 |
| EXISTING | ALTA VERAPAZ | SAN CRISTÓBAL ALTA VERAPAZ | CHIXOY II | 230 | 69 | EXPANSION | 105 |
| NEW | BAJA VERAPAZ | SAN JERÓNIMO | LA CUMBRE | 230 | 69 | TRANSFORMATION | 105 |
| NEW | BAJA VERAPAZ | SALAMÀ | SALAMÀ SUR | 230 | 69 | TRANSFORMATION | 105 |
| NEW | HUEHUETENANGO | SANTA CRUZ BARILLAS | MAYALAND | 230 | 69 | TRANSFORMATION | 105 |
| NEW | HUEHUETENANGO | LA DEMOCRACIA | LA MESILLA | 230 | 69 | TRANSFORMATION | 105 |
| NEW | IZABAL | LIVINGSTON | MODESTO MÉNDEZ | 230 | 69 | TRANSFORMATION | 105 |
| EXISTING | RETALHULEU | SANTA CRUZ MULUÁ | LOS BRILLANTES | 230 | | EXPANSION | |
| NEW | JUTIAPA | COMAPA | MELONAR | 230 | 138 | TRANSFORMATION | 75 |
| NEW | QUETZALTENANGO | COATEPEQUE | COATEPEQUE III | 230 | 69 | TRANSFORMATION | 105 |
| EXISTING | IZABAL | LIVINGSTON | IZABAL | 230 | | EXPANSION | |
| NEW | PETÉN | MELCHOR DE MENCOS | MELCHOR DE MENCOS II | 230 | 69 | TRANSFORMATION | 105 |
| EXISTING | GUATEMALA | VILLA CANALES | LOS LLANOS | 230 | 69 | EXPANSION | 105 |
| NEW | CHIQUIMULA | CHIQUIMULA | VADO HONDO | 230 | 138 | TRANSFORMATION | 75 |

| | | | | | | | |
|----------|---------------|---------------------|--------------------|-----|-----|----------------|---------|
| EXISTING | ESCUINTLA | ESCUINTLA | ESCUINTLA II | 230 | | MANEUVERS | |
| EXISTING | HUEHUETENANGO | NENTÓN | GRACIAS A DIOS | 230 | 69 | TRANSFORMATION | 105 |
| NEW | ESCUINTLA | MASAGUA | PUERTO SAN JOSÉ II | 400 | 230 | TRANSFORMATION | 900 |
| NEW | SAN MARCOS | PAJAPITA | MELENDREZ II | 400 | 230 | TRANSFORMATION | 225/105 |
| EXISTING | ALTA VERAPAZ | TACTIC | TACTIC | 400 | 230 | EXPANSION | 900 |
| EXISTING | ALTA VERAPAZ | CHISEC | YALCHACTI | 400 | 230 | EXPANSION | 225 |
| EXISTING | PETÉN | LA LIBERTAD | PETÉN ITZÁ | 400 | 230 | TRANSFORMATION | 225 |
| NEW | GUATEMALA | PALENCIA | GUATEMALA | 400 | 230 | TRANSFORMATION | 900 |
| EXISTING | CHIQUIMULA | CHIQUIMULA | VADO HONDO | 400 | 230 | EXPANSION | 225 |
| EXISTING | JUTIAPA | COMAPA | MELONAR | 400 | 230 | EXPANSION | 225 |
| EXISTING | RETALHULEU | SANTA CRUZ MULUÁ | BRILLANTES | 400 | | EXPANSION | |
| EXISTING | QUICHÉ | NEBAJ | COVADONGA | 230 | | EXPANSION | |
| NEW | IZABAL | MORALES | MORALES | 230 | | EXPANSION | |
| NEW | SAN MARCOS | SAN MARCOS | SAN MARCOS II | 230 | | EXPANSION | |
| NEW | GUATEMALA | SAN JOSÉ PINULA | SAN JOSÉ PINULA | 230 | | MANEUVERS | |
| EXISTING | GUATEMALA | GUATEMALA | GUATEMALA ESTE | 230 | | EXPANSION | |
| EXISTING | SANTA ROSA | PUEBLO NUEVO VIÑAS | LA VEGA II | 230 | | EXPANSION | |
| NEW | IZABAL | LIVINGSTON | MODESTO MÉNDEZ | 230 | | EXPANSION | |
| NEW | ALTA VERAPAZ | CHISEC | YALCHACTI | 230 | | EXPANSION | |
| NEW | ALTA VERAPAZ | CHISEC | YALCHACTI | 230 | | EXPANSION | |
| NEW | HUEHUETENANGO | SANTA CRUZ BARILLAS | MAYALAND | 230 | | EXPANSION | |
| NEW | ESCUINTLA | MASAGUA | PUERTO SAN JOSÉ II | 230 | | EXPANSION | |
| NEW | ESCUINTLA | MASAGUA | PUERTO SAN JOSÉ II | 400 | | EXPANSION | |

