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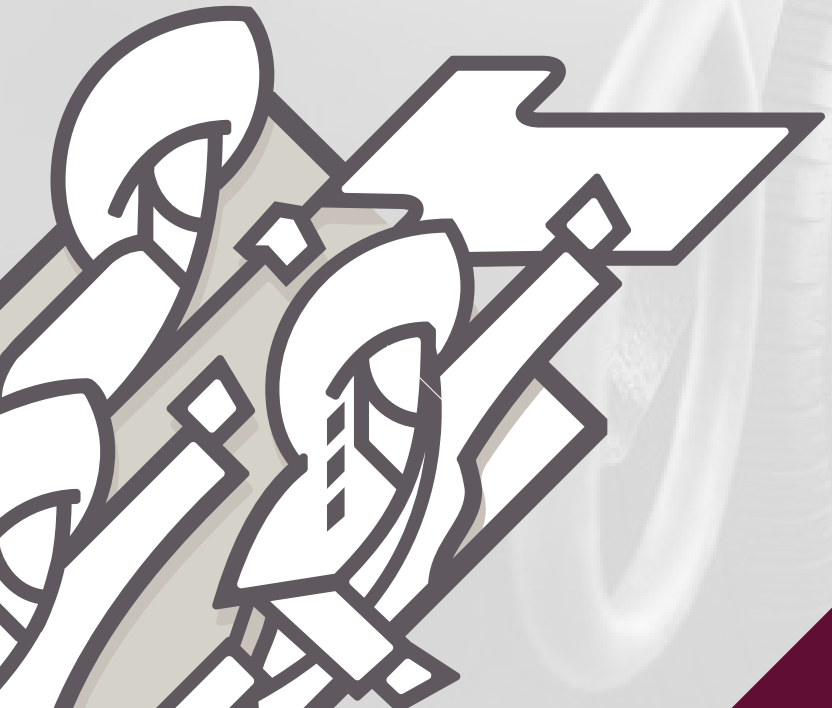
PLAN FOR THE DEPLOYMENT OF ELECTRIC VEHICLE CHARGERS IN THE STATE OF PUEBLA

June 2022



Agencia de Energía del Estado de Puebla

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The participation and review of the departments of the State Public Administration is also recognized.

Finally, to recognize the private sector companies that have joined the strengthening of this Plan, which have contributed great value to the development of the project, which are not indicated due to confidentiality.

AEEP/SE
Plan for the Deployment of Electric Vehicle Chargers in the State of Puebla,
Puebla de Zaragoza, Abril de 2022

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ABSTRACT

The government of the State of Puebla, through the Ministry of Economy and the Energy Agency of the State of Puebla, have outlined the mission of positioning the State as an "Electromobility hub" in order to detonate investments in the matter, strengthen and promote local productive chains in electromobility, encourage entrepreneurship and innovation in the sector, and finally develop the charging infrastructure for electric vehicles. Accordingly, this Plan is intended to be a guide for the orderly, studied and planned installation of electric vehicle chargers (electrolineras) throughout the state.

In particular, the importance of electromobility as an alternative to decarbonise the transport sector is understood. Likewise, the importance of the automotive sector in everyday life is understood, as well as in the economy of the country and mainly of our state. In this sense, an exhaustive review of the hybrid and electric vehicle models marketed in Mexico in recent years was carried out, in order to explore the growth in demand, as well as the existing options in the market in order to understand their possible penetration.

On the other hand, the types of electric vehicle chargers were examined, as well as the different connectors most used in the international market, with the intention of making a strategic selection of the characteristics that the chargers to be used in this PLAN should have.

Likewise, the data of the electric vehicle charging station currently installed in the state, security considerations such as proximity to public security bodies, the volume of traffic that circulate on the main roads, the potential places for the installation of electric vehicles were analyzed. Finally, the similar background to this plan and indicators for the proposed installation of electric vehicle charging station in the State were reviewed.

This document was made with a methodology of two approaches: 1) installation of fast charging chargers on the main routes of the state, and 2) installation of chargers in the conurbated areas of the state, so it was determined that the following are required:

I. 10 fast charging chargers distributed in 6 main routes of the state.
II. 89 electric vehicle chargers in 82 municipalities of the state.

In this vein of ideas, this plan aims to install **43 chargers** in different regions of the State by the end of 2022, within which **2 fast charging chargers will be installed by the companies** Link in the metropolitan area of Puebla, and Tesla in the municipality of Tehuacán. It is necessary to emphasize that, for the correct implementation of this PLAN, we will work together with the private initiative and municipalities of the state of Puebla, which will contribute to the satisfaction of the goals embodied.

1. INTRODUCTION

1 INTRODUCTION

In Mexico and the world, the transport sector is one of the largest generators of greenhouse gas (GHG) emissions and with the highest energy consumption. Internal combustion engines (ICE), which mostly use gasoline or diesel, emit various gases into the environment that alter the natural composition and deteriorate the quality of the air in the environment, affecting the health of the human being. The main harmful elements found in the exhaust gases of motor vehicles are carbon dioxide (CO2), carbon monoxide (CO), sulfur dioxide (SO2), nitrogen oxides (NOX), hydrocarbons (HC) and particulate matter (PM).

Approximately 77% of the national population lives in urban localities, a situation that has generated various problems, such as: traffic congestion, increase in air pollution and better energy security due to the intensive use of energy, which intensify the effects of global warming. This situation makes it necessary to make people aware of the consequences and effects of the use of motor vehicles, and the energy and environmental impact they have caused in recent decades.

The National Development Plan (2019 – 2024) promotes actions for the regional development of the country through the implementation of strategic projects of the government of Mexico and the governments of Mexico towards sustainable urban mobility schemes. Additionally, the National Electric System Development Program (PRODESEN 2019) emphasizes its National Electromobility Strategy as a national effort and the first federal initiative, with the purpose of facing in a coordinated and sustainable manner the environmental challenges associated with the transport (departments) sector and electric mobility.

At the national level, the United Nations Framework Convention on Climate Change (UNFCCC) of the United Nations (UN) stands out, which, through the World Health Organization (WHO), has established guidelines to regulate the emission of greenhouse gases in vehicles with an internal combustion engine. As a result, Mexico at the 2015 meeting of the Conference of the Parties (COP), held in Paris, made a commitment to reduce its GHG emissions from the transport sector by 22% by 2030.

Many government organizations have promoted regulations regarding the maximum allowable limits of emissions. This has led to the development of different technologies, which include engines that use biofuels as an energy source and electric motors as the main or secondary source in the propulsion of vehicles.

One to mitigate the main source of emissions in the country, electromobility has proven to be an alternative to motorized transport, which is socially, economically and environmentally viable; which in turn aims to improve the quality of life of people. Therefore, various federal agencies and agencies have come together with the purpose of working to promote electromobility, such as: the Ministry of Environment and Natural Resources (SEMARNAT), the Secretariat of Clean Energies (INEEL), International Copper Association Mexico, the Mexican Association of Industry (AMIA), and the National Chamber of Electrical Manufacturing (CANAME) worked together for the development of the Strategic Plan 2019 – 2022 Alliance for the electromobility in Mexico, which aims to solve the challenge of mobility with bold and coordinated actions by the public and private sectors (Ibarra González., Sergio Luis; Internatinoal Copper Association Mexico 2019).

The decrease in exhaust gas emissions that could be generated with the potentiation of **electromobility** could be substantive, this derived from the fact that **motor transport was the most representative component in 2020 with 90.45%** of participation within the means of transport used, as reported in the National Energy Balance of 2020, of the Ministry of Energy (Ministry of Energy, 2021), the transport sector consumes about 38.87% of energy nationwide and contributes 26% of CO2 emissions. 65% of this energy comes from gasoline, 26% from diesel, while the remaining 9% is concentrated in kerosene, liquefied gas, electric power, fuel oil and dry gas.

1.1 Legal Basis (Legal Foundations)

Considering the articles 1, 2, 3 fraction II, IV, IX, X, XI, XII y XX, 7 fractions I, IV, V, VI y VII, 32 fractions II, VI and VIII, article 37, article 40 section I of the Decree of the Honorable Congress of the State, by which it creates the Energy Agency of the State of Puebla; as well as articles 3, 4, 6, 7 fractions I, III, IV, V, VII, VIII and XI, 13 fractions I, II, IV, V, V, XXXIII, XXXIV, and XLI, article 18 fractions II, III, IV, V, VI, XI, article 21 fraction VIII, and taking into account the strategic alignment to the National Development Plan 2019 – 2024, in its axis Well-being, Objective 3.5, strategy 3.5.8; State Development Plan of the State of Puebla 2019 – 2024 in its axis 3 Economic Development for All in its Transversal Infrastructure Strategy, Lines of action 2, 3 and 4; Transversal Strategy Environmental Care and Attention to Climate Change, Lines of action 2, 3, 4 and 5, as well as in Axis 4 Reduction of Inequalities in the Transversal Infrastructure Strategy, Lines of Action 1, 2; Transfersal Strategy Care of the Environment and attention to Climate Change in its Line of Action 4, 5; as well as in the Transversal Approaches in their lines of action 4, 5 and 7; as well as in the Special Program for Sustainable Energy Development in its Theme 2 "Competitiveness and Energy Security" Objective 1, Strategy 2, Line of Action 2; Theme 3 "Energy Sustainability" Objective 1, Strategy 2, in its line of action 1; Objective 2, Strategy 1 in its Action Line 3; Institutional Program for the Promotion of Sustainable Energy Development in its Theme 1 "Competitiveness and Energy Security" Objective 1, Strategy 2, Line of action 2, finally the alignment with the Sustainable Development Goals of the 2030 Agenda 7, 8, 9, 11, 12 and 13 and with the purpose of promoting and promoting Sustainable Energy Development, as well as strengthening the link with representatives of the private sector, interested in participating in the State of Puebla to develop sustainable and strategic energy projects.

1.2 Objetives

1.2.1 General Objective

Determine the number, routes and strategic locations for the installation of new charging centers for electric vehicles that can supply the electric vehicle charging service in order to boost electric mobility in the state of Puebla.

1.2.2 Specific Objectives

I. By 2022, increase the number of electric vehicle chargers in the state of Puebla by up to 50%.

II. Install 2 fast charging chargers within the State of Puebla

III. Determine the strategic location and technical specifications of charging centers for electric vehicles on major highways in the state.

IV. Determine the strategic location and technical specifications of charging centers for electric vehicles in the main conurbated areas of the state.

V. Identify the different actors and institutions involved in the development of electric vehicle charging infrastructure.

VI. Accelerate the adoption of electromobility in the state, with a coverage approach throughout the territory of Puebla.

VII. Contribute to the fulfillment of the goals proposed by Mexico for the reduction of Greenhouse Gas emissions.

VIII. Carry out the installation of electric chargers in 82 municipalities of the state of Puebla.

2. BACKGROUND

2 BACKGROUND

2.1 Electric Vehicles

Electric mobility or electromobility, in different academic definitions can be conceived as the concept of using electric propulsion technologies, accompanied by information in motorized means of transport and applying communication technologies and connected infrastructures to enable the electric propulsion of vehicles and fleets. Powertrain technologies include full electric vehicles and hybrid plug-ins to electric current, as well as hydrogen fuel cell vehicles that convert hydrogen into electricity.

The common definition is call an electric vehicle that uses electricity as a source of energy to be driven, either partially or totally. Applications of this type have been promoted by the need to reduce the emissions of polluting gases from vehicles to the environment, whose development has been given in a pure or combined way. Its name has been established according to the use of technologies based on electricity, being defined, in general, in three categories (Sánchez, Luis Gerardo; Fabela, Manuel de Jesús; Cruz, Mauricio Eliseo; Flores, Oscar; Mexican Institute of Transportation, 2021). These categories correspond to the hybrid electric vehicle (HEV), the Plug-in Hybrid Electric Vehicle (PHEV) and the "pure" electric vehicle (EV).

2.1.1 Hybrid Electric Vehicle

Hybrid Electric Vehicles (HEVs) combine the use of an internal combustion engine, and an electric motor which uses the energy stored in a battery and does not need to be connected to an outlet to recharge. That is, the battery can be charged through regenerative braking and the internal combustion engine, capturing the energy that is normally lost when braking, using the electric motor as a generator and storing that energy in the battery. This battery also contributes to the power of auxiliary systems, in addition to providing the vehicle with the ability to turn off the internal combustion engine when the vehicle is stopped and turn it on when required.

2.1.2 Plug-in Hybrid Electric Vehicle

Plug-in hybrid vehicles (PHEVs) combine the use of an electric motor with that of an internal combustion engine, but unlike HEVs, PHEVs use higher capacity batteries prepared to connect to the electrical network to charge them, although they can also be charged through the internal combustion engine and regenerative braking. By having larger capacity batteries, the vehicle's travel autonomy is increased, particularly in urban areas since it

works mainly with stored electricity. It should be noted that, the internal combustion engine can drive the vehicle when the battery is fully discharged, during rapid acceleration or when reaching a high speed. When PHEVs run on the battery alone, they do not emit exhaust gases and, although the internal combustion engine is in operation, fuel consumption is better since they generally emit fewer exhaust gases than similar conventional vehicles.

2.1.3 Electric Vehicles

Electric vehicles (EVs) use batteries to store electrical energy used by one or more motors, so, they must be charged connecting the vehicle to the power grid, also taking advantage of the charge through regenerative braking. Due to the absence of an internal combustion engine, these vehicles do not emit exhaust gases, although they are inferred emissions that are calculated during the so-called "life cycle" by electricity production systems.
One of the modalities that also is present in electric vehicles, is the hydrogen fuel cell electric vehicle (FCEV). In this engine, the vehicle is driven by an electric motor that obtains electricity due to a battery that combines hydrogen with oxygen in the air. Taking the hydrogen gas into electricity, only water and heat are produced at the outside, so, this vehicles do not emit polluting gases when are circulating (IMT, 2021). However, the production of hydrogen can generate polluting gases, although in less quantity than those generated by fossil fuel vehicles. An advantage of this type of vehicle is that it can be recharged in a hydrogen station, with charging times similar to those of gasoline or diesel.

2.2 Fleet Vehicle in Mexico and the State of Puebla

An important phenomenon in Mexico has had is its population growth, having a total of 126,014,024 inhabitants until 2020, which increased industrial activity an d the vehicle fleet. The latter reached 50,347,569 vehicle units registered in circulation until the same year, as reported by the National Institute of Statistics and Geography (INEGI), distributed as shown in Figure 1.

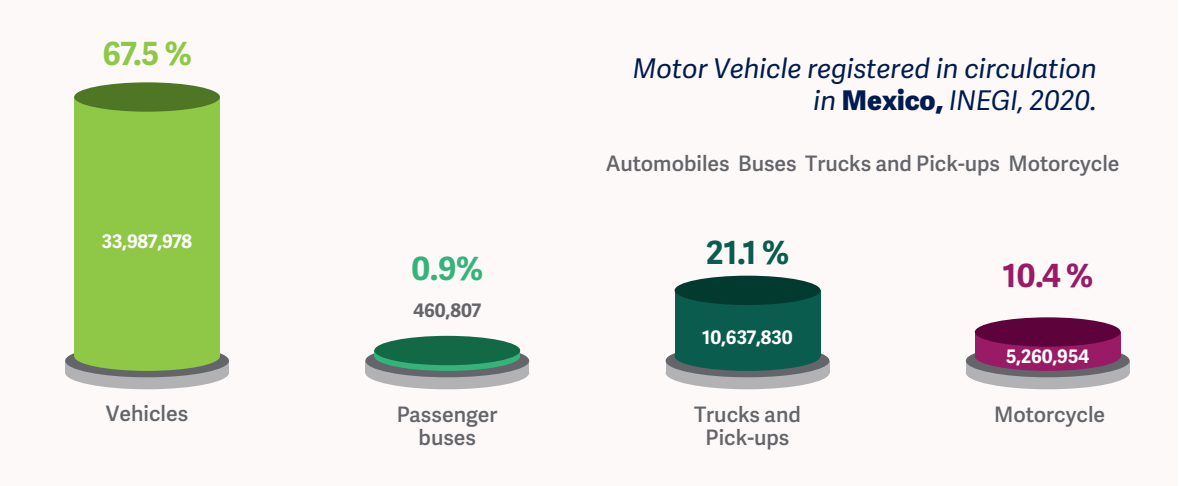


Figure 1.- Fleet Vehicle in Mexico
Source: Own creation with INEGI Information

According to the same source, Puebla was placed among the fifteen entities with the most motor vehicles registered in circulation, also ranking among the localities where the fleet of motorcycles and private cars grew the most. For example, in 2019 the total registration of motorized units was 1,123,451, while for the year 2020 it increased to 1,164,392 units, a figure that represented 3.5% more vehicles in circulation and 2% of the total vehicle fleet of the country. The distribution of the vehicle fleet in Puebla can be seen in Figure 2.

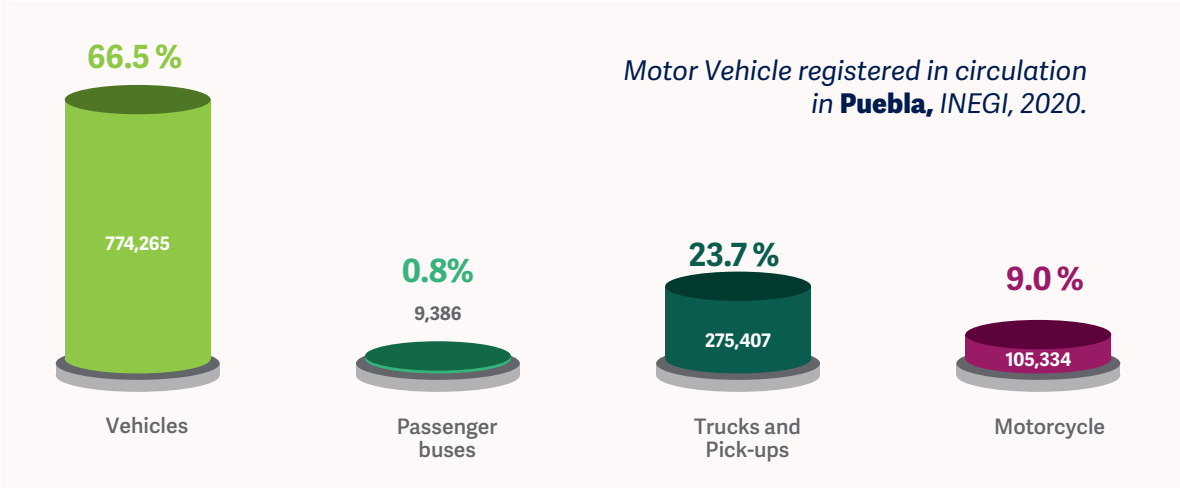


Figure 2.- Fleet Vehicle in Puebla.
Source: Own creation with INEGI Information

It should be noted that the vehicle fleet in the state has reflected a downward trend in the last twelve years, since in 2009 the total figure was 1,138,679, while in 2018 it reached the highest peak by registering 1,553,518 automobiles.

The increase in vehicles in circulation, although it contributes to the economic growth of the country, has also produced greater pollution to the environment, mainly to water, soil and the atmosphere, constituting a serious problem of health risk and environmental damage that society currently faces.

In this context, one of the most important indicators to measure the environmental damage reported by INEGI is air quality and energy consumption, which is a problem that has not currently been solved, due to the rapid increase in the internal combustion vehicle fleet, industrial activity and the provision of services they demand, overall, large amounts of energy from fossil fuels, consequently generating a significant volume of greenhouse gas emissions and pollutants.