15.4. Transmission Lines 230-400 kV

| TYPE | DEPARTMENT | TRANSMISSION LINE | VOLTAGE (kV) | LENGTH (KM) |
|----------|---------------|---|--------------|-------------|
| NEW | ALTA VERAPAZ | SEGUNDO CIRCUITO CHIXOY II - SAN AGUSTIN (3) | 230 | 102 |
| NEW | ALTA VERAPAZ | YALCHACTI - MODESTO MENDEZ (4) | 230 | 129 |
| ADEQUACY | CHIMALTENANGO | LAS CRUCES - SOLOLÁ AND CONNECTION TO SAN JUAN COMALAPA | 230 | 1 |
| ADEQUACY | ESCUINTLA | SANTA ISABEL - ALBORADA AND CONNECTION TO PUERTO SAN JOSE II | 230 | 1 |
| ADEQUACY | ESCUINTLA | SAN JOAQUIN - ARIZONA AND CONNECTION TO PUERTO SAN JOSÉ II | 230 | 1 |
| NEW | ESCUINTLA | DOUBLE CIRCUIT ESCUINTLA I - PUERTO SAN JOSÉ II | 230 | 34 |
| NEW | ESCUINTLA | ESCUINTLA II - PACIFICO (4) | 230 | 4 |
| ADEQUACY | GUATEMALA | DOUBLE CIRCUIT GUATE ESTE - GUATE NORTE AND CONNECTION TO GUATEMALA | 230 | 1 |
| ADEQUACY | GUATEMALA | DOUBLE CIRCUIT GUATE NORTE - TACTIC AND CONNECTION TO GUATEMALA | 230 | 1 |
| NEW | GUATEMALA | DOUBLE CIRCUIT GUATEMALA - LA VEGA II | 230 | 46 |
| ADEQUACY | GUATEMALA | GUATEMALA - TACTIC AND CONNECTION TO SALAMÁ SUR | 230 | 1 |
| NEW | BAJA VERAPAZ | DOUBLE CIRCUIT SAN JUAN COMALAPA - SALAMÁ SUR | 230 | 60 |
| ADEQUACY | CHIQUIMULA | PANALUYA - LA ENTRADA AND CONNECTION TO VADO HONDO (4) | 230 | 1 |

| | | | | |
|----------|----------------|--|-----|-----|
| NEW | IZABAL | MORALES – ATLÁNTICO (4) | 230 | 47 |
| NEW | IZABAL | IZABAL - MODESTO MÉNDEZ (4) | 230 | 60 |
| ADEQUACY | JUTIAPA | LA VEGA II - AHUACHAPAN AND CONNECTION TO MELONAR (4) | 230 | 1 |
| ADEQUACY | JUTIAPA | MOYUTA - AHUACHAPAN AND CONNECTION TO MELONAR (4) | 230 | 1 |
| ADEQUACY | BAJA VERAPAZ | CHIXOY II - SAN AGUSTIN AND CONNECTION TO LA CUMBRE (4) | 230 | 1 |
| ADEQUACY | IZABAL | IZABAL -MORALES AND CONNECTION TO RÍO DULCE II | 230 | 1 |
| NEW | PETÉN | PETÉN ITZÁ – MELCHOR DE MENCOS II (4) | 230 | 103 |
| ADEQUACY | QUETZALTENANGO | LOS BRILLANTES - LA ESPERANZA AND CONNECTION TO SANTA MARÍA II | 230 | 1 |
| NEW | QUETZALTENANGO | MELENDREZ II - COATEPEQUE III (4) | 230 | 21 |
| NEW | QUETZALTENANGO | COATEPEQUE III - LOS BRILLANTES (4) | 230 | 33 |
| NEW | QUICHÉ | SECOND CIRCUIT COVADONGA - USPANTÁN | 230 | 43 |
| ADEQUACY | QUICHÉ | HUEHUETENANGO II - COVADONGA AND CONNECTION TO RÍO BLANCO | 230 | 1 |
| ADEQUACY | QUICHÉ | COVADONGA - USPANTÁN AND CONNECTION TO CHAJUL (4) | 230 | 1 |
| NEW | QUICHÉ | COVADONGA- MAYALAND (4) | 230 | 31 |
| NEW | SAN MARCOS | MELENDREZ II - SAN MARCOS II (4) | 230 | 48 |
| NEW | ALTA VERAPAZ | DOUBLE CIRCUIT TACTIC - YALCHACTI (1) | 230 | 75 |
| NEW | ESCUINTLA | DOUBLE CIRCUIT PUERTO SAN JOSÉ II - EL MELONAR (1) | 230 | 108 |
| NEW | HUEHUETENANGO | MAYALAND - YALCHACTI (4) | 230 | 98 |
| NEW | HUEHUETENANGO | MELENDREZ II - LA MESILLA (4) | 230 | 104 |
| NEW | HUEHUETENANGO | LA MESILLA - MAYALAND (4) | 230 | 127 |
| NEW | JUTIAPA | DOUBLE CIRCUIT MELONAR - VADO HONDO (1) | 230 | 90 |
| NEW | PETÉN | DOUBLE CIRCUIT YALCHACTI - PETÉN ITZÁ (1) | 230 | 107 |
| NEW | ALTA VERAPAZ | DOUBLE CIRCUIT GUATEMALA - TACTIC | 400 | 77 |
| NEW | ESCUINTLA | DOUBLE CIRCUIT PUERTO SAN JOSE II - GUATEMALA | 400 | 82 |
| NEW | PETÉN | DOUBLE CIRCUIT MEXICO - PETÉN ITZÁ | 400 | 110 |
| NEW | QUETZALTENANGO | SEGUNDO CIRCUITO MELENDREZ II – BRILLANTES | 400 | 37 |
| NEW | SAN MARCOS | DOUBLE CIRCUIT MELENDREZ II - PTO SAN JOSE II | 400 | 174 |
| ADEQUACY | SAN MARCOS | TAPACHULA-BRILLANTES AND CONNECTION TO MELÉNDREZ II | 400 | 1 |
| NEW | SAN MARCOS | SECOND CIRCUIT TAPACHULA – MELENDREZ II | 400 | 71 |
| ADEQUACY | HUEHUETENANGO | LA MESILLA - MAYALAND AND CONNECTION TO GRACIAS A DIOS | 230 | 1 |