As we know, the "light" vehicle sector in Mexico largely employs internal combustion engines and, although the sale of hybrid and electric vehicles has increased since 2016, it is still a small fraction of the total vehicles sold in the country, as shown in Chart 1.

Chart 1. Classification of Hybrid Vehicles most sold in Mexico from 2016 to 2021.

Year	Hybrid and Electric Vehicles				Total, Sold Vehicles	Hybrid and Electric Vehicles %
	HEV	PHEV	EV	Total		
2016	7,490	521	254	8,265	1,607,165	0.51
2017	9,349	968	237	10,554	1,534,943	0.69
2018	16,022	1,584	201	17,807	1,427,086	1.25
2019	23,938	1,365	305	25,608	1,317,931	1.94
2020	21,970	1,986	449	24,405	950,063	2.57
2021	39,118	3,013	838	42,969	1,014,735	4.23

**1. HEV: Hybrid Electric Vehicle, 2. PHEV: Plug-in Hybrid Electric Vehicle, 3. EV: Electric Vehicle. Source: INEGI (2020)*

As can be observe in the Figure 3, since 2016 there has been a growing trend towards electric mobility, emphasizing the last year 2021 in which a total of 42,969 hybrid and electric vehicles were sold. According to statistics from INEGI, in 2021, 56% of electric technology vehicles were marketed in four states: Mexico City, State of Mexico, Jalisco and Nuevo León.

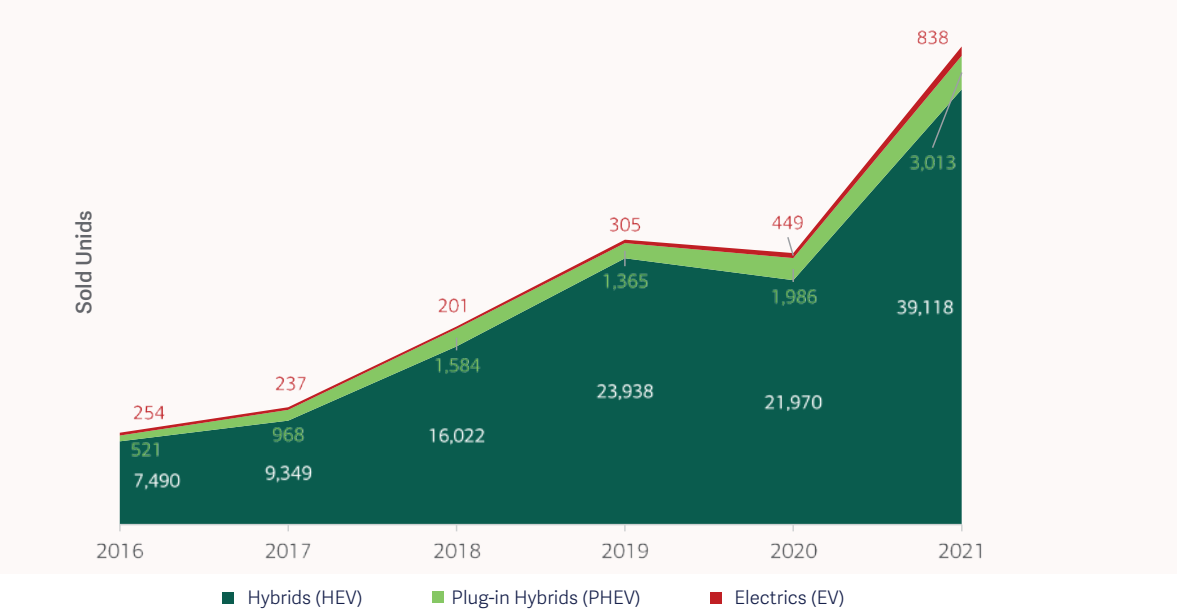


Figure 3. Hybrid sold vehicles in Mexico, from 2016 to 2021.
Source: Own creation with INEGI Information

In addition, the information shows that from 2016 to 2021, the hybrid-electric proportion of the total number of cars sold increased significantly, having shares of 0.51% and 4.23% in the years 2016 and 2021, respectively.

This fact is an indicator that shows that the demand for charging centers for hybrid and electric vehicles has increased. Therefore, one of the guidelines for the promotion of this technology is the preference of the consumer, since in large part there is no sufficiently widespread infrastructure to opt for an electric vehicle. In this sense, hybrid vehicles offer the advantage of having a greater autonomy, compared to electric vehicles, by being able to use fossil fuels.

On the other hand, with regard to hybrid vehicles sold in the state of Puebla, according to data provided by INEGI, in 2021 the highest sales in 6 years were obtained, as shown in Chart 2. Likewise, it was obtained that these sales of mobile units in the state represented 3.93% of the total sales of hybrid and electric cars sold in Mexico.

Chart 2. Classification of Hybrid Vehicles most sold in Mexico from 2016 to 2021.

Year	Hybrid and Electric Vehicles				Total, Sold Vehicles	Hybrid and Electric Vehicles %
	HEV	PHEV	EV	Total		
2016	276	21	3	300	8,265	3.63
2017	228	32	5	265	10,554	2.51
2018	432	42	6	480	17,807	2.70
2019	692	53	9	754	25,608	2.94
2020	713	47	18	778	24,405	3.19
2021	1,578	88	24	1,690	42,969	3.93

**1. HEV: Hybrid Electric Vehicle, 2. PHEV: Plug-in Hybrid Electric Vehicle, 3. EV: Electric Vehicle. Source: INEGI (2020)*

Meanwhile, the annual period 2017 is when the largest drop in vehicle sales in this area was presented, with a total of units for sale of only 265 transport units.

Figure 4 shows the sales of hybrid, plug-in hybrid and electric vehicles in the state of Puebla. It is worth mentioning that the sales scale of the graph is logarithmic, so resembling straight lines would indicate that the growth in the period has been exponential, and in the sales of these units have been increased year after year. For example, in the year 2021 the highest sales of hybrid vehicles (1,578 units), plug-in hybrids (88 units) were recorded. In this sense, despite the fact that there are few vehicle sales, the current trend is exponential.

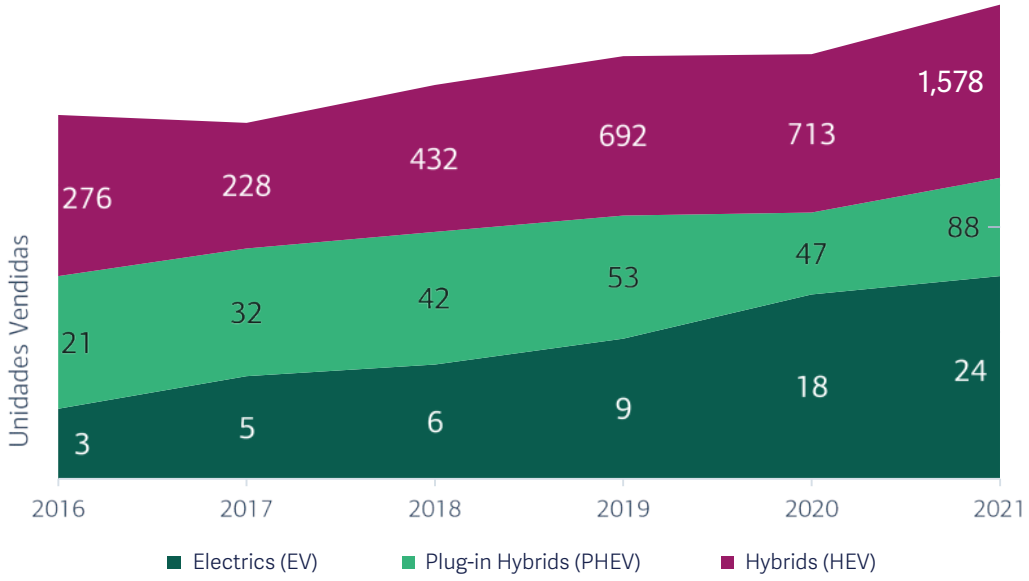


Figure 4. Hybrid sold vehicles in Puebla, from 2016 to 2021 (Logarithmic graph)
Source: Own creation with INEGI Information

Chart 3 and Figure 5 show the percentage increases over the previous year for electric, plug-in hybrid and hybrid vehicles. It highlights that the mobile units of **electric** type are those that have the **highest average percentage growth (54%)** in the period from 2017 to 2021, with a value of 54%. Likewise, in 2021 hybrid vehicles had the largest annual increase, growing their sales by 121% compared to the previous year.

Chart 3. vehicle percentage growth calculation EV, PHEV and HEV.

Year	Growth percentage (EV)	Growth percentage (PHEV)	Growth percentage (HEV)
2017	67%	52%	-17%
2018	20%	31%	89%
2019	50%	26%	60%
2020	100%	-11%	3%
2021	33%	87%	121%
Average growth	**54%**	**37%**	**51%**

Source: Own elaboration with INEGI information

Similarly, it emphasizes in the exponential growth presented by plug-in hybrid cars in 2021, going from a growth of 3% in 2020 to a growth of 121% in 1 year.

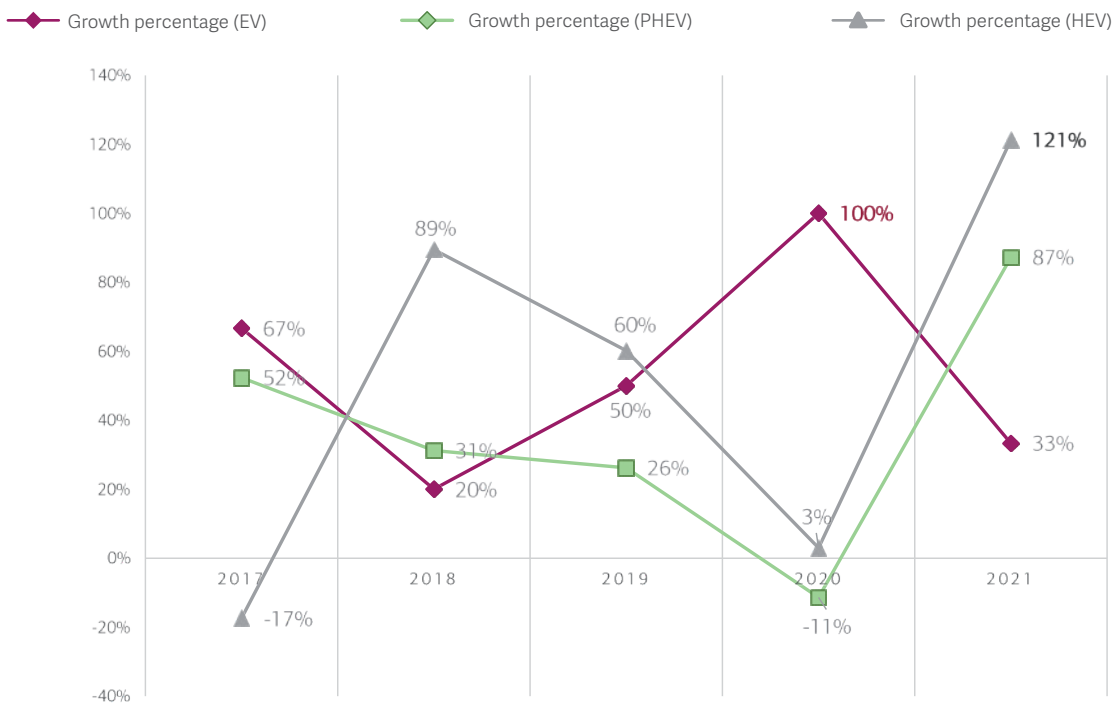


Figure 5. Vehicle percentage growth calculation EV, PHEV and HEV.
Source: Own elaboration with INEGI information

2.3 Vehicle Commercialized in Mexico

According to a report by the Mexican Association of the Automotive Industry (AMIA), in Mexico the sale of hybrid and electric vehicles has increased, being significant as of 2016, (Secretariat of Communications and Transportation, Mexican Institute of Transport, 2020). Some models and brands of hybrid and electric vehicles, representative and available in the country, are shown in Chart 4.

Chart 4. Electric and Hybrid Vehicles Models Commercialized in Mexico

No.	Brand	Model	Autonomy[1] (KM)	Battery
1	Nissan	Leaf 24 kW Eléctrico 17 152 hp	241	40kWh ion-litio
2		Leaf 24 kW Eléctrico 17 220 hp	241	40kWh ion-litio
3		X-Trail Hybrid Híbrido	984	202V ion-litio
4	Tesla	Model X Eléctrico	560	16.8 kWh 350 V ion-litio
5		Model Y Eléctrico	451	75 kWh 350 V ion-litio
6		Model 3 Eléctrico	573	50-75 kWh 360 V ion-litio
7		Model S Eléctrico	652	60 kWh ion-litio
8	Toyota	Prius Híbrido	45	Ion-litio
9		Prius C Híbrido	50	Ion-litio
10		RAV4 Híbrido	75	Ion-litio
11		Camry Híbrido	1,300	1 kWh 259 V ion-litio
12	Mercedes	Benz GLE 500e Híbrido	900	Ion-litio
13		Benz GLC 350e Híbrido	99	Ion-litio
14	Zacua	MX2 Eléctrico	160	18 kWh Ion-litio
15		MX3 Eléctrico	160	18 kWh Ion-litio
16	BMW	i3 Eléctrico	260	42.2 kWh 353 V ion-litio
17		i3s Eléctrico	380	42.2 kWh 353 V ion-litio
18		530e enchufable Híbrido	50	12 kWh ion-litio
19	Chevrolet	Bolt EV Eléctrico Volt enchufable Híbrido	397	65 kWh 120 V ion-litio
20	Renault	Twizy Eléctrico	100	6.1 kWh ion-litio
21	KIA	Niro Híbrido	1210	1.6 kWh 240 V Litio Polímero
22	Jaguar	I-PACE Eléctrico	470	90 kWh 388 V ion-litio
23	Ford	Fusion Hybrid Híbrido	1,300	Ni-Me
24	Honda	Insight Hybrid Híbrido	1,206	1.2 kWh ion-litio

Source: Secretaría de Comunicaciones y Transporte.

It is important to mention the range of kilometers of autonomy of hybrid and electric vehicles marketed in Mexico, having values of 45 to 1,300 and from 241 to 652, respectively. Derived from this, as an indicator **for the establishment of distance between electric vehicle charging centers on the routes of the state,** the lower limit of autonomy in electric vehicles marketed in the country will be taken into account.

[1] The autonomy of the models 8,9,10 (Toyota), 14 and 15 (Zacua), 18 (BMX), 20 (Renault) and 22 (Jaguar) corresponds specifically to the battery.

2.4 Electric Vehicle Charging Centers

Electric vehicle charging centers are charging stations for electric and plug-in hybrid cars. They can be installed in homes, public spaces or businesses and are powered by the mains, so they are safe and can be used at all times. These vary in the magnitude of voltage and current, which influences the recharge time of electric vehicles (CFE, 2022).

Currently there are projects by the CFE, as well as by the hand of Nissan and BMW, which carried out the deployment of infrastructure for electric and plug-in hybrid cars, in coordination with the Ministry of Energy and the Technical Committee of the Fund for the Energy Transition and the Sustainable Use of Energy (FOTEASE) elaborated the Program for the Promotion of Electromobility through Investment in Charging Infrastructure (PEII).

2.4.1 Electric Chargers (Clasification)

Charging stations are classified at three different levels (SCT, 2020), according to the power supply capacities and their charging characteristics, as detailed in Chart 5.

Chart 5. Electric Vehicles Capacity Charge Levels

	Current (A)	Voltage (V)	Power (kW)	Recharge time (km/h[2])	Primary Use
CA Level1	12 - 16	120	1.3 - 1-9	3 - 8	Residential areas, work station
CA Level 2	< 80	208 - 240	< 19.2	16 - 32	Residential areas, work station, public spaces
CC fast charge	< 200	208 - 600	50-150	288 - 384	Public Spaces

**AC: Alternate Current, DC Direct (Continous) Current. Source: Secretaría de Comunicaciones y Transporte*

[2] *Autonomy kilometers by recharging hour*

An established infrastructure of electric vehicle charging centers is essential to ensure proper operation and functioning within the framework of electric mobility. The automotive industry in Mexico has seen the potential and advantages of electric mobility and has played an active role in infrastructure investment.

2.4.2 Recharge Plugs for Electric Vehicle

All electric vehicles have a built-in charger whose mission is to convert the alternating current of the electrical network into direct current (AC / DC) to be stored in the batteries.

The recharging process entails significant temperature increases in the components involved, causing the risk of overheating when current intensities and charging times are high. For this reason, the power that rectifiers can handle is limited.

Therefore, it is recommended that a charging station supply direct current directly to the batteries, performing the AC/DC transformation outside the vehicle. For this type of recharge, the connectors models are CHAdeMO, CCS Combo and SAE J1772 Combo (SCT, 2020).

There is a wide range of connectors on the market for plug-in, hybrid and electric vehicles as each manufacturer designs its own connector. Different connectors have been found depending on the geographical region where hybrid and electric vehicles are marketed. These come mainly from German, American, Japanese, Italian or French manufacturers. Currently, the International Electrotechnical Commission (IEC) is responsible for standardization at the international level. While, the Society of Automotive Engineers standardizes the connectors used in the United States of America. Table 6 shows the types of connectors identified worldwide.

[3]*Is the mean component that convert the energy AC to DC*

Chart 6. Recharge Plugs Clasification

	Models		Features
1	SAE J1772		- Plug 1 - Maximun Power: 19.2 - 5 pins (2 for AC recharge, 3 for signal transmition) - Vehicles: Nissan LEaf, Chevrolet Bolt Electryc Tipe, Chevrolet Volt Hybrid, Fisher Karma, Coda Automotive Sedan, Toyota Prius Plug-in Hybrid, Mitsubishi i MiEV, Honda Fit EV, Ford Focus Electric, Smart Electric Drive, Tesla Roadster, Tesla Model S, Renault Kangoo Z. E., Renault Fluence Z. E., BMW ActiveE. - This Plugs are design for single phase systems (120V or 240V), like american and japanesse.
2	Plug VDE-AR-E 2623-2-2		- Plug 2 (Type Fast Semi) - Maximun Power: 43.5 kW - 7 pins (4 for triphasic systems and 3 for signal transmition) - Estándar IEC 62196-2 - Vehicle: Audi Sportback e-tron, BMW i3, Porsche Panamera Hybrid , Renault ZOE, Tesla Model S, VW e-Up!, VW e-Golf - Plug development by Mennekes (Germany), RWE and Daimler.
3	Plug SCAME		- Plug 3 - Maximun Power: 22 kW - 7 pins (4 for triphasic recharge and 3 for signal transmition) - IEC 62196-2 - Vehicle: Small Electric Vehicles - Made in 2010 by EV Plug Alliance, used in Formula E
4	Combined Charging System (CSS)		- Plug 4 (Fast Charging) - Maximun Power: 100kW - 5 pines (2 for recharge in DC, 3 for signal transmition) - Vehicle: BMW i3, VW e-Up! And VW e-Golf - Plug based on Plug 2, as a solution for AC recharge. - Made on Germany in 2011, by Audi, BMW, Daimler, Ford, General Motors, Porsche and VW
5	Charge de Move (CHAdeMO)		- Plug 4 (Fast Charge) - Maximum Power: 900kW - 10 pins (2 for DC recharge, 7 for signal transmition, 1 assignation pin) - Standard: GB/T (China), IEC 62196-3 Type 4 - Vehicle: Nissan Leaf, Mercedes Class B-EV, Mitsubishi i-MiEV, Peugeot Ion, Citröen C-Zero, Fiat 500e, Subaru Plug-in Stella and Micro-vet Fiorino. - Plug with the densest network of charging stations, due to Nissan's aggressive strategy of giving the greatest coverage to its customers.

Source: Secretaría de Comunicaciones y Transporte (SCT).

2.4.3 Electric Vehicle Carge System in Mexico and Puebla

As mentioned before, CFE has promoted the deployment of infrastructure for electric and plug-in hybrid cars, through the Program for the Promotion of Electromobility through Investment in Charging Infrastructure (PEII).

The program contemplated in its creation the installation of 100 charging centers for electric vehicles in public access sites in the metropolitan areas of Mexico City, Monterrey and Guadalajara with a perspective of free recharging and compatible with all electric vehicles that were located in the national market. Therefore, according to information from SEMARNAT, in June 2018, **there were 1,528 charging centers installed for public electric vehicles,** of which the majority are in Mexico City (21%); Nuevo León (11%) and Jalisco (9%).

In this sense, according to information from Plug Share[4] , as of March 2022, Puebla has 45 charging stations that house 87 electric chargers in total. Which are distributed as follows; in the central and northern part of the state there are 43 charging stations (see Figure 6), while in the southern zone only 2 of them (see Figure 7). For more information regarding the directions, coordinates and power of electric vehicle charging center, see Annex 1. Specifications of electric vehicle charger stations in the State of Puebla in this document. The municipality that has the largest number of electric vehicle chargers is the municipality of Puebla with a total of 20 chargers, while the municipality of San Andrés Cholula has 13 chargers, making a total of 68 within the metropolitan area.

[4] This platform concentrates more than 533,000 electric vehicle charging stations from the main networks such as Tesla, Supercharger, Endesa, among others around the world.

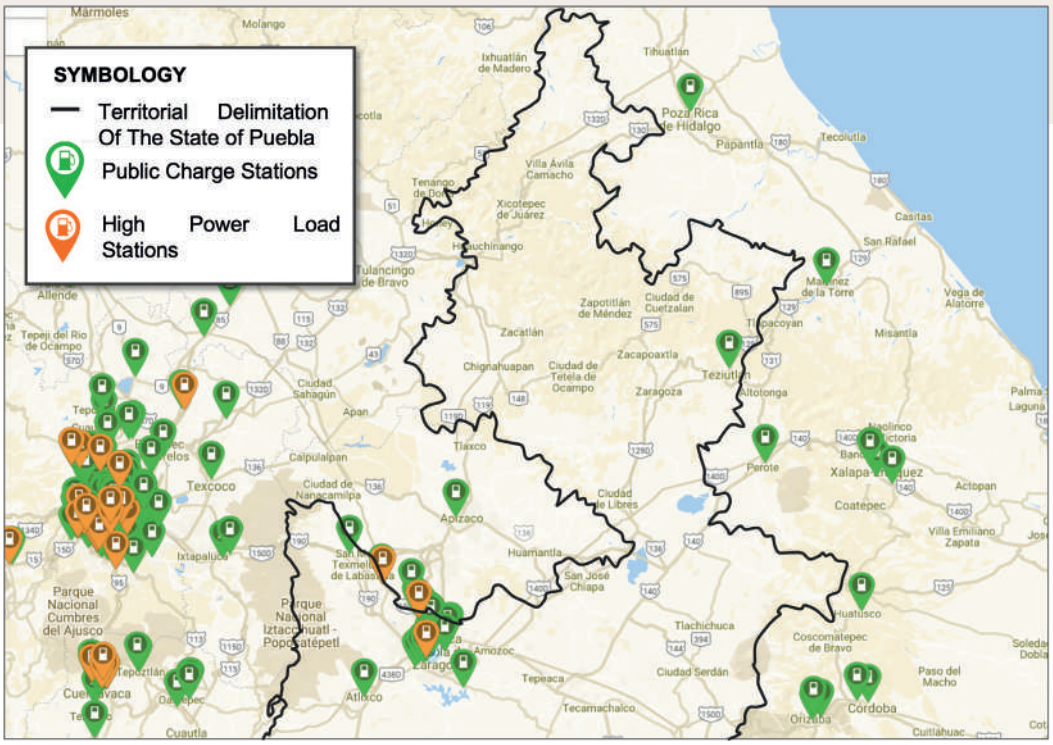


Figure 6. Charging Stations in Downtown and North in Puebla.
Source: Plug Share.

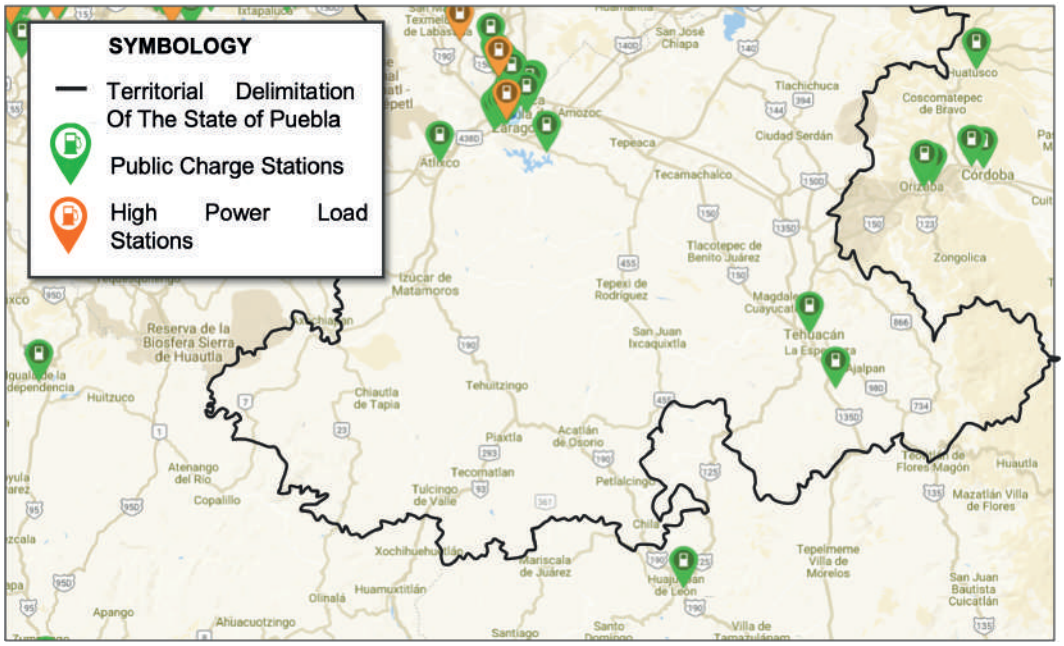


Figure 7.- Charging Stations in South Puebla
Source: Plug Share.

2.5 Security Considerations

In the Plan for the Deployment of Electric Vehicle Chargers in Puebla, it is important to consider and point out the importance of safety for the installation and operation of these equipment, since this involves the whole society, being commonly in public places of high traffic of people and vehicles.

First, in the event of an incident, it is important that there is training on safety measures and good practices in the places where the chargers are installed. According to firefighter safety specialists, they have to go beyond their traditional protocols, since they must find the specific information about the electrified vehicle involved.

At the same time, it is important that the recharging point is installed or checked by an authorized professional, and has the appropriate protections, and avoid to overload the electrical installation. It is also important that the end user knows about the security measures and good practices at the charging points. Therefore, as part of the implementation of the Plan, installation and maintenance of electric chargers by qualified suppliers will be included to ensure compliance with quality and safety standards to reduce as much as possible the chances of an accident.

However, since electric vehicles provide great advantages, it is important to take into account that the biggest risk to the batteries of an electric or hybrid car are accidents (crashes). To do this, as with gasoline vehicles, the vehicle is designed with the occupants and the battery as much as possible. In this sense, most electric vehicles have their battery on the floor of the cabin, a place less prone to crashes by statistics and easily insulated in a reinforced safety cage.

The fire and police stations in city were identified (Annex 2. Fire Stations in the State of Puebla and Annex 3. Police stations in the State of Puebla, respectively) as shown in figure 8, in order to consider the proximity of these public security stations with potential places for the installation of electric vehicle chargers.

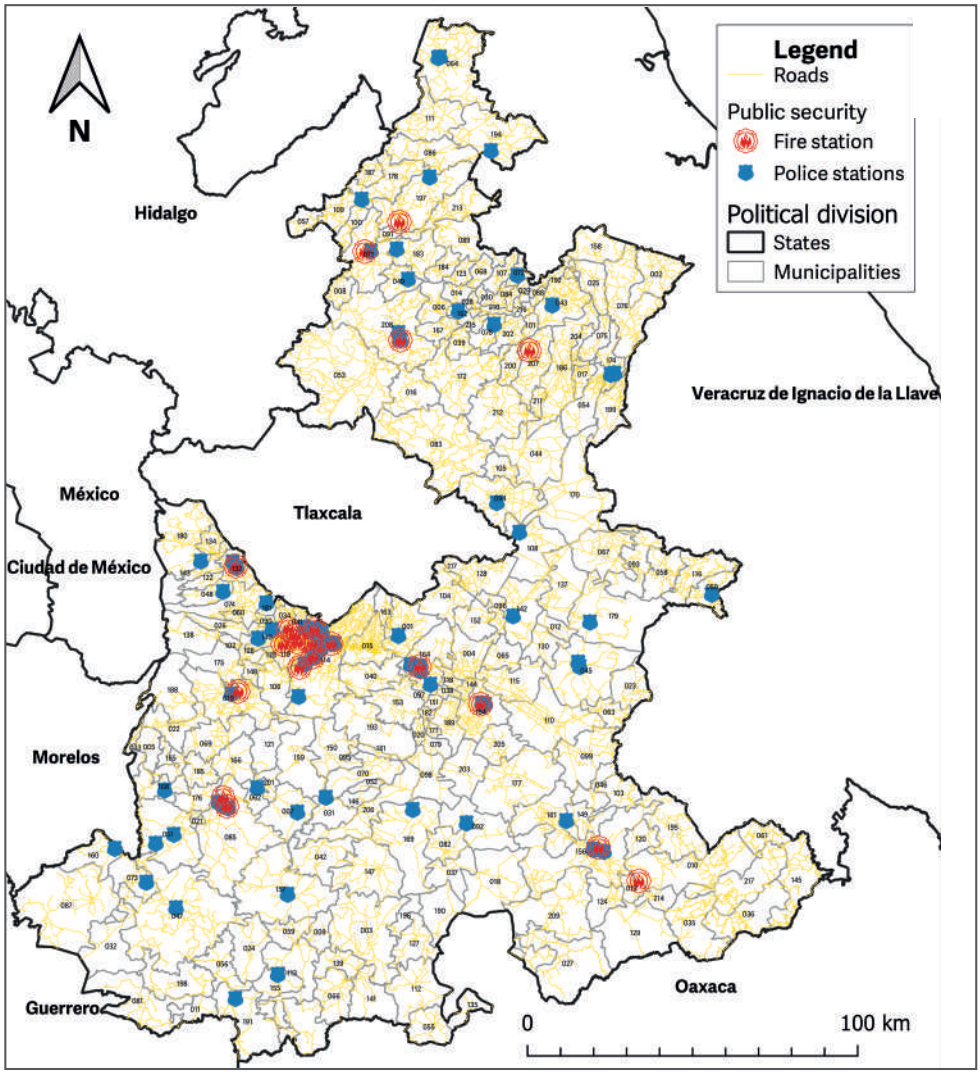


Figure 8. Fire and police stations, and state roads.
Source: Own elaboration with information from the National Statistical Directory of Economic Units (DENUE).

2.6 Annual Average Daily Traffic (TDPA)

The indicator of the annual traffic volume on the road network is called Annual Average Daily Transit or TDPA. The Secretariat of Communications and Transportation (SCT) realize this vehicle count with the objective of know annually the volumes and classification of the traffic that circulates in the different states of the country. This calculation is carried out in different locations of the road network, and is published by the SCT (Secretariat of Communications and Transport, 2022). Figure 9 shows the TDPA from 2019 to 2021 divided into quintiles for the different measurement points in the state. In Annex 4. TDPA from 2019 to 2021 the TDPA measurements of the different years are observed.

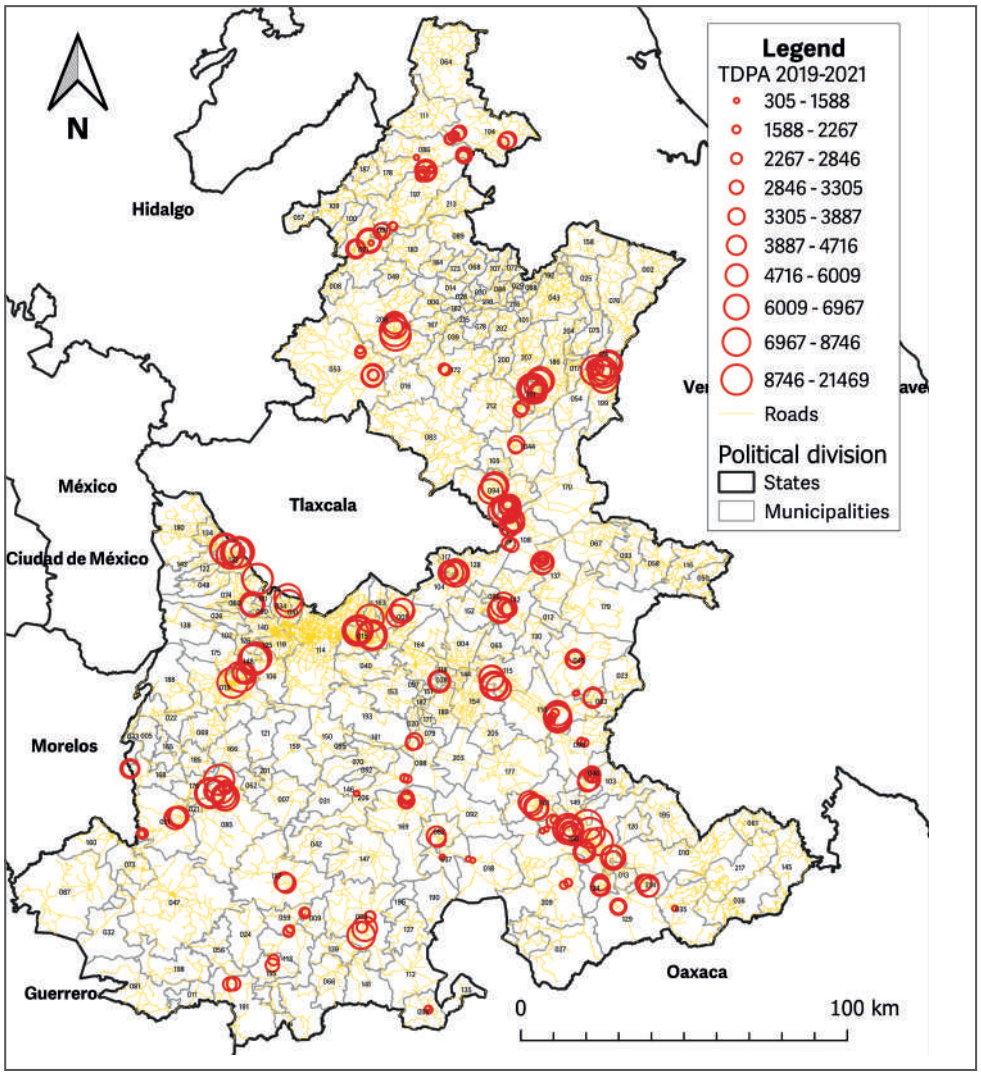


Figure 9. TDPA from 2019 to 2021 in Puebla.
Source: Own elaboration with information from the SCT

2.7 Economic Spillover in Tourism

According to information from the Ministry of Tourism, in 2021 in Mexico, 190 million tourists spent the night in a destination. Of these, 83.4% traveled by land (Ministry of

Tourism, 2022). Figure 10 shows the economic spillover from tourism activity in the State compared to 2019. It is observed that the municipality with the greatest economic spillover derived from tourist activity is Puebla with 11,655 million pesos in that year.

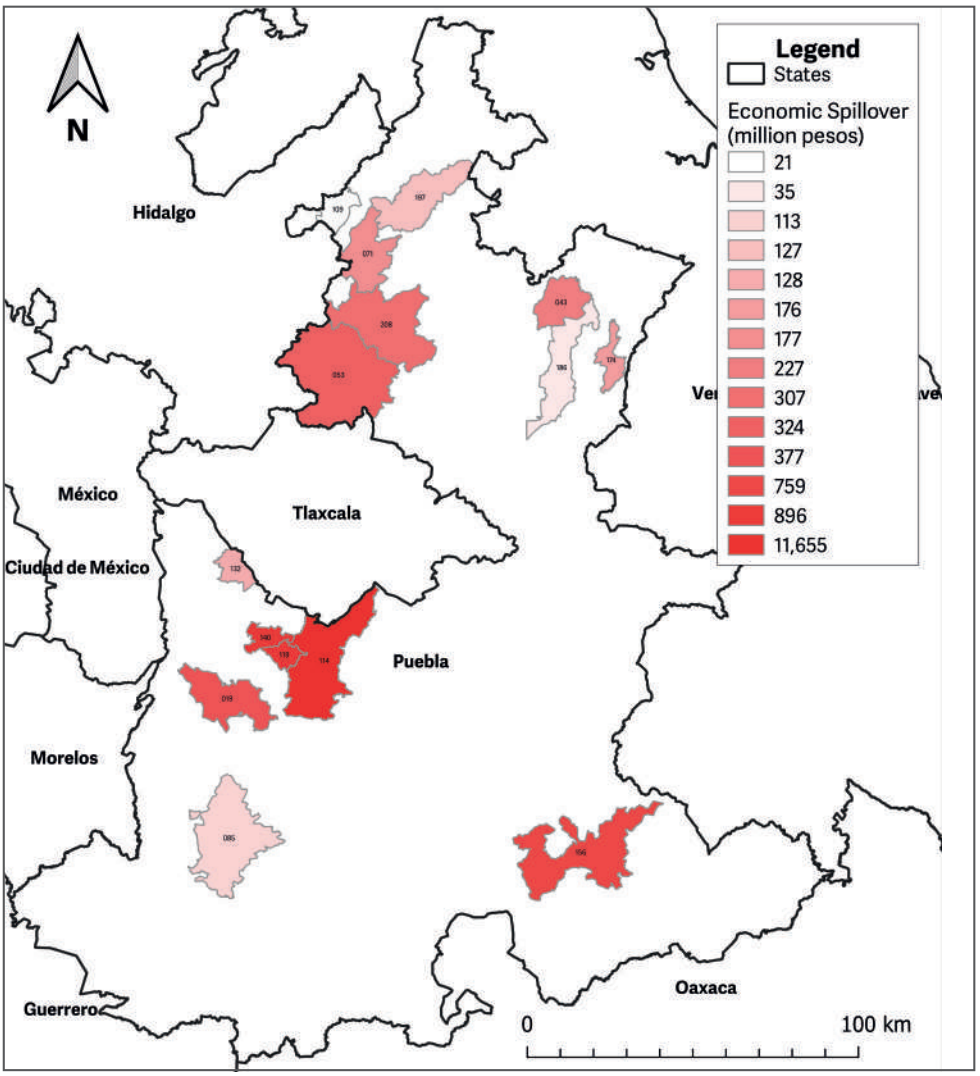


Figure 10. Economic spillover generated by tourism in 2019 .
Source: Own elaboration with information from the Ministry of Culture and Tourism (2020).

[5] The source of information specific tourist destination. In this sense, the tourist destination of Cholula is interpreted as the municipalities of San Pedro Cholula and San Andrés Cholula.

Likewise, Chart 7 shows the economic spillover and influx generated by tourism in 2019 in different tourist destinations in the state of Puebla. Likewise, an indicator of economic spillover per tourist is calculated for each of the tourist destinations.

Chart 7. Economic Spillover and Influx generated by tourism in 2019.

Touristic Place	Tourist influx (tourists)	Economic Spillover (millions MXN)	Economic Spillover per Tourist (MXN pesos/tourists)
Cd. Puebla	10,179,093	11,656	1,145
Tehuacán	911,504	759	832
Teziutlán	223,769	176	788
Izúcar de Matamoros	178,073	114	637
San Martín Texmelucan	180,382	128	710
Atlixco	560,262	377	673
Huauchinango	261,187	177	679
Cuetzalan del Progreso	320,100	227	709
Cholula	984,640	896	910
Xicotepec	177,336	127	715
Chignahuapan	503,578	324	644
Zacatlán	462,536	307	663
Pahuatlán	30,544	21	702
Tlatlauquitepec	51,758	35	671
Resto del Estado	710,509	530	746

Source: Own elaboration with information from the Ministry of Culture and Tourism (2020).

In Chart 7 , Puebla, Cholula and Tehuacán stand out as tourist destinations in first, second and third place with greater affluence, economic spillover, and economic spillover per tourist of the State, respectively.

2.8 Potential locations for the installation of electric vehicle chargers

Potential places for the installation of such chargers were considered, those where the municipal, state or federal government owns the property, or has a contract or alliance that allows them to use the property. These, in turn, were classified according to the following headings:

I. Natural Areas
II. Stands
III. Museums
IV. Cultural centers
V. Strategic Points
VI. Convention and/or Citizenship Services Centers

Figure 11 shows the potential locations for the installation of electric vehicle chargers in the state of Puebla.

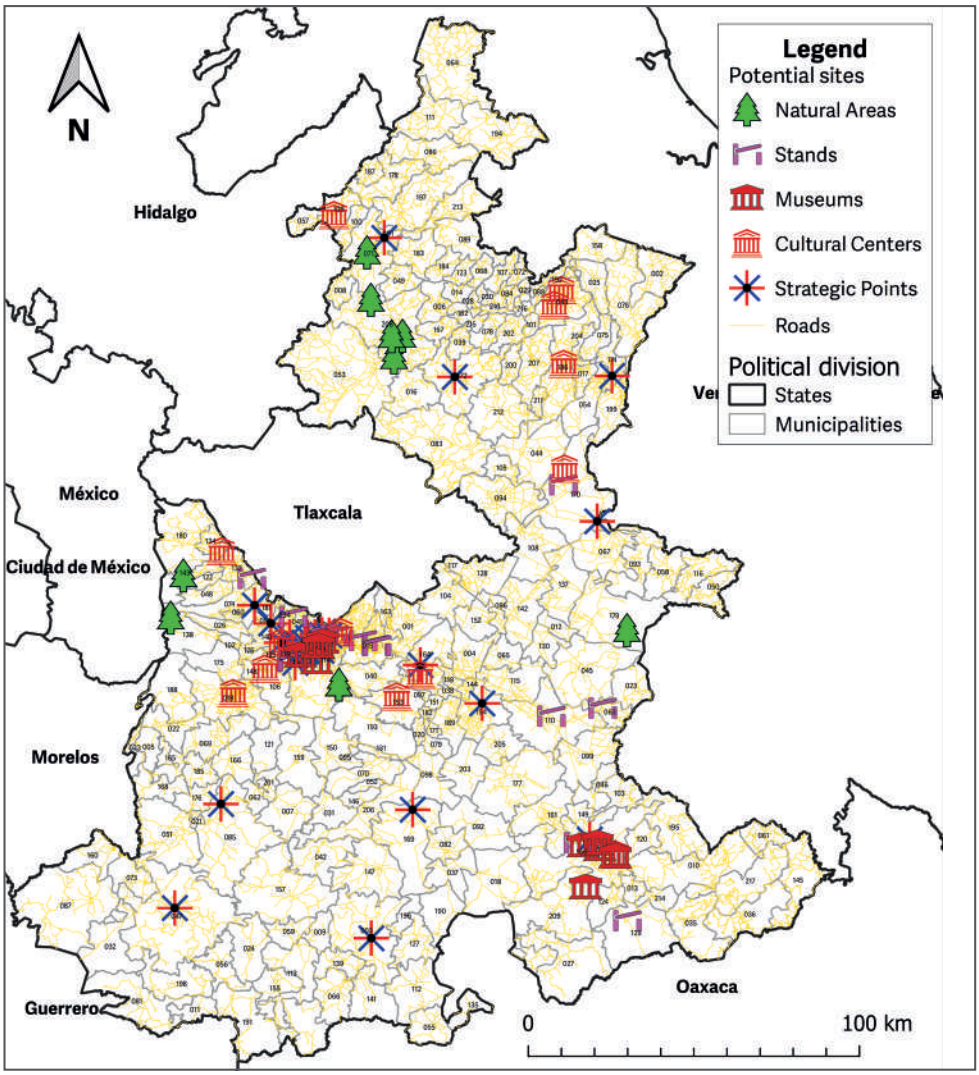


Figure 11. Potential locations for the installation of electric vehicle chargers.
Source: own elaboration with information from the DENUE.

2.9 Background and Index

According to international experience, the lack of electric charger infrastructure is considered as one of the main barriers in the adoption of electric vehicles (WARDS AUTO, 2020). In this regard, the autonomy of an electric vehicle, which represents the maximum distance that this type of vehicle can travel using the full charge of its batteries, generates an "anxiety range" in drivers (Kchaou-Boujelben, 2021) of the same. Therefore, determining the optimal locations where to install electric vehicle chargers in a specific region is a topic of special interest in the deployment of vehicles that use this type of technology.

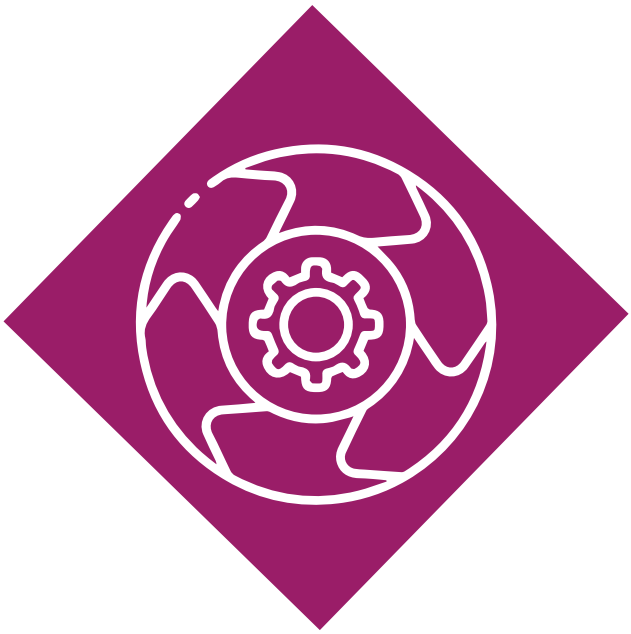
The problem of positioning electric vehicle charger stations can be treated as a problem of positioning facilities (Micari, Polimeni, Napoli, Andaloro, & Antonucci, 2017). In this sense, a wide variety of research has been done in this regard, which aims to determine the best locations for the installation of electric vehicle chargers by optimizing different criteria.

The types of models used are: vehicular flows, using target functions or demand coverage approaches; and other models where the behavior patterns of users when recharging their vehicles at work or in places near their homes are considered (Kchaou-Boujelben, 2021).

In the case of demand hedging approaches, the common assumptions in the different models are:

1. The driver takes the shortest trajectory between an origin and a destination.
2. Drivers typically go from one origin to one destination, or from destination to origin, following the same trajectory in both directions.
3. The speed of energy consumption is constant in all vehicles.
4. All vehicles have the same capacity or equivalent autonomy.
5. The vehicle's battery must be at least half its capacity at the start of each trip.
6. Fast charging stations are considered suitable for these models as long as two stations are at a distance shorter than the range of electric vehicles.

On the other hand, the electric vehicle charging infrastructure, on the different routes within the state of Puebla, must consider that at least 50% of the lower limit of autonomy of vehicles marketed in the country is covered, which is 241 km. Therefore, electric vehicle chargers must be located at least 120 km away from each other.



3. METHODOLOGY

3 METHODOLOGY

In order to increase the infrastructure of electric vehicle chargers in the state, there are two approaches to the installation of new electric chargers in the state, which are listed below, and described in the following subsections.

1. **Routes** with greater coverage and TDPA in Puebla where fast charging chargers must be installed.
2. **Conurbated areas** in Puebla.

3.1 Routes

The methodology used in determining recommended locations for the installation of new electric vehicle chargers on state routes is described below. The maximum distance between these chargers must be 120 km, corresponding to 50% of the lower limit of autonomy in electric vehicles marketed in Mexico.

1) Of the **roads** in Puebla, those that contain the highest TDPA values during the years 2019 to 2021 will be selected[6].
2) Based on the identified roads, the **routes** will be established, considering their origin and destination, inside and outside the state, that connect more municipalities, and that have a distance greater than 121 km.
3) Considering the TDPA during the years 2019 to 2021, the values that exist on the **Route** will be taken, and the median will be calculated; with this value the installation of electric vehicle chargers will be prioritized over the **Routes.**
4) The current location of electric vehicle chargers operating near these Routes will be identified in order to verify which **routes** lack the electric vehicle charging infrastructure.

[6] The TDPA of the period 2019-2021 was analyzed, due to the impact suffered by mobility in the state and the country, compared to the impact of the COVID-19 pandemic in the years 2020 and 2021.
[7] Se consideran lugares potenciales: instalaciones del gobierno estatal, casetas de cobro en carreteras estatales y federales, áreas o parques naturales, centros culturales federales y municipales.

5) Finally, for each **Route** , the **pre-selected places** for the installation of the chargers will be determined, looking for the scope of the following criteria:

a. Potencial place[7], no more than 5km of the Route.
b. Be located within 20 km of public safety stations or firefighters.
c. Be located less than 121 km between them, or from the beginning or end of the **Route.**

3.2 Conurbated Areas

The methodology used in determining the recommended locations for the installation of new electric vehicle chargers in conurbated areas of the state is now described.

1) Population data and chargers of electric vehicles installed in the 217 municipalities of Puebla were obtained.
2) The Indicator of Electric Vehicle Chargers (ICVE) per capita "chargers per 100,000 thousand inhabitants" was calculated in the municipalities that have electric vehicle chargers.
3) The value of the indicator of "chargers per 100,000 thousand of population" of the selected reference municipality was established.
4) Based on the population of the state's 217 municipalities, and considering the electric vehicle chargers currently installed in them. Those municipalities where at least one electric charger must be installed were determined, prioritizing those that are on the main routes of the state and identifying those that are tourist destinations.

4. RESULTS

4 RESULTS

Below is the selection of the 6 Routes mentioned in section "3.1 Routes", as well as the definition of the number of electric chargers to be installed in the different municipalities of the state, taking into account the TDPA of the years 2019, 2020 and 2021 of each of the routes, as well as their length and the chargers currently installed.

Additionally, the population of each of the municipalities and the number of chargers in each of them are considered, in order to determine an indicator that reflects the number of chargers per 100,000 habitants.

4.1 Mean Routes in Puebla

4.1.1 Mean routes Selection

The 6 main Routes of the state were selected considering the TDPA and the minimum length established; as shown in Figure 12.

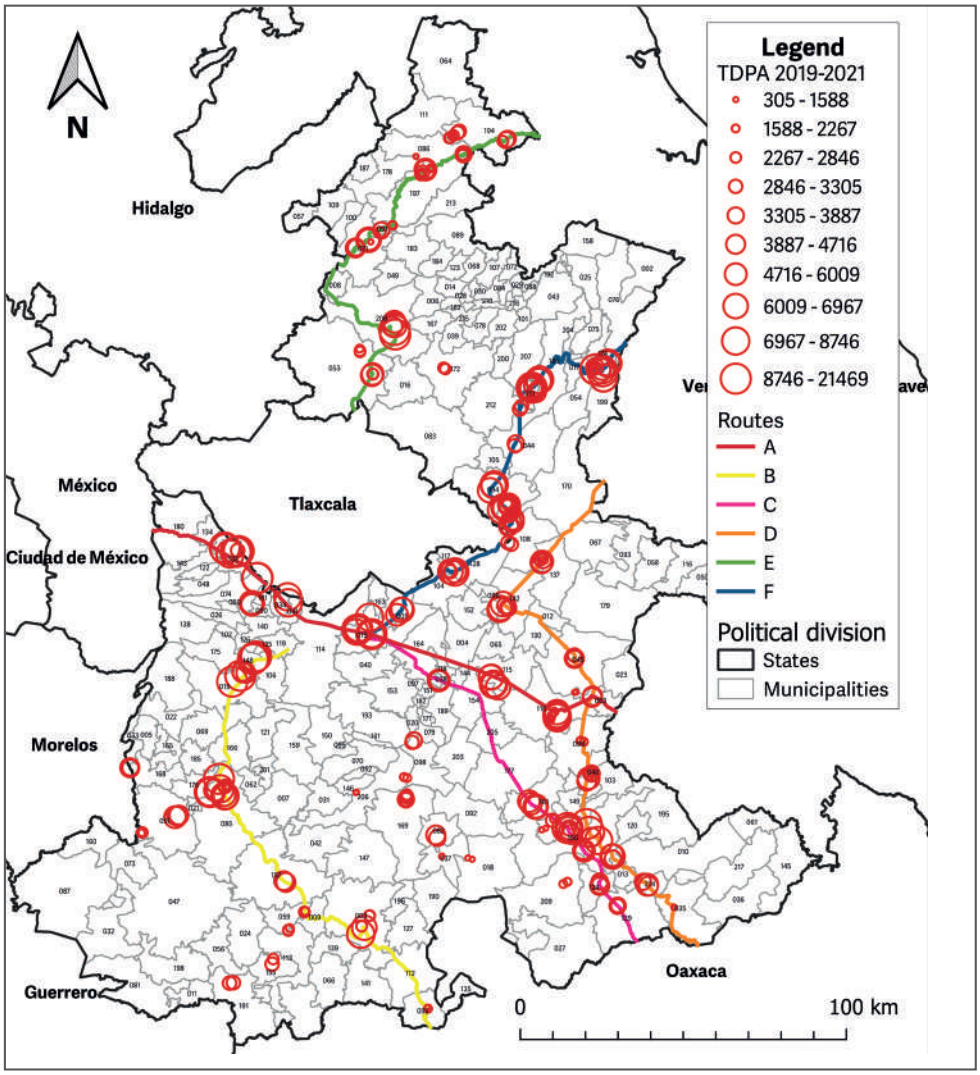


Figure 12. Selected routes for the installation of electric vehicle chargers in Puebla.
Source: own elaboration with information from the SCT

It should be noted that Figure 12 shows TDPA measurements, which indicates that there are important communication routes in the state. However, origin-destination routes do not Correspond to the minimum distance established. For example, the highway corresponding to Routes B and C is the same that starts from Cuapiaxtla de Madero to Tehuitzingo, and has an approximate length of 104 km, and therefore is not considered a Study Route of this Plan.

The length and statistics of the TDPA from 2019 to 2021 on the different selected routes, considering their origin and destination, is shown in Chart 8.

Chart 8. TDPA length and statistics on selected Routes.

ID	Route	Longitude (km)	Samples of TDPA	Min	Max	Media	Median
A	México - Puebla - Córdoba	159.3	14	4,301.3	11,393.4	7,445.7	7,053.2
B	Puebla – Huajuapan de León	217.7	27	2,020.4	21,469.0	8,570.1	7,001.2
F	Amozoc - Perote	164.9	42	2,940.9	10,011.3	6,107.1	6,302.0
C	Puebla - Tehuacán - Oaxaca	139.9	27	2,846.1	10,996.1	5,581.9	4,964.8
D	Xalapa - Tehuacán - Teotitlán	205.9	36	709.6	9,792.4	3,964.3	3,659.3
E	Apizaco - Tuxpán	177.4	29	1,701.2	10,007.2	4,118.2	3,470.5

4.1.2 Electric Vehicle Charging Centers

After determining the 6 main Routes in the state of Puebla, according to the criteria described in the Methodology, The next step was identify the charging electric vehicles chargers in these Routes. Figure 13 shows the vehicle chargers installed in the state, and the selected routes.

As is shown in Figure 13, there is currently only one fast-charging electric vehicle charger in the state. This has a maximum power of 150 kW, consists of 6 Tesla chargers, and is located in the boundary, here in Puebla.

It should be noted that, the Plan, the installation of 2 additional fast charging chargers in the state of Puebla is contemplated, one in the metropolitan area of Puebla, installed and operated by the company Link, another one in the municipality of Tehuacán, installed and operated by the company Tesla. These actions increase by 100% the number of fast charging chargers within the State of Puebla, being important to increase the infrastructure of electric chargers and promote the demand for electric vehicles within the State.

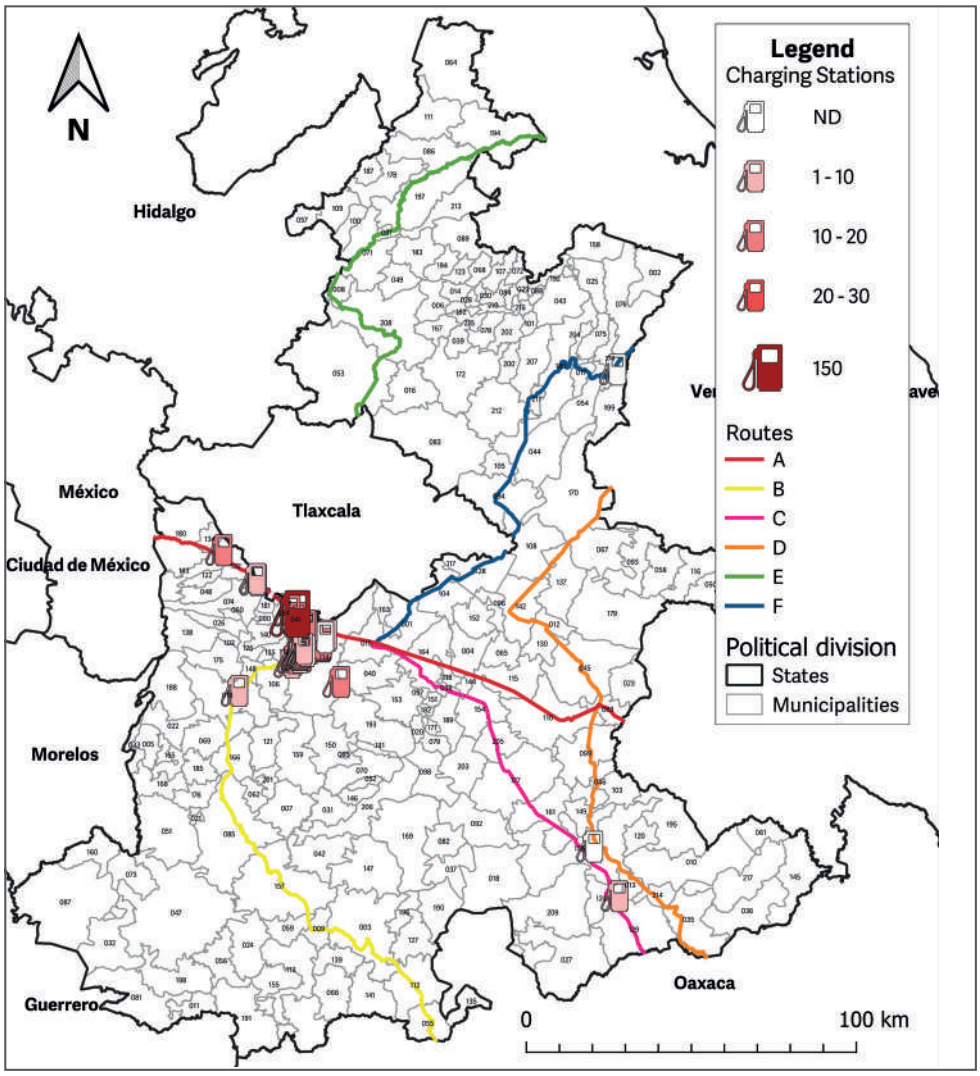


Figure 13. Electric Vehicle Chargers in the state and selected routes.
Source: Own elaboration with information from PlugShare.

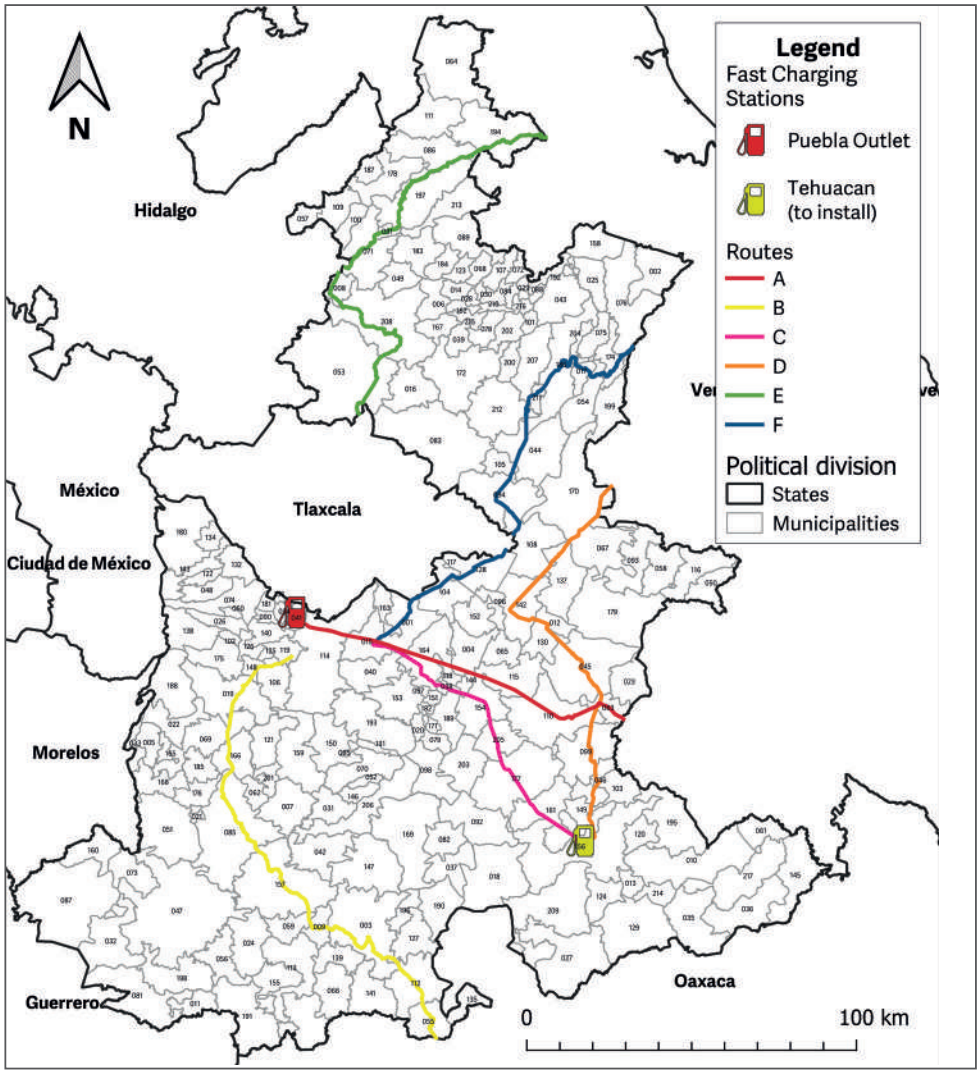


Figure 14. Modified routes considering fast charging chargers installed or to be installed.
Source: Own elaboration.

Considering that the fast charging charger located near the Mexico-Puebla-Córdoba Route in the Puebla Outlet, and the estimation of the next installation of a fast charging charger, Tesla brand, in the city of Tehuacán. Which has been developed through the joint effort of the private sector and the State Government, through the Energy Agency of the State of Puebla, the Secretariat of Economy and Museums of Puebla, the information on the length of the routes is updated, as shown in Figure 14.

It is also important to add an additional distance to the different routes that are connected by other Routes to the existing or nearby fast charging chargers to be installed in the state. The value of the additional distance considered for each Route is shown in Chart 9.

Chart 9. Modification to the selected Routes.

ID	Route	Longitud 1 (km)	Additional distance (km)	Longitude (km)
A	México - Puebla - Córdoba	111.3	0.0	111.3
B	Puebla – Huajuapan de León	217.7	17.9	235.6
F	Amozoc - Perote	164.9	30.0	194.9
C	Puebla - Tehuacán - Oaxaca	98.2	0.0	98.2
D	Xalapa - Tehuacán - Teotitlán	143.9	0.0	143.9
E	Apizaco - Tuxpán	177.4	0.0	177.4

Due to the implementation of the Plan, we can observe that for Route C Puebla – Tehuacán – Oaxaca, the length between electric vehicle chargers would already meet the criterion of 120 km between said chargers, so it would not be necessary to install new charging stations for electric vehicles.

4.1.3 Previous selection for the electric chargers installation

In previous selection, the Figure 15 shows the potential zones that provides the requirements and methodology criterium selection (7.a and 7.b) 3.1. Additionally, the security forces are shown because they are the ones who determined the relevance of the potential zones.

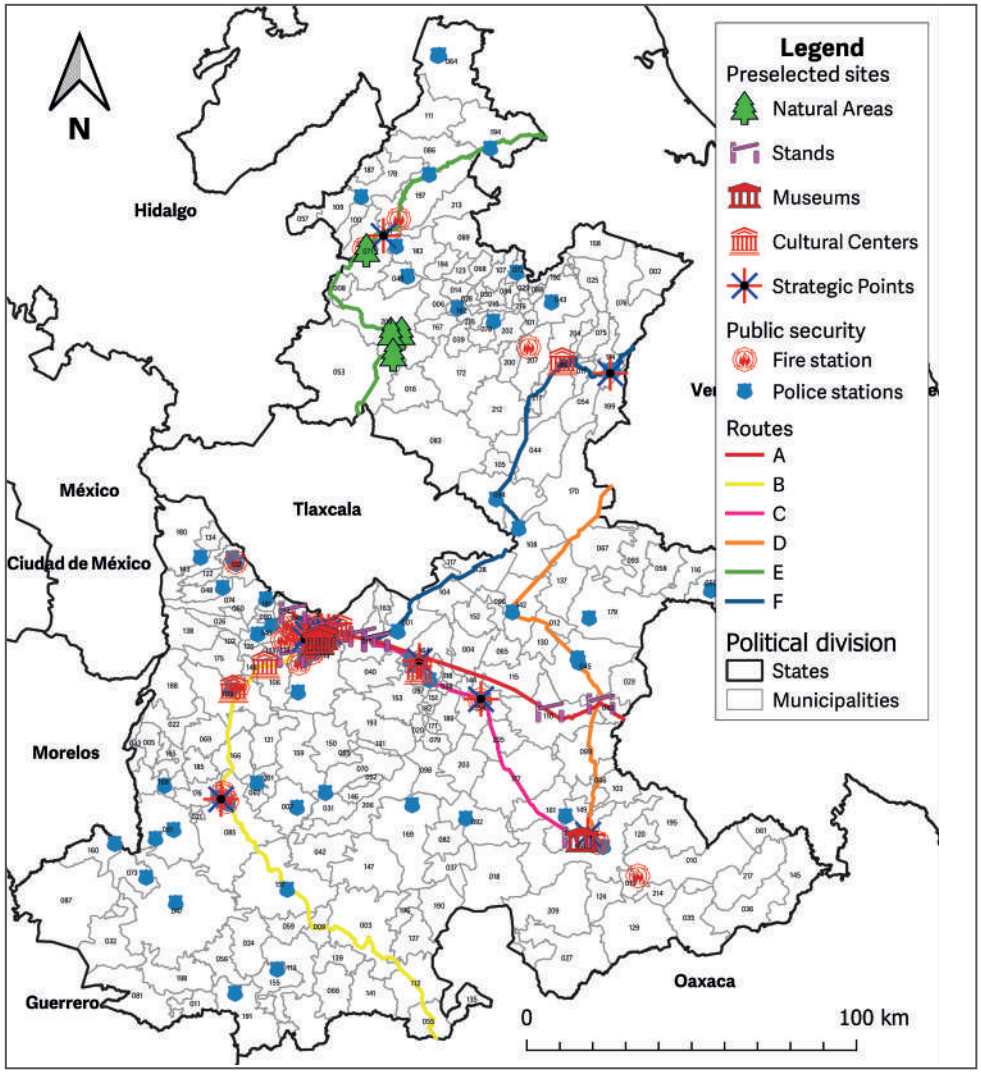


Figure 15. Places shortlisted based on criteria 7.a and 7.b of methodology 3.1.

Also, based on the information shown, Table 10 mentions the recommended strategies to accomplishment with the criterium points 7.c and 7.d of methodology 3.1.

Chart 10. Recommendations for the establishment of electric vehicle chargers on the selected routes.

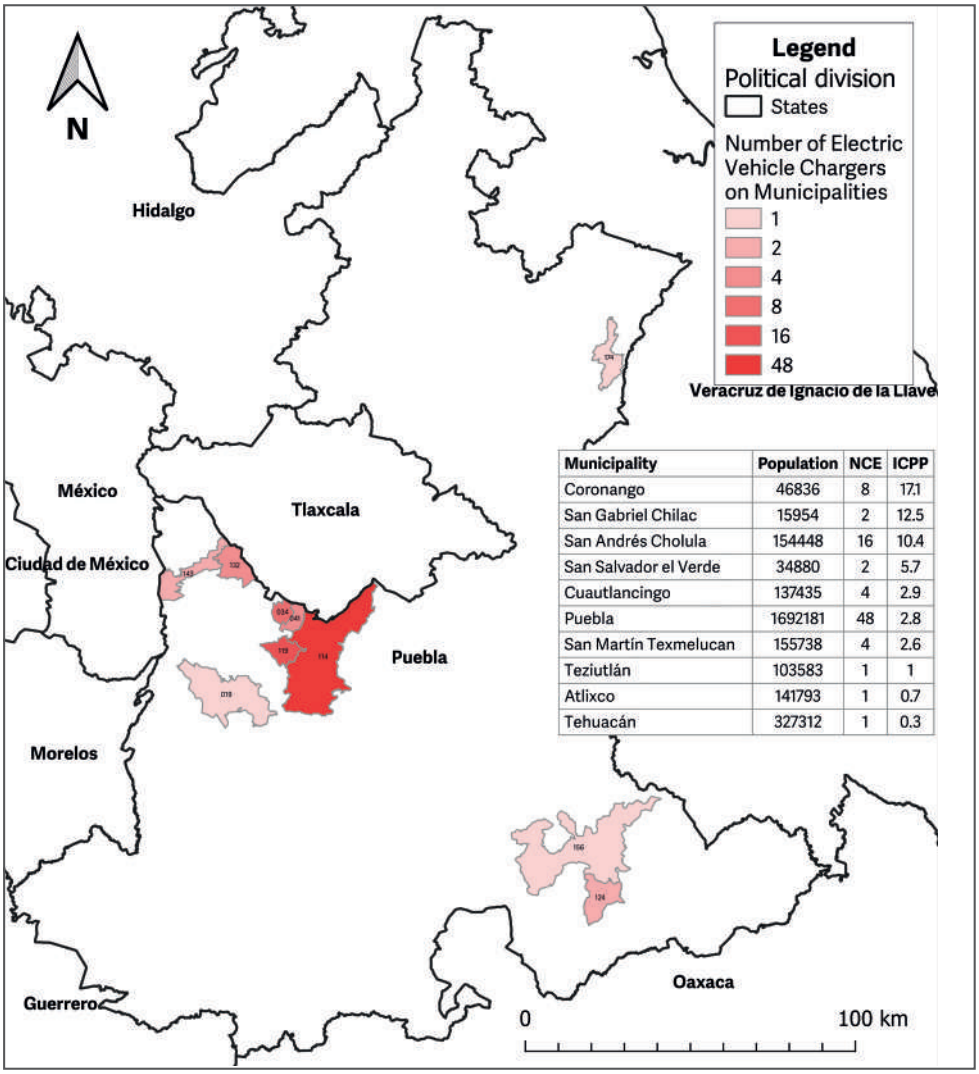
ID	Route	Longitude (km)	Recommendations
A	México - Puebla - Córdoba	111.3	Place a fast charging charger in the CAPUFE booth in the municipality of Esperanza, due to the importance of this Route and in order to cover most of it.
B	Puebla – Huajuapan de León	235.6	Place two fast charging chargers, the first in the Zócalo of the municipality of Izúcar de Matamoros, and the second in Acatlán de Osorio, Acatlán. It should be noted that Acatlán de Osorio does not have a fire or police station nearby. Therefore, if the fast charging charger is installed in this municipality, special training to the available security corps should be considered.
F	Amozoc - Perote	194.9	Place a fast charging charger in the Zócalo of the municipality of Teziutlán, because there is a police station in it.
C	Puebla - Tehuacán - Oaxaca	98.2	This route complies with the established indicator of 121 km between fast charging stations.
D	Xalapa - Tehuacán - Teotitlán	143.9	Place a fast charging charger in the municipality of San Nicolás Buenos Aires, due to its proximity to the police station in the municipality of Oriental, and to the end of the Route in Puebla.
E	Apizaco - Tuxpán	177.4	Place two fast charging chargers near the ends of the Route. Recommended municipalities: 1. Chignahuapan or Zacatlán 2. Venustiano Carranza or Jalpan The above in order to cover the greatest distance on the Route.

According to the established methodology, 7 fast charging chargers are needed to be able to cover the main routes of the state. The exact locations proposed for the installation of fast charging chargers are shown in section 5.

4.2 Electric Vehicle Charging Centers in the Study Zone

As mentioned above, Puebla has a total of 45 infrastructure points for charging stations, which house 87 electric chargers. Figure 16 shows highlights the municipalities where

electric vehicle chargers are installed, as well as their population and subsequent calculation of the Electric Vehicle Chargers Indicator (ICVE) per capita "Electric Vehicle Chargers per 100,000 habitants".



Municipality	Population	NCE	ICPP
Coronango	46836	8	17.1
San Gabriel Chilac	15954	2	12.5
San Andrés Cholula	154448	16	10.4
San Salvador el Verde	34880	2	5.7
Cuautlancingo	137435	4	2.9
Puebla	1692181	48	2.8
San Martín Texmelucan	155738	4	2.6
Teziutlán	103583	1	1
Atlixco	141793	1	0.7
Tehuacán	327312	1	0.3

Figure 16. Electric Chargers installed in municipalities of Puebla.
Source: Own elaboration with data from INEGI and PlugShare.

In this sense, the extreme values of the municipalities that show greater development in the infrastructure of electric vehicles as is the case of San Andrés Cholula, or that its population is very small as in the case of Coronango, were dismissed. Therefore, the indicator of the ICVE per capita of the municipality of Puebla will be taken as a reference, which has a value of 2.8. Figure 17 shows the chargers that must be installed in all municipalities of the State to meet the standard of 2.8 chargers per 100,000 habitants.

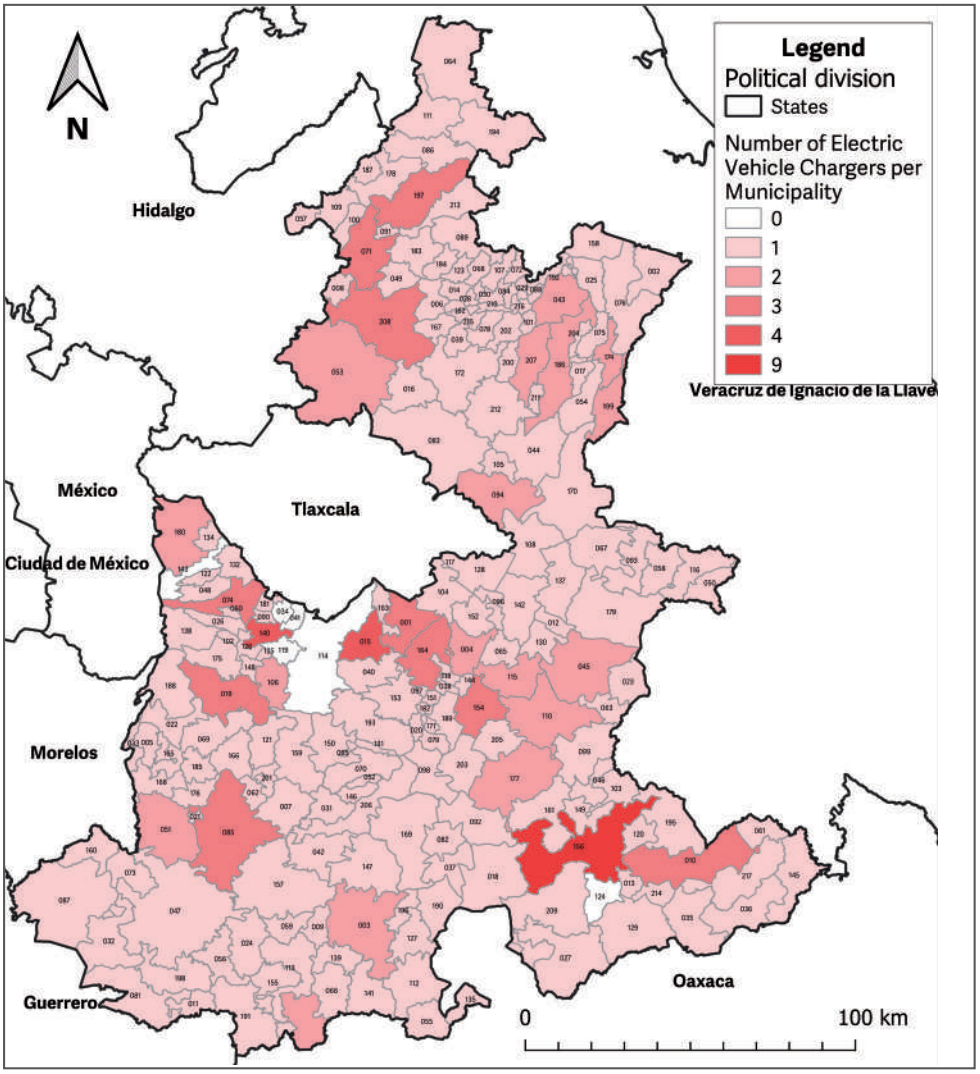


Figure 17. Electric Vehicle Chargers to Be Installed in the Municipalities of the State.
Source: Own elaboration.

Finally, with the aim of prioritizing the municipalities where electric vehicle chargers must be installed, those where the selected Routes pass were selected. Figure 18 shows these highlighted municipalities.

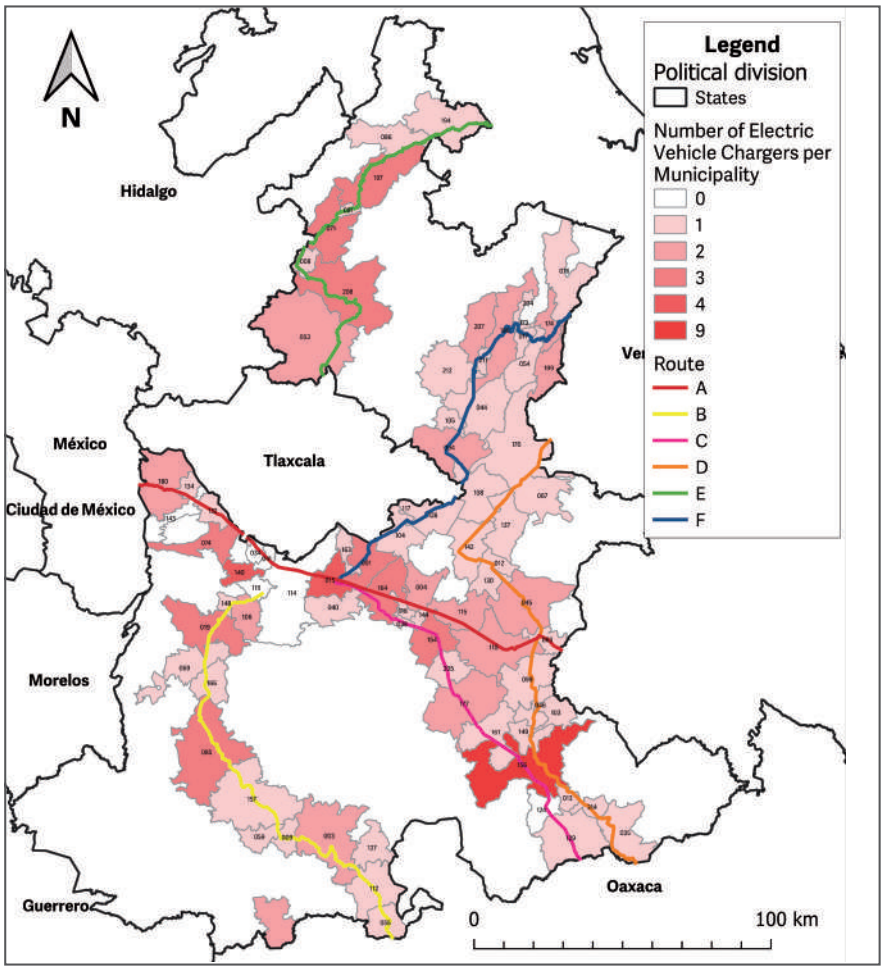


Figure 18. Municipalities through which the main routes of the state cross.
Source: Own elaboration.

The breakdown of the information for each of the 217 municipalities in the state of Puebla is shown in Annex 5. Breakdown of information from municipalities. In total, according to the established methodology, 261 electric vehicle chargers must be installed in 211 municipalities in the state of Puebla. However, in order to prioritize the installation in the different municipalities, it is recommended to install 98 electric vehicle chargers in the 82 municipalities through which the main routes of the state pass.

5. PLAN FOR THE DEPLOYMENT OF CHARGERS APPROACH

5 PLAN FOR THE DEPLOYMENT OF CHARGERS APPROACH

5.1 Mean routes

Chart 11 presents the proposal of places to install fast charging chargers in the main routes of the state of Puebla.

Chart 11. Proposal of places to install fast charging chargers.

ID	Route	Longitude (km)	No. Chargers	Approachs
A	México - Puebla - Córdoba	111.3	1	30. CAPUFE - Plaza De Cobro No. 27.
B	Puebla – Huajuapan de León	235.6	2	11. Zócalo de Izúcar de Matamoros. SN. Ayuntamiento de Acatlán de Osorio.
F	Amozoc - Perote	194.9	1	13. Zócalo de Teziutlán.
C	Puebla - Tehuacán - Oaxaca	98.2	0	S/N
D	Xalapa - Tehuacán - Teotitlán	143.9	1	SN. Ayuntamiento de San Nicolás Buenos Aires
E	Apizaco - Tuxpán	177.4	2	47. Zacatlán Adventure SN. Ayuntamiento de Venustiano Carranza o Jalpan.

SN: Not Number, is not a potential zone

Derivate from the Plan, it follows that 4 of the potential places are suitable for installing fast charging chargers, while another 3 are proposed based on their proximity to fire or police stations so that they meet the established criteria.

5.2 Conurbation Zone

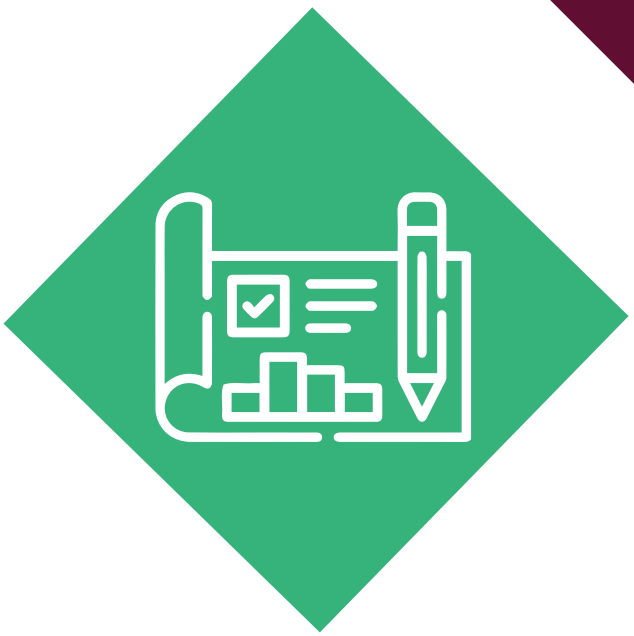
According to the information presented in the map showing the ideal distribution for the installation of the new electric chargers in the State, considering those through which the main routes pass (see Figure 18). The dispersion of chargers and prioritization of municipalities is shown in Chart 12, which highlights (light gray filling) municipalities with tourist destinations.

Chart 12. Proposal for the installation of chargers in conurbation zones.

No.	ID	Municipality	Charger type	P_CVEI
1	156	Tehuacán	CA Nivel 1-2	8
			CC de Carga Rápida	1
2	015	Amozoc	CA Nivel 1-2	4
3	140	San Pedro Cholula	CA Nivel 1-2	4
4	001	Acajete	CA Nivel 1-2	3
5	019	Atlixco	CA Nivel 1-2	3
6	071	Huauchinango	CA Nivel 1-2	3
7	074	Huejotzingo	CA Nivel 1-2	3
8	085	Izúcar de Matamoros	CA Nivel 1-2	3
9	154	Tecamachalco	CA Nivel 1-2	3
10	164	Tepeaca	CA Nivel 1-2	3
11	197	Xicotepec	CA Nivel 1-2	3
12	208	Zacatlán	CA Nivel 1-2	3
13	003	Acatlán	CA Nivel 1-2	2
14	004	Acatzingo	CA Nivel 1-2	2
15	045	Chalchicomula de Sesma	CA Nivel 1-2	2
16	053	Chignahuapan	CA Nivel 1-2	2
17	094	Libres	CA Nivel 1-2	2
18	106	Ocoyucan	CA Nivel 1-2	2
19	110	Palmar de Bravo	CA Nivel 1-2	2
20	115	Quecholac	CA Nivel 1-2	2
21	174	Teziutlán	CA Nivel 1-2	2
22	177	Tlacotepec de Benito Juárez	CA Nivel 1-2	2
23	180	Tlahuapan	CA Nivel 1-2	2
24	186	Tlatlauquitepec	CA Nivel 1-2	2
25	199	Xiutetelco	CA Nivel 1-2	2
26	207	Zacapoaxtla	CA Nivel 1-2	2
27	008	Ahuazotepec	CA Nivel 1-2	1
28	009	Ahuehuetitla	CA Nivel 1-2	1
29	012	Aljojuca	CA Nivel 1-2	1
30	013	Altepexi	CA Nivel 1-2	1
31	017	Atempan	CA Nivel 1-2	1
32	035	Coxcatlán	CA Nivel 1-2	1
33	038	Cuapiaxtla de Madero	CA Nivel 1-2	1
34	040	Cuautinchán	CA Nivel 1-2	1
35	044	Cuyoaco	CA Nivel 1-2	1

No.	ID	Municipality	Charger type	P_CVEI
36	046	Chapulco	CA Nivel 1-2	1
37	054	Chignautla	CA Nivel 1-2	1
38	055	Chila	CA Nivel 1-2	1
39	059	Chinantla	CA Nivel 1-2	1
40	063	Esperanza	CA Nivel 1-2	1
41	067	Guadalupe Victoria	CA Nivel 1-2	1
42	069	Huaquechula	CA Nivel 1-2	1
43	076	Hueytamalco	CA Nivel 1-2	1
44	086	Jalpan	CA Nivel 1-2	1
45	091	Juan Galindo	CA Nivel 1-2	1
46	099	Cañada Morelos	CA Nivel 1-2	1
47	103	Nicolás Bravo	CA Nivel 1-2	1
48	104	Nopalucan	CA Nivel 1-2	1
49	105	Ocotepec	CA Nivel 1-2	1
50	108	Oriental	CA Nivel 1-2	1
51	112	Petlalcingo	CA Nivel 1-2	1
52	117	Rafael Lara Grajales	CA Nivel 1-2	1
53	118	Los Reyes de Juárez	CA Nivel 1-2	1
54	127	San Jerónimo Xayacatlán	CA Nivel 1-2	1
55	128	San José Chiapa	CA Nivel 1-2	1
56	129	San José Miahuatlán	CA Nivel 1-2	1
57	130	San Juan Atenco	CA Nivel 1-2	1
58	132	San Martín Texmelucan	CA Nivel 1-2	1
59	134	San Matías Tlalancaleca	CA Nivel 1-2	1
60	136	San Miguel Xoxtla	CA Nivel 1-2	1
61	137	San Nicolás Buenos Aires	CA Nivel 1-2	1
62	142	San Salvador el Seco	CA Nivel 1-2	1
63	144	San Salvador Huixcolotla	CA Nivel 1-2	1
64	148	Santa Isabel Cholula	CA Nivel 1-2	1
65	149	Santiago Miahuatlán	CA Nivel 1-2	1
66	157	Tehuitzingo	CA Nivel 1-2	1
67	161	Tepanco de López	CA Nivel 1-2	1
68	163	Tepatlaxco de Hidalgo	CA Nivel 1-2	1
69	166	Tepeojuma	CA Nivel 1-2	1
70	170	Tepeyahualco	CA Nivel 1-2	1
71	173	Teteles de Avila Castillo	CA Nivel 1-2	1
72	194	Venustiano Carranza	CA Nivel 1-2	1
73	204	Yaonáhuac	CA Nivel 1-2	1
74	205	Yehualtepec	CA Nivel 1-2	1
75	211	Zaragoza	CA Nivel 1-2	1
76	212	Zautla	CA Nivel 1-2	1
77	214	Zinacatepec	CA Nivel 1-2	1

The municipalities of Cuetzalan del Progreso and Pahuatlán are not included in this prioritization because the main routes identified do not pass through them. However, they are taken into account for future updates of the Plan.



6. OPERATION AND INSTALATION´S PLANIFICATION

6 OPERATION AND INSTALATION´S PLANIFICATION

As part of the planning of the installation and operation of electric vehicle chargers, 3 stages are considered (see Figure 19).

1. Chargers and place's identification
2. Installation
3. Operation and maintenance

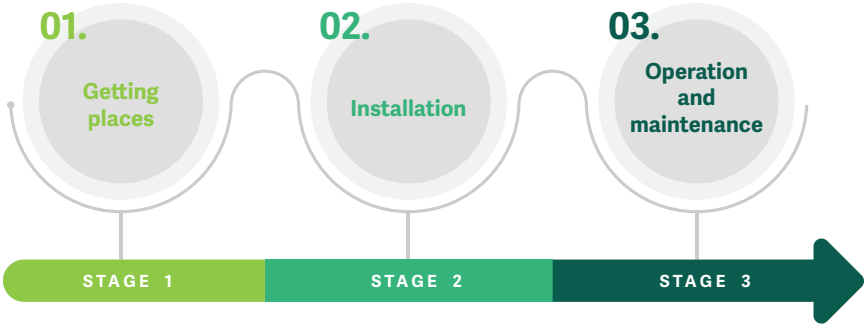


Figure 19. Planning Diagram.

6.1 Donation Process

Once the background has been developed and the panorama of electric mobility in the country and in the state of Puebla has been exposed, an analysis was carried out taking into account all the factors to be considered for the installation of electric vehicle chargers in the points that represent a greater benefit to each of the actors involved. By the date of May 2022, the Energy Agency of the State of Puebla was informed of the interest in some companies in the automotive sector and the interest in donating electric chargers, distributed in the most effective and efficient way in the state.

Therefore, in consideration of the analysis set out above regarding the locations that would bring greater benefits for citizens who have this type of mobile units, these points will be taken into account for their next installation.

The above, with the aim that, together with the Energy Agency of the State of Puebla, and private sector companies, generate an increase of at least 50% in the number of electric vehicle chargers in the main conurbation zones, as well as on the routes with the highest vehicular flow, thus promoting electromobility within the state of Puebla.

6.2 Zone obtainment

Considering that electric vehicle chargers are already available for the execution of the project, it will be the job of the Energy Agency of the State of Puebla to link with the corresponding entities. On the other hand, it is important to acquire the permits that are applicable in the territorial demarcation in which the facilities of the shippers will be established, as well as the agreements that are necessary for the project to be legally exercised in said territories, belong to the state, municipalities or corresponding entities.

In this sense, it will be under the responsibility of the Agency, the approach with the natural persons, legal entities and / or entities responsible for the places that are considered potential areas for the installation of this technology. This with the aim that, together with the support of the State Government, the energy sector is potentiated and the existing lack in the sector is satisfied.

6.3 Vehicle Charge Station Installation

Therefore, once the donation of this technology has been made, and the points at which the installation of the electric chargers will be installed have already been established and agreed, it will be the Energy Agency of the State of Puebla who will be in charge of covering the economic resources for its respective start-up. The above with the support of the Secretariat of Infrastructure, for the execution and adaptation of the territorial areas, which will house the chargers of electric vehicles and where the end user will be supplied with said service.

Following up on this, regarding the installation procedure before the Federal Electricity Commission, itis important to mention that based on article 46 Fraction I of the Electricity Industry Law (LIE) no permit or registration is required for the sale of electrical energy from an end user to third parties, as long as the electrical energy is used in the facilities of this.

> ***From the Federal Electric Industry Law:***
>
> *Article 46: To provide the Electricity Supply or represent the Exempt Generators, permission from the CRE is required in the form of Supplier. The CRE may establish specific requirements to offer the Basic Supply and to offer the Supply of Last Resort, in order to promote the efficiency and quality of such services.*
> *Fraction I. The sale of electrical energy from an End User to a third party, provided that the electrical energy is used within the End User's premises.*

In this same sense, the Governing Body of the CRE issued on November 13, 2018 the Agreement that allows the sale of electricity between individuals. This regulation encourages the construction of infrastructure for the recharging of electric cars, in which users of this type of vehicle will benefit because they will have the possibility of accessing more recharging points. At the same time, the increase in the production of electric vehicles by the Mexican automotive industry will be promoted, resulting in greater jobs, economic growth, innovation in that sector and the improvement of the environment.

Additionally, information was collected regarding the contracting of electric vehicle charging services before the Federal Electricity Commission, the procedure established for obtaining the electric power supply service for electric vehicle recharging was consulted, which adheres to the contracting of low voltage electricity supply. The procedure is detailed in Figure 20.

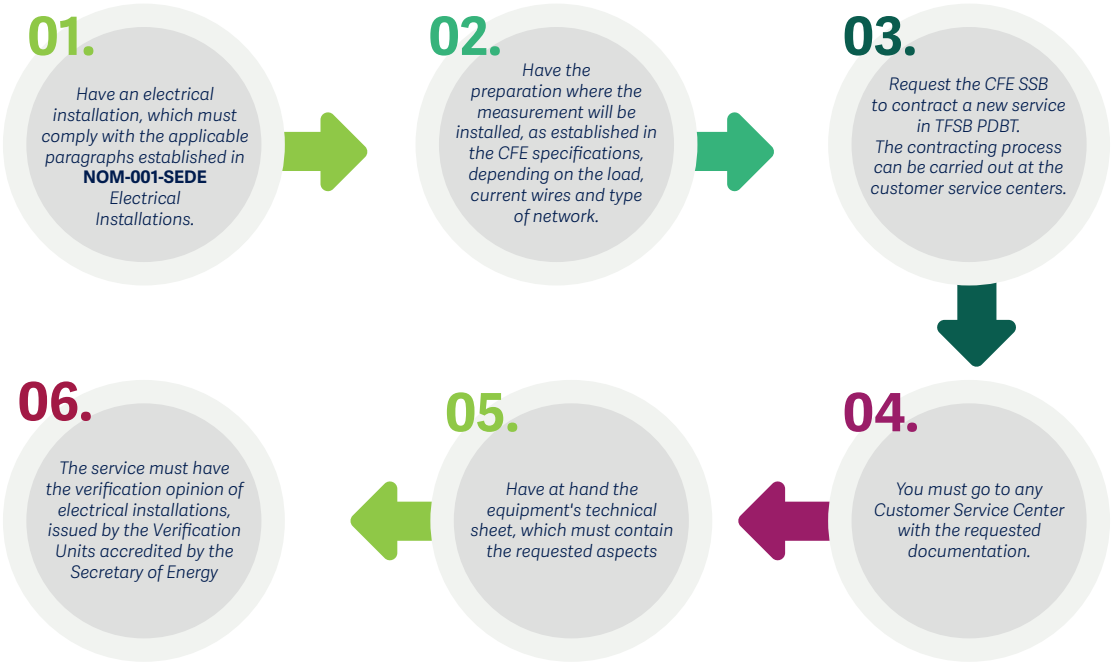


Figure 20. Procedure to contract the service of supply of electrical energy destined to the recharging of electric vehicles[8].
Source: Federal Electricity Commission.

[8] *SSB: Basic Service Provider; TFSB: Final Basic Supply Rate; PDBT: Small Demand Low Voltage.*

Regarding the response time, this will depend on the size of the population in which the supply is required, so the maximum times considered are:

- 5 Working days for populations with more than 10,000 users
- From 10 working days for populations between 5,000 and 10,000 users
- 15 Working days for populations with more than 10,000 users

Following up on this, in the procedure expressed in Figure 20, you must have the installation of a connection, which is classified into four different items:

I. Single-phase connections
II. Biphasic Connections
III. Triphasic connections
IV. Connections in Concentrations

6.4 Operation and administration of equipment

Subsequently, once the electric vehicle chargers have been installed in the already established areas, it is appropriate to consider the parties that will be responsible for the operation of these, taking into account the main aspects that are:

a) Maintenance of electric vehicle chargers, either due to deterioration of equipment, technical failures, or what is applicable to situations that may arise in the operation of these.
b) Insure this technology, considering all unforeseen events that may arise within the facilities of the cargo service, ensuring that the equipment is insured and backed by a guarantee.
c) Payment of the energy consumed before CFE for the service granted, determining who will be responsible for liquidating and covering the economic expense.

6.5 Project Operational Stages

Taking into account the processes encompassed in the execution of this project, the actors that could execute each phase, and in order to carry out an analysis and weigh the risks of the different stage when carrying out the management of these stages, a risk matrix was made. In this matrix, the events that each of the possible stages could entail are foreseen. The stages that were considered for this Plan are shown in Chart 13.

Chart13. Deployment stages.

	Donation	Installation	Getting Place	Operation		
				Maintenance	Insurance	Electricity cost
Stage 1	Company A[9]	AEEP	AEEP	Company A	Company A	Company A
Stage 2	Company A	AEEP	AEEP	Company B[10]	Company B	Company B
Stage 3	CompanyA	AEEP	AEEP	Company B	Company B	Municipality or State
Stage 4	Company A	AEEP	AEEP	AEEP	AEEP	Municipality or State[11]
Stage 5	Company A	AEEP	AEEP	AEEP	AEEP	AEEP

[9]Company A, refers to the organization that will install the charging stations.
[10]Company B, refers to a external organization that would be agreed exclusively for the equipment operations.
[11]The Municipality or State box refers to the corresponding dependencies that will house the facilities of each of the electric vehicle chargers.

Once the scenarios that could be presented have been defined, a risk matrix is carried out, in which the events that could arise will be weighed. With this support, the severity and probability of these were rated, in order to obtain the severity of the risk (see Chart 14).

Chart 14. Risk matrix for the evaluation of scenarios.

Risk Matrix						
		Probability				
		Improbable	Possible	Occasional	Moderate	Constant
Severity		2	4	6	8	10
Insignificant	1	2	4	6	8	10
Low	2	4	8	12	16	20
Moderate	3	6	12	18	24	30
Critical	4	8	16	24	32	40
Catastrophic	5	10	20	30	40	50

Risk	Colour
Low	1-8
Medium	9-18
High	19-24
Very High	25-50

So taking into account the above, the events involved in the execution of each scenario are presented, weighing each situation, not without first mentioning a possible solution that would counteract or reduce the impact of them.

STAGE 1

Event	Probability	Severity	Score	Risk	Solution
The contract for the installation is not adequate and therefore the operation of the charger's can´t be optimal.	2 - Improbable	4 - Critical	8	Low	Establish a clear and concise contract in which the company to be hired ensures the installation and correct adaptation for the operation of the chargers, offering a guarantee on the work done.
The company that will donate the chargers for electric vehicles makes a donation of obsolete equipment, which does not fulfill its proper function without having a guarantee of these.	4 - Possible	4 - Critical	16	Middle	Establish in the donation contract or agreement the technical and compatibility characteristics of the chargers, ensuring the useful life of the equipment.
The technical information provided regarding the sites where the installation will be carried out is incorrect, generating problems at the time of installation.	4 - Possible	2 - Minor	8	Low	Have a technical review, where the information previously obtained is corroborated, thus avoiding problems in the installation process.
The company responsible for the maintenance of electric vehicle chargers does not provide the necessary maintenance, generating a deterioration in said technology	4 - Possible	4 - Critical	16	Medium	The Energy Agency of the State of Puebla will provide periodic monitoring where the optimal operation of the chargers is ensured. Through the contract made, the commitment of the donor company regarding the constant maintenance of the equipment will be clearly defined.
Electric chargers lack accident insurance, generating legal problems for those responsible for the property.	2 - Improbable	4 - Critical	8	Low	By means of the contract, it will clearly define the commitment of the donor company with respect to the insurance of the equipment.
The company responsible for the operation does not make the corresponding payments to the electricity service, disabling the electricity supply.	2 - Improbable	2 - Minor	4	Low	The Energy Agency of the State of Puebla will carry out periodic follow-ups regarding the operation of the chargers, executing an alternating follow-up regarding the fulfillment of payment of said service.

STAGE 2

Event	Probability	Severity	Score	Risk	Solution
The contract for the installation is not adequate and therefore the operation of the chargers can not be optimal.	2 - Improbable	4 - Critical	8	Low	Establish a clear and concise contract in which the company to be hired ensures the installation and correct adaptation for the operation of the chargers, offering a guarantee on the work done.
The company that will donate the chargers for electric vehicles makes a donation of obsolete equipment that does not fulfill its adequate function without having a guarantee of these.	4 - Possible	4 - Critical	16	Medium	Establish in the donation contract the technical and compatibility characteristics of the chargers, ensuring the useful life of the equipment.
The technical information provided regarding the sites where the installation will be carried out is incorrect, generating problems at the time of installation.	4 - Possible	2 - Minor	8	Low	Have a technical review, where the previously obtained information is corroborated, thus avoiding problems in the installation process.
The company responsible for the maintenance of electric vehicle chargers does not provide the necessary maintenance, generating a deterioration in said technology.	6 - Occasional	4 - Critical	24	High	The Energy Agency of the State of Puebla will provide periodic monitoring where the optimal operation of the chargers is ensured. By means of the contract for the operation of the chargers, the commitment of the operating company with respect to the constant maintenance of the equipment will be clearly defined.
Electric chargers lack accident insurance, generating legal problems for those responsible for the property.	6 - Occasional	4 - Critical	24	High	The charger operation contract shall clearly define the commitment of the operating undertaking to the insurance of such equipment.
The company responsible for the operation does not make the corresponding payments to the electricity service, disabling the electricity supply.	6 - Occasional	3 - Moderate	18	Medium	The Energy Agency of the State of Puebla will carry out periodic follow-ups regarding the operation of the chargers, executing an alternating follow-up regarding the fulfillment of payment of said service.
A company that operates this technology is not located, as it is not currently considered a profitable economic model.	8 - Moderate	5 – Catastrophic	40	Very High	Make a link with companies in the sector, agreeing benefits that do not harm the company operating the chargers, and encouraging support in favor of said organization, seeking the benefit of the private sector.

STAGE 3

Event	Probability	Severity	Score	Risk	Solution
La contratación para la instalación no sea la adecuada y por lo tanto el funcionamiento de los cargadores no pueda ser óptimo.	2 - Improbable	3 - Moderate	6	Low	Establish a clear andciso contract in which the company to be hired ensures the installation and correct adaptation for the operation of the chargers, offering a guarantee on the work done.
La empresa que donará los cargadores para vehículos eléctricos realice una donación de equipos obsoletos, que no cumplan con su adecuada función sin contar con una garantía de estos.	6 - Occasional	3 - Moderate	18	Medium	Establish in the donation contract the technical and compatibility characteristics of the chargers, ensuring the useful life of the equipment.
La información técnica proporcionada respecto a los sitios en los cuales se llevará a cabo la instalación sea incorrecta, generando problemas al momento de la instalación.	8 - Moderate	3 - Moderate	24	Low	Have a technical review, where the previously obtained information is corroborated, thus avoiding problems in the installation process.
La empresa responsable del mantenimiento a los cargadores de vehículos eléctricos no brinde el mantenimiento necesario, generando un deterioro en dicha tecnología.	10 - Constant	4 - Critical	40	Very High	The Energy Agency of the State of Puebla will provide periodic monitoring where the optimal operation of the chargers is ensured. By means of the contract for the operation of the chargers, the commitment of the operating company with respect to the constant maintenance of the equipment will be clearly defined.
Los cargadores eléctricos carezcan de un seguro contra accidentes, generando problemas legales a los responsables del inmueble.	10 - Constant	4 - Critical	40	Very High	The contract or agreement for the operation of shippers shall clearly define the commitment of the operating undertaking to the insurance of such equipment.
La institución responsable de la operación no realice los pagos correspondientes al servicio de electricidad, inhabilitando el suministro eléctrico en el servicio.	10 - Constant	4 - Critical	40	Very High	Make an agreement with that institution, where benefits are agreed for both parties, in order to seek the support of that institution to cover that expense.
No se localice una empresa que realice la operación de dicha tecnología, ya que actualmente no se considera un modelo económico rentable.	8 - Moderate	4 - Critical	32	Very High	Make a link with companies in the sector, agreeing benefits that do not harm the company operating the chargers, and encouraging support in favor of said organization, seeking the benefit of the private sector.

.

STAGE 4

Event	Probability	Severity	Score	Risk	Solution
The contract for the installation is not adequate and therefore the operation of the chargers can not be optimal.	2 - Improbable	3 - Moderate	6	Low	Establish a clear andconciso contract in which the company to be hired ensures the installation and correct adaptation for the operation of the chargers, offering a guarantee on the work done.
The company that will donate the chargers for electric vehicles makes a donation of obsolete equipment, which does not fulfill its adequate function without having a guarantee of these.	6 - Occasional	3 - Moderate	18	Medium	Establish in the donation contract or agreement the technical and compatibility characteristics of the chargers, ensuring the useful life of the equipment.
The technical information provided regarding the sites where the installation will be carried out is incorrect, generating problems at the time of installation.	6 - Occasional	4 - Critical	24	High	Have a technical review, where the previously obtained information is corroborated, thus avoiding problems in the installation process.
The institution responsible for maintenance does not provide the necessary maintenance, generating a deterioration in the chargers.	8 - Moderate	4 - Critical	32	Very High	Make an agreement / agreement with a company that provides optimal maintenance, since, although the Agency does not have the expertise in the subject, private companies will be made / contacted.
Electric chargers lack accident insurance, generating legal problems for those responsible for the property.	10 - Constant	5- Catastrophic	50	Very High	Make an agreement with a company that provides the insurance service, since, although the Agency does not have the expertise in the subject, private companies will be made / contacted.
The institution responsible for the operation does not make the corresponding payments to the electricity service, disabling the electricity supply in the service.	10 - Constant	4 - Critical	40	Very High	Make an agreement with that institution, where benefits are agreed for both parties, in order to seek the support of that institution to cover said expense.
The Energy Agency of the State of Puebla does not have the necessary experience to carry out the operation and maintenance of this type of technology.	10 - Constant	5- Catastrophic	50	Very High	Seek support/ advice with companies that have the necessary knowledge for the operation of this technology.

STAGE 5

Event	Probability	Severity	Score	Risk	Solution
The contract for the installation is not adequate and therefore the operation of the chargers can not be optimal.	2 - Improbable	3 - Moderate	6	Low	Establish a clear and concise contract in which the company to be hired ensures the installation and correct adaptation for the operation of the chargers, offering a guarantee on the work done.
The company that will donate the chargers for electric vehicles makes a donation of obsolete equipment, which does not fulfill its adequate function without having a guarantee of these.	6 - Occasional	5 – Very Critical	30	Very High	Establish in the donation contract the technical and compatibility characteristics of the chargers, ensuring the useful life of the equipment.
The technical information provided regarding the sites where the installation will be carried out is incorrect, generating problems at the time of installation.	6 - Occasional	4 - Critical	24	High	Have a technical review, where the information previously obtained is corroborated, thus avoiding inconveniences in the installation process.
The AEEP does not provide adequate maintenance to electric vehicle chargers, thus leading to a deterioration in this technology.	10 - Constant	4 - Critical	40	Very High	Make an agreement with a company that provides optimal maintenance, since, although the Agency does not have the expertise in the subject, private companies will be made / contacted.
Electric chargers lack accident insurance, generating legal problems for those responsible for the property.	10 - Constant	5 - Catastrophic	50	Very High	Make an agreement with a company that provides the insurance service, since, although the Agency does not have the expertise in the subject, private companies will be made / contacted.
The AEEP does not make the corresponding payments to the electricity service, disabling the electricity supply.	10 - Constant	4 - Critical	40	Very High	Seek some type of national or international financing to correct this expense, in case you do not have the resource to cover it. In case of having such capital, it will seek to make some type of agreement with CFE for the application of a lower charge.
The AEEP does not have the necessary experience to perform the operation and maintenance of this type of technology	10 - Constant	5 - Catastrophic	50	Very High	Seek support / advice with companies that have the necessary knowledge for the operation of this technology.

Finally, a total weighting of each of the stages presented was carried out, where it was concluded that stage 5 is the one with the highest risk score (240 points), unlike stage 1, which presents a risk score of only 60 points.

	Score	Conclusion:
Stage 1	**60**	This stage has the lowest risk weighting, since being the company that will make the donation of the equipment, who executes the operation of the project, it is considered that it has the necessary experience to manage the risks of each situation.

	Score	Conclusion:
Stage 2	**138**	Stage 2 calls for a company to be hired to handle only the operation of electric vehicle chargers, which is considered unlikely, as it is not a profitable economic model. So the chances of a company performing such an operation are very lows.

	Score	Conclusion:
Stage 3	**200**	This stage contemplates two cases that are considered unlikely, since as mentioned above the fact that a company agrees to perform the maintenance and insurance of the chargers as well as, that the municipality or state makes the payment for the energy consumed is very low.

	Score	Conclusion:
Stage 4	**220**	Lthe probability that it is the city council or state that makes the payment for the energy is extremely low, which implies a greater risk by not having who makes the payment of the said service, in the same way the Energy Agency covers the rest of the operation, which is reflected in a high risk.

	Score	Conclusion:
Stage 5	**240**	This stage has the highest risk weighting, since the Energy Agency of the State of Puebla covers most of the stages (Installation, obtaining the place and operation), which translates into a greater risk, as the Agency is a public body that does not have enough experience to handle this technology.

Due to the conclusion, it is considered by the scoring ranges and the risk analysis involved in the execution of the proposed activities, stage 1 is the most viable option, given that the levels of probability and severity of risks are lower than the rest of the stages.

7. CONCLUSIONS

7 CONCLUSIONS

This Plan is part of the main axes of the Public Policy of the Electromobility Hub. This is intended to be a guide for the orderly strengthening of the infrastructure necessary for the development of the electromobility sector.

Through the review and analysis of the information regarding electric vehicles available internationally, nationally and locally, it was found that electric vehicles have increased their share in the Mexican market, transiting from 0.51% to 4.23%, in the years 2016 and 2021, respectively.

Likewise, a review of the electric vehicles marketed in Mexico was carried out, finding that the shortest autonomy corresponds to 241 km; while, the greatest autonomy corresponds to 652 km.
On the other hand, different types of electric chargers were identified, impacting on the recharge time of electric vehicles. There are also different types of connectors that apply to different types of electric vehicles. This forces users to have connector adapters to charge electrical energy in different chargers.

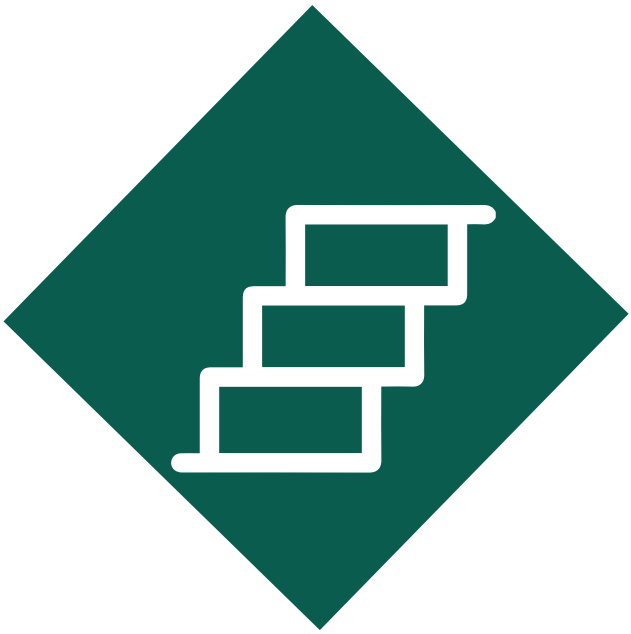
In addition, it should be noted that the Plan considers safety conditions by placing them no more than 20 km away between a charger and the nearest security body; and the Annual Average Daily Transit (TDPA), which offers us an overview of which routes have the highest vehicular flow in the State.

Additionally, in order to execute this Plan, potential locations for the installation of the chargers were identified. The selection criteria of these was that they are part of the Municipal, State or Federal Public Administration. In this sense, 78 potential places for the installation of electric chargers in the State were identified.

In summary, considering the coverage approach on the main routes of the State of Puebla, and considering the installation of a fast charging charger in the municipality of Tehuacán, it was determined that 7 additional fast charging chargers are required to achieve coverage in the main communication routes of the State. The above considering the installation of a charger in the municipality of Tehuacán.

Similarly, according to the coverage approach in conurbation zones, 98 chargers are required distributed in 82 municipalities, which cross the Electromobility Routes of Puebla. in order to encourage the demand for electric vehicles in the State, through extensive coverage and an extensive network of electric charger infrastructure.

Finally, a section of the procedure required by the Federal Electricity Commission to register the electric vehicle supply service was included, which has the Small Demand Low Voltage (PDBT) rate for residential services.



8. CONTINUATION PROCESS

8 CONTINUATION PROCESS

• The technical and legal administrative process for the installation of chargers for electric vehicles in the state of Puebla must be developed. First, the electrical characteristics of the proposed installations should be reviewed in order to identify with which type of chargers they are compatible according to their technical characteristics. Then standardized legal instruments must be developed for the donation and assignment of operating rights of electric chargers, as well as for the operation and maintenance of these by a private entity.

• The Plan must be presented to the different participating agencies, as well as to the private sector involved in the project. The above is intended to start the installations of these in the selected locations. Subsequently, carry out the proper monitoring of the operation of the installed electric chargers.

• Likewise, it is necessary to train the security forces and operators near the electric chargers installed and to be installed, in the event of accidents that occur with them, such as fires, short circuits, floods, etc.

• It is also recommended to identify the different types of economic models for the operation and maintenance of electric chargers. In order to know the advantages and disadvantages of these and develop strategies to promote the infrastructure of electric chargers.

Finally, the strategy of promotion of the Plan by the Energy Agency of the State of Puebla must be developed and executed, in order to disseminate the benefits of electric chargers.

Acronyms and Glossary

	Acronyms
AEEP	Agencia de Energía del Estado de Puebla
AMIA	Asociación Mexicana de La Industria Automotriz
BEV	Vehículo Eléctrico de Baterías, por sus siglas en inglés Battery Electric Vehicle
CANAME	Cámara Nacional de Manufacturas Eléctricas
CMNUCC	Convención Marco de las Naciones Unidas sobre el Cambio Climático
CA	Alternate Current
CC	Direct Current
CEI	Comisión Electrotécnica Internacional
CFE	Comisión Federal de Electricidad
CONUEE	Comisión Nacional para el Uso Eficiente de la Energía
COP	Conference of Parts
CRE	Comisión Reguladora de Energía
GHG	Greenhouse Gases
DOE	Department of Energy
FCEV	Fuel Cell Electric Vehicle
FOTEASE	Fondo para la Transición Energética y el Aprovechamiento Sustentable de la Energía
HEV	Hybrid Electric Vehicle
ICE	Internal Combustion Engine
INEEL	Instituto Nacional de Electricidad y Energías Limpias
INEGI	Instituto Nacional de Estadística y Geografía
LIE	Ley de la Industria Eléctrica
WHO	World Health Organization
UNO	United Nations Organization
PED	Plan Estatal de Desarrollo
PEII	Programa para la Promoción de la Electromovilidad por medio de la Inversión en Infraestructura de Recarga
PDBT	Pequeña Demanda Baja Tensión
PHEV	Plug-in Hybrid Electric Vehicle
PRODESEN	Programa de Desarrollo del Sistema Eléctrico Nacional
SCT	Secretaría de Comunicaciones y Transporte
SSB	Suministrador de Servicio Básico
SEMARNAT	Secretaría de Medio Ambiente y Recursos Naturales
SENER	Secretaría de Energía
TDPA	Average Annual Daily Transit.
TFSB	Tarifa Final de Suministro Básico

Acronyms and Glossary

Glossary	
Connection	It is called connection in the electrical installations to the part of the distribution network of the supplying company that feeds the box or general boxes of protection or equivalent functional unit.
Fossil Fuel	A fossil fuel is one that comes from the biomass produced in past eras, which has undergone burial and after it, transformation processes, due to increased pressure and temperature, until the formation of substances of great energy content, such as coal, oil, or natural gas.
Electric Mobility	Electric mobility is one that makes use of one or more electric motors to generate locomotion.
Vehicle Park	Shows the number of vehicle units registered by state and municipal governments, according to the type of vehicle and the service it provides, in addition to the national production and sale of automobiles.
Fast Charging Charger for Electric Vehicles	Is a compressor installed in a combustion engine to generate a supercharger, thus increasing its specific power. The energy for the supercharger is provided mechanically by means of belts, chains or shafts connected to the engine crankshaft.
Conurbated Areas	It is a region comprising a number of cities, large towns and other urban areas that, through population growth and their physical growth merge.

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Gobierno de Puebla

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ANNEXES

Agencia de Energía
del Estado de Puebla

Annex 1. Specifications of electric vehicle charging stations in the state of Puebla

No.	Load Center Name	Address	Municipality	Locality	Coordinates	No. Chargers	Load Centers (kW)
1	CC Angelópolis	Centro Comercial Angelópolis, 72193	Puebla	Heroica Puebla de Zaragoza	19.03201, -98.23414	2	N/P
2	Grand Fiesta Americana Puebla	Parque Milenium, Calle Osa Mayor 2507, Reserva Territorial Atlixcáyotl, Centro Comercial Angelópolis	Puebla	Heroica Puebla de Zaragoza	19.0332, -98.23016	3	18
3	Plaza Solesta	Calle Osa Mayor, Centro Comercial Angelópolis	Puebla	Heroica Puebla de Zaragoza	19.0342, -98.22982	8	7 a 18
4	City Express Puebla Angelópolis	Cto Juan Pablo II 1755, Reserva Territorial Atlixcáyotl, La Noria	Puebla	Heroica Puebla de Zaragoza	19.03401, -98.22562	2	18
5	Nissan Zero Emission Charging Station	Blvrd Atlixco No. 4717, Estrellas del Sur, 72190	Puebla	Heroica Puebla de Zaragoza	19.04023, -98.24008	1	N/P
6	Tesla Destination Charger	Blvrd Atlixco 3915, Animas, 72400	Puebla	Heroica Puebla de Zaragoza	19.04307, -98.23629	1	18
7	Courtyard by Marriott Puebla Las Animas	Av. Manuel Espinosa Iglesias 31 Pte. 3333, Villas de Atlixco, 72400	Puebla	Heroica Puebla de Zaragoza	19.0462, -98.23401	2	18
8	Mercedes-Benz	Blvrd. Hermanos Serdán 194, Real del Monte, 72060	Puebla	Heroica Puebla de Zaragoza	19.06562, -98.22282	1	N/P
9	Casona María Puebla	Calle 3 Ote. 1414, Barrio de Analco, 72500	Puebla	Heroica Puebla de Zaragoza	19.03903, -98.18951	3	11
10	Restaurante Casa reyna	Privada 2 Oriente 1007, Centro, 72000	Puebla	Heroica Puebla de Zaragoza	19.0419, -98.1911	2	9.6 a 11
11	Rosewood Puebla	Calle 10 Nte. 1402 barrio del Alto	Puebla	Heroica Puebla de Zaragoza	19.04534, -98.18908	3	16
12	City Express Puebla Centro Tesla	C. 10 Nte. 1406, Barrio del Alto, 72000	Puebla	Heroica Puebla de Zaragoza	19.04599, -98.18901	2	18
13	Parque Puebla	Calz Park, Ignacio Zaragoza 410, 72220	Puebla	Heroica Puebla de Zaragoza	19.07056, -98.17391	1	9.6
14	Nissan Diagonal	Diagonal Defensores de la República 868, Renacimiento	Puebla	Heroica Puebla de Zaragoza	19.06456, -98.18192	1	N/P
15	BMW VECSA Puebla	Blvrd. Esteban de Antuñano 354	Puebla	Heroica Puebla de Zaragoza	19.08245, -98.23848	1	7
16	Marriott Puebla Hotel Mesón del Ángel	Boulevard Hermanos Serdán 807, Frac, Las Fuentes de Puebla	Puebla	Heroica Puebla de Zaragoza	19.09259, -98.23077	2	18
17	Staybridge Suites Puebla	Boulevard Hermanos Serdán 810	Puebla	Heroica Puebla de Zaragoza	19.09381, -98.22943	3	9
18	Fiesta Inn Puebla Finsa	Carretera Lateral Autopista México-Puebla 7735 Rancho Moratilla	Puebla	Heroica Puebla de Zaragoza	19.09915, -98.23455	2	18
19	City Express Suites Puebla Autopista	Autopista México - Puebla 7533, Rancho Moratilla	Puebla	Heroica Puebla de Zaragoza	19.09874, -98.23377	2	18
20	Komplex Puebla	Reserva Territorial Atlixcáyotl	Puebla	Heroica Puebla de Zaragoza	19.00995, -98.2454	3	18
21	Adagio Town Plaza	P.º Opera 11, Lomas de Angelópolis	San Andrés Cholula	San Bernardino Tlaxcalancingo	18.99375, -98.27687	1	9.6
22	Plaza los Arcángeles y Chedraui Selecto	Lateral sur vía Atlixcáyotl 6510 San Bernandino	San Andrés Cholula	San Bernardino Tlaxcalancingo	19.00548, -98.26738	2	18
23	La Vista Country Club	Atlixcáyotl km 4, 72810	San Andrés Cholula	San Bernardino Tlaxcalancingo	19.00829, -98.25463	2	7
24	Mercedes-Benz Reyes Huerta	Blvrd. Atlixcáyotl 4000-B	San Andrés Cholula	San Bernardino Tlaxcalancingo	19.01481, -98.25606	1	N/P
25	Nissan Angelópolis	Atlixcáyotl 4000A, Emiliano Zapata, 72197	San Andrés Cholula	San Bernardino Tlaxcalancingo	19.01509, -98.25585	1	N/P

No.	Load Center Name	Address	Municipality	Locality	Coordinates	No. Chargers	Load Centers (kW)
26	Chevrolet Angelópolis	Atlixcáyotl 3204, La vista club, 72830	San Andrés Cholula	San Bernardino Tlaxcalancingo	19.01632, -98.25253	1	30
27	Marsala Angelópolis	Atlixcáyotl 3246, 72858	San Andrés Cholula	San Bernardino Tlaxcalancingo	19.01786, -98.25155	1	7
28	Audi Center Angelópolis	Atlixcáyotl 2304, Reserva Territorial Atlixcáyotl, Conjunto Residencial el Pilar	San Andrés Cholula	San Bernardino Tlaxcalancingo	19.02158, -98.24607	1	24
29	BMW VECSA Puebla	Vía Atlixcáyotl 5316 Reserva Territorial Atlixcáyotl 72190	San Andrés Cholula	San Bernardino Tlaxcalancingo	19.02611, -98.23621	1	7
30	Plaza Mazarik	Plaza Mazarik Boulevard Atlixcáyotl 1501 Reserva Territorial Atlixcáyotl	San Andrés Cholula	San Bernardino Tlaxcalancingo	19.02698, -98.23659	1	18
31	Hotel Villa Florida Puebla	Blvrd Atlixcáyotl 1100 Reserva Territorial Atlixcáyotl, Centros Comerciales Desarrollo Atlixcáyotl	San Andrés Cholula	San Bernardino Tlaxcalancingo	19.02745, -98.23617	2	13
32	Lincoln Puebla	Atlixcáyotl 5310a Reserva Territorial Atlixcáyotl, Corredor Comercial Desarrollo Atlixcáyotl	San Andrés Cholula	San Bernardino Tlaxcalancingo	19.02701, -98.23455	1	N/P
33	Universidad Iberoamericana Puebla	Blvrd del Niño Poblano 2901, Reserva Territorial Atlixcáyotl, Centro Comercial Puebla	San Andrés Cholula	San Bernardino Tlaxcalancingo	19.03138, -98.24198	1	7
34	Super carga La Capillita	Autopista México - Puebla 64	Puebla	Puebla	19.22889, -98.37418	3	N/P
35	Oxxo Autopista La Capillita	Autopista México - Puebla Km. 98+400	Puebla	Puebla	19.23222, -98.37662	1	7
36	Africam Safari	Blvrd. Cap. Carlos Camacho Espíritu Km 16.5 Oasis	Puebla	Puebla	18.93716, -98.13685	3	13
37	Tesla Destination Charger	C. Guerrero 117, Sanctorum	Cuautlancingo	Sanctorum	19.11203, -98.24992	1	18
38	Hotel One Finsa	Lat. Sur Aut. México Puebla 55 Sanctorum	Cuautlancingo	Sanctorum	19.12081, -98.25847	3	18
39	Restaurante Palmira Atlixco	Puebla-Matamoros, Ricardo Flores Magón	Atlixco	Atlixco	18.91171, -98.42799	1	9.6
40	Hotel Los Arcos	Calle Vicente Guerrero Ote 16, Tercera, 75880	San Gabriel Chilac	San Gabriel Chilac	18.32412, -97.34091	2	7
41	Nissan Tehuacán	Calle 32 Nte. 239, Zona Alta, 75760	Tehuacán	Tehuacán	18.46594, -97.41256	1	N/P
42	Los Cochinitos Puebla	Carretera México-Puebla San Francisco Ocotlán	Coronango	San Francisco Ocotlán	19.14093, -98.27833	2	18
43	Misión Gran Ex-Hacienda de Chautla	Camino Ex Hacienda de Chautla s/n San Lucas el Grande	San Salvador el Verde	San Lucas el Grande	19.31463, -98.47251	2	18
44	Nissan Sado Teziutlán	Carretera Teziutlán-Nautla 405–407	Teziutlán	Teziutlán	19.8313, -97.3464	1	N/P
45	Outlet Puebla Premier Tesla Supercharger	Autopista México Puebla Km 115, San Francisco Ocotlán, México	Corononago	San Francisco Ocotlán (Ocotlán)	19.13231, -98.2665	87	150
Total							

Fuente: Datos recolectados en plataforma Plug Share

Annex 2. Fire stations in the state of Puebla

No.	Unit Name	Company name	Municipality	Coordinates	
1	Bomberos De Tecamachalco Ac	Asociación Civil (Non Gubernamental Organization)	Tecamachalco	18.8819875	-97.731893
2	Central De Bomberos	Operativo Puebla De La secretaria De Seguridad Pública	Puebla	19.0169214	-98.210569
3	Dirección De Protección Civil Y Bomberos	Sistema Municipal De Protección Civil Izúcar De Matamoros	Izúcar de Matamoros	18.5901141	-98.456573
4	Dirección De Protección Civil Y Bomberos	Municipio De Tehuacán Puebla	Tehuacán	18.4726172	-97.394881
5	Dirección De Protección Civil Y Bomberos Del Municipio De Zacatlán Puebla	Comisión Nacional De Emergencia Delegación Zacatlán	Zacatlán	19.9211286	-97.961034
6	Dirección Del Heroico Cuerpo De Bomberos	Secretaria De Seguridad Publica	Puebla	19.0170282	-98.210608
7	Estación Central De Bomberos De Huauchinango	Municipio De Huauchinango Puebla	Huauchinango	20.1740234	-98.062913
8	Estación De Bomberos	H Ayuntamiento San Martin Texmelucan	San Martín Texmelucan	19.2760677	-98.431466
9	Estación De Bomberos Defensores	Gobierno Del Estado De Puebla	Puebla	19.0562246	-98.213507
10	Estación De Bomberos México 68	Director Policía Estatal De Bomberos	Puebla	19.0545996	-98.159133
11	Estación De Bomberos Protección Civil Y Suma	Presidencia Municipal De Zacapoaxtla	Zacapoaxtla	19.8918378	-97.591939
12	Estación De Bomberos San Pablo Xochimehuacan	Heroico Cuerpo De Bomberos Puebla Estación San Pablo Xochimehuacan	Puebla	19.0962028	-98.206647
13	Estación De Bomberos Tepeaca	Gobierno Del Estado De Puebla	Tepeaca	18.9891841	-97.906576
14	Estación De Bomberos Zapata	Gobierno Del Estado De Puebla	Puebla	18.987039	-98.249039
15	Estación De Bomberos Zavaleta	Bomberos Zavaleta	Puebla	19.0594777	-98.256174
16	Heroico Cuerpo De Bomberos Del Municipio Cuautlancingo	Gobierno Municipal De San Juan Cuautlancingo	Cuautlancingo	19.096775	-98.280859
17	Heroico Cuerpo De Bomberos	H. Ayuntamiento	Atlixco	18.9181817	-98.42519
18	Protección Civil Bomberos	Municipio De San Andres Cholula Puebla	San Andrés Cholula	19.0523577	-98.296797
19	Secretaria De Seguridad Publica Vial Y Bomberos Del Municipio De Cuautlancingo	Secretaría De Seguridad Pública De Cuautlancingo	Puebla	19.0779897	-98.261293
20	Subestación De Bomberos Base Santa Cecilia	H. Ayuntamiento De Izúcar De Matamoros	Izúcar de Matamoros	18.615227	-98.467777
21	Unidad De Protección Civil Y Bomberos Del Municipio Ajalpan	Municipio De Ajalpan Puebla	Ajalpan	18.3771916	-97.279509
22	Unidad Operativa De Protección Civil Y Bomberos	Honorable Ayuntamiento De Xicotepec De Juárez Pue	Xicotepec	20.2586543	-97.963851

Annex 3. Police stations in the state of Puebla

No.	Unit name	Company Name	Municipality	Coordinates	
1	Base De Operaciones De La Policía Estatal	Secretaria De Seguridad Pública Del Estado De Puebla	Huehuetla	20.10604715	-97.62700628
2	Base De Operaciones De La Policía Estatal	Gobierno Del Estado	Cuetzalan del Progreso	20.02065482	-97.52733346
3	Base De Operaciones De La Policía Estatal De Xaltepuxtla	Secretaría De Seguridad Pública	Tlaola	20.18051337	-97.97178929
4	Base De Operaciones De La Policía Estatal Preventiva	Base De Operaciones Del Municipio De Teotlalco	Teotlalco	18.4692749	-98.77744015
5	Base De Operaciones Policía Estatal	Secretaria De Seguridad Pública Del Estado De Puebla	Chichiquila	19.19489629	-97.07127273
6	Base De Operaciones Policía Estatal	Secretaría De Seguridad Pública Del Estado	Tlacuilotepec	20.32252789	-98.07179181
7	Base De Operaciones Policía Estatal Preventiva Francisco Z Mena	Municipio De Francisco Z Mena Puebla	Francisco Z. Mena	20.72682769	-97.85314082
8	Base De Policía Del Sector Escape De Lagunillas	Comandancia Municipal De Chietla	Chietla	18.48365963	-98.66082333
9	Base De Policía Municipal Sector 5	H. Ayuntamiento Del Estado De Puebla	Puebla	19.03628158	-98.20138227
10	Casta De Policía	Caseta De Policía	Puebla	19.05422177	-98.15067492
11	Centro De Coordinación Regional De Teziutlán	Centro De Coordinación Regional De La Policía Estatal De Teziutlán	Teziutlán	19.82632858	-97.34981985
12	Comandancia De La Policía Ministerial	Fiscalía General Del Estado De Puebla	Francisco Z. Mena	20.72873831	-97.84783788
13	Comandancia De La Policía Municipal De Tlachichuca	Presidencia Municipal Tlachichuca	Tlachichuca	19.11548519	-97.41933197
14	Comandancia De Policía	Municipio De Chiconcuautla Puebla Mcp930215628	Chiconcuautla	20.09465403	-97.93957059
15	Comandancia De Policía	Sin Datos	San Pedro Cholula	19.06944867	-98.36809276
16	Comandancia De Policía	Gobierno Del Estado De Puebla	Puebla	18.99621605	-98.23459946
17	Comandancia De Policía Auxiliar De San Andres Azumiatla	Sin Datos	Puebla	18.90315805	-98.25244892
18	Comandancia De Policía Municipal	Municipio De Huehuetlán El Chico Puebla	Huehuetlán el Chico	18.37285492	-98.68758788
19	Comandancia De Policía Municipal	H Ayuntamiento Tepatlaxco De Hidalgo	Tepatlaxco de Hidalgo	19.07730804	-97.96668233
20	Comandancia De Policía Municipal Chiautzingo	Gobierno Del Estado	Chiautzingo	19.20288953	-98.46836144
21	Comandancia De Policía Municipal De Chiautla De Tapia Del Estado De Puebla	Gobierno Del Municipio De Chiautla	Chiautla	18.29975357	-98.60279306
22	Comandancia De Policía Municipal De San Felipe Hueyotlipan	Comandancia De Policía San Felipe Hueyotlipan	Puebla	19.0869105	-98.21166087
23	Comandancia De Policía Municipal De San Pedro Tlaltenango	Comandancia De Policía De San Pedro Tlaltenango	Tlaltenango	19.17017788	-98.34448433
24	Comisaria Norte Policía Municipal	Secretaria De Seguridad Publica	Puebla	19.08648789	-98.18525509
25	Corporación Auxiliar De Policía De Protección Ciudadana	Gobierno Del Estado De Puebla	San Martín Texmelucan	19.28781459	-98.44032999
26	Corporación Auxiliar De Policía De Protección Ciudadana	Gobierno Del Estado	Tepeaca	18.97653614	-97.90321952
27	Corporación Auxiliar De Policía De Protección Ciudadana	Gobierno Del Estado De Puebla	Tehuacán	18.46514549	-97.40792826
28	Corporación Auxiliar De Policía De Protección Ciudadana Delegación Oriental	Corporación Auxiliar De Policía De Protección Ciudadana Del Estado De Puebla	Oriental	19.37221349	-97.62101743
29	Corporación Auxiliar De Policía De Protección Ciudadana.	Seguridad Pública Del Estado De Puebla	Izúcar de Matamoros	18.59160124	-98.46950626
30	Corporación Auxiliar De Policía De Protección Civil	Secretaría General De Gobierno Estatal	Teziutlán	19.82259759	-97.36021096

No.	Unit name	Company Name	Municipality	Coordinates	
31	Delegación De La Policía Auxiliar Del Estado De Puebla Base Huauchinango	Coordinación Auxiliar De Policía Ciudadana	Huauchinango	20.17533939	-98.04542899
32	Destacamento De La Policía Estatal Preventiva	Secretaría De Seguridad Pública Del Estado De Puebla	Xicotepec	20.38595577	-97.87757957
33	Dirección De La Policía Estatal Turística	Secretaría De Seguridad Pública Del Estado De Puebla	Puebla	19.04580816	-98.19052293
34	Dirección General De La P0licia Estatal Preventiva	Dirección General De La Policía Estatal Preventiva	Puebla	19.03655782	-98.19078493
35	Estación De Bomberos México 68	Director Policía Estatal De Bomberos	Puebla	19.05459958	-98.15913274
36	Fiscalía General Del Estado De Puebla	Policía Ministerial De Lafiscalía general del Estado De Puebla En El Distrito Judicial De