(1) LINE DESIGNED AND BUILT FOR 400 KV, INITIALLY ENERGIZED AT 230 KV

(2) LINE DESIGNED AND BUILT FOR 230 KV, INITIALLY ENERGIZED AT 69 KV

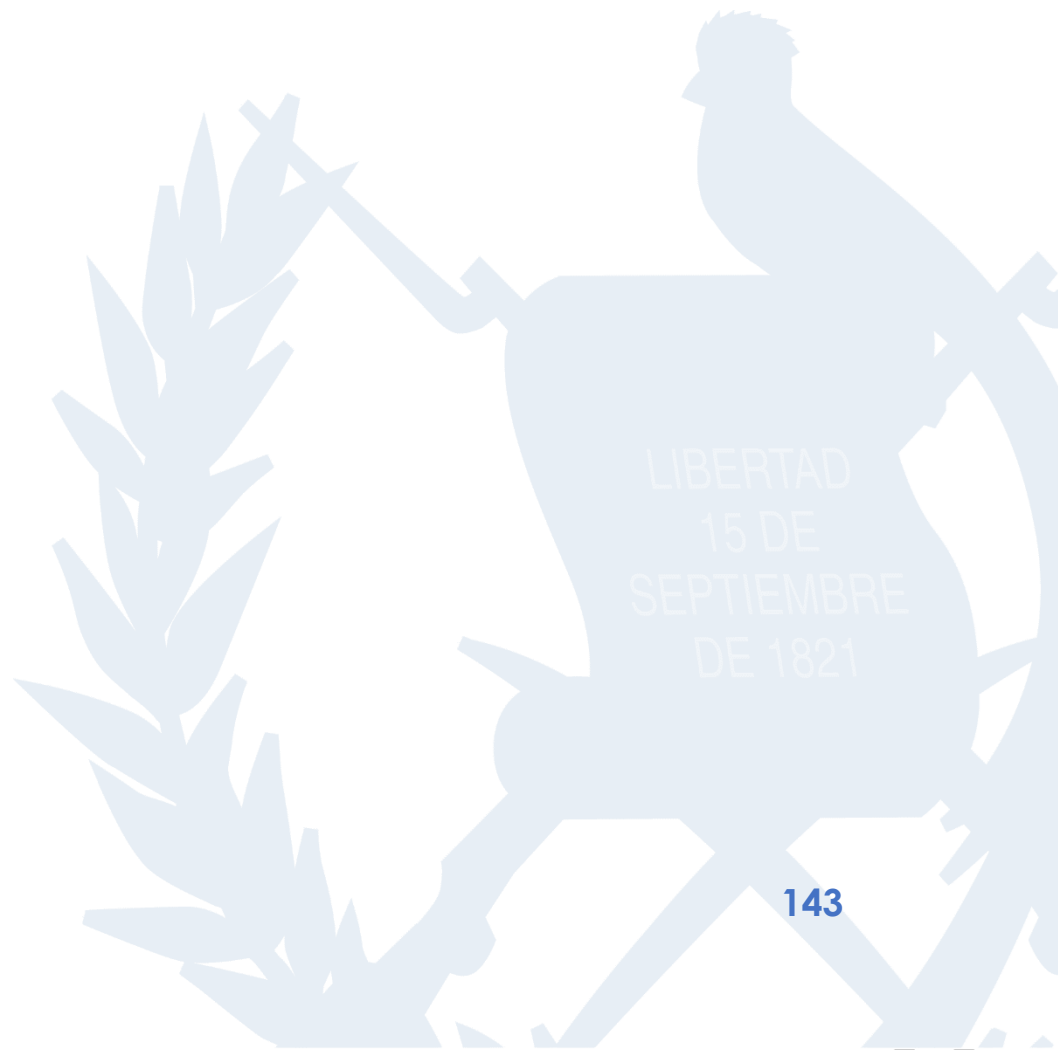
(3) CONDITIONED TO THE CONSTRUCTION BY EPR OF THE SECOND CIRCUIT OF GUATEMALA NORTE - SAN AGUSTÍN

(4) INFRASTRUCTURE DESIGNED AND BUILT FOR DOUBLE CIRCUIT, STARTS OPERATIONS WITH ONE CIRCUIT

16. DESIGN CONSIDERATIONS

- ✓ According to the long-term vision of the PET-2022-2052, only the works to be incorporated into the SNI are presented; the required substation expansions or the adaptation of transmission lines must be considered when addressing the design of the infrastructure.
- ✓ The transportation of 2700 MW up to 3000 MW of power limited by the 400 kV transmission lines of Mexico - Guatemala - Mexico; from the proposed Meléndrez electric substation to the Yalchacti substation and the Petén Itza substation; as well as the export/import of the energy generated in the country.
- ✓ The values of the operational capacity of the works and the expansions defined in the Plan may be modified by means of technical studies, prior to their connection.
- ✓ The secondary voltage level in new substations is a reference voltage; this voltage may be modified to benefit the optimal use of the new infrastructure. The secondary voltage level at new substations or extensions may be changed if the distribution company in the area justifies such a change based on demand growth, current demand or some other factor.
- ✓ For practical purposes, the single-line diagrams presented in this document contain mostly new works or extensions; part of the existing network has been omitted to simplify the graphic presentation.
- ✓ The names defined in this Plan do not constitute the official name of the works; they are referential and may be modified according to the georeferencing of the works or, failing that, if the convenience of the case is demonstrated.
- ✓ Line layouts and substation locations are not definitive, they are referential and may vary depending on the feasibility of construction. Those works resulting from bidding should consider a maximum deviation limit from the reference point; this ensures that the needs identified in the plan are fulfilled.

- ✓ Works requiring reactive power compensation to maintain voltage levels within the ranges established by current regulations must consider a multi-stage reactive power compensation contribution and that the reactors used are line reactors.
- ✓ The location of the proposed electric substation for the 400 kV network must have a maximum radius of 10 kilometers around; for the 230 kV network the maximum radius must be 5 kilometers and for the electric substation in the 69 kV network a maximum radius of 2 kilometers is established.
- ✓ The works proposed in previous expansion plans of the transportation system that have not been tendered, awarded or that have not been requested on their own initiative are not effective.
- ✓ Where relevant to future conditions, consideration should be given to preparing the infrastructure to operate at capacities above energization.



17. CONCLUSIONS

- ✓ The works included in the plan are indispensable and urgent in order to contribute to the fulfillment of the goal of reaching 99.99% of the population with electric coverage.
- ✓ The incorporation of the works included in this plan will provide the necessary conditions for the development of the Plan for the Economic Recovery of Guatemala and the strengthening of the national power grid.
- ✓ The Expansion Plan of the Transportation System contains the reinforcements in the electric power transmission infrastructure necessary to guarantee the future supply of electric power, access of new users to the electric power grid, improvement of service quality in rural areas and reliability of supply.
- ✓ The PET-2022-2052, promotes investments in the electric sector, fostering the necessary conditions for the development of health, tourism, education, security, and quality of life in compliance with the Energy Policy and the Government General Policy 2020-2024.
- ✓ The reinforcements contained in the PET-2022-2052 reduce energy losses in the transmission and distribution network, indirectly contributing to the release of greenhouse gases associated with the country's electricity production chain.
- ✓ Through the execution of the PET-2022-2052, Guatemala aims to consolidate its position as a dynamic and strategic participant in the commercial exchange of electricity by taking advantage of bilateral and regional interconnections.
- ✓ The proposed reinforcements provide the conditions required to exploit the existing generation potential in Guatemala, providing the necessary means to encourage investment in the country's electricity production chain, bringing the delivery points of electricity generation closer to the points of consumption.
- ✓ Las The works resulting from the Expansion Plan of the Transportation System 2020-2050, must incorporate or modify the Supplementary

Control Schemes that are necessary and are instructed in the connection resolution issued by the National Commission of Electric Energy, as part of the approval of the electrical studies in accordance with the Technical Standards for Access and Use of Transportation Capacity (NTAUCT for its acronym in Spanish).

The works specifically proposed to promote bilateral investments through interconnections are as follows:

| SUBSTATION | VOLTAGE (KV) | DEPARTMENT | PAÍS FRONTERIZO |
|-------------------|--------------|---------------|-----------------|
| PETEN ITZA | 400 | PETEN | MEXICO |
| ATLÁNTICO | 230 | IZABAL | HONDURAS |
| MELCHOR DE MENCOS | 230 | PETÉN | BELICE |
| MORALES | 230 | IZABAL | HONDURAS |
| LA MESILLA | 230 | HUEHUETENANGO | MÉXICO |
| MELONAR | 230 | JUTIAPA | EL SALVADOR |
| VADO HONDO | 230 | CHIQUIMULA | HONDURAS |
| ESQUIPULAS | 138 | CHIQUIMULA | HONDURAS |
| LAS CUMBRES | 138 | JUTIAPA | EL SALVADOR |
| PEDRO DE ALVARADO | 138 | JUTIAPA | EL SALVADOR |
| EL FLORIDO | 69 | CHIQUIMULA | HONDURAS |
| SAN CRISTOBAL | 69 | JUTIAPA | EL SALVADOR |
| GRACIAS A DIOS | 69 | HUEHUETENANGO | MÉXICO |
| EL CEIBO | 69 | PETÉN | MÉXICO |



LIBERTAD
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DE 1821

18. RECOMMENDATIONS

- Promote that Carrier Agents maintain their facilities under optimal conditions, as well as that they have their own expansion plan considering the most probable scenarios of occurrence.
- Promote the adequacy of the distribution network for the optimal use of the new reinforcements considered. Distribution agents can work with the Ministry to plan such growth.
- To promote the transmission works in the 69 kV network proposed in this Plan with the purpose of increasing electricity coverage, the construction of new investments in medium voltage must be guaranteed, so that the distribution systems are prepared to effectively meet the connection of new users and the natural growth in demand, at the same rate at which the investments in transmission are made.
- That transportation agents, in accordance with operational needs, include in their planning the pertinent actions to guarantee the quality of service as stipulated in current regulations.
- To provide a close connection point, with reliability, selectivity and security to new investments in the generation park.
- To transfer the voltage level of the country's transmission network to a robust 400 kV infrastructure, which reduces losses and efficiently transfers power to Mexico, Belize and Central America, establishing Guatemala as an important link in the Regional Electricity Sector.
- To initiate the procedure established in the Regulations of the General Law on Electricity, in such a way that the National Commission of Electric Energy perform the corresponding evaluations to determine the works to be tendered considering the urgency and necessity to promote the development of the Plan for the Economic Recovery and the access to electric energy of 99.99% of the population.

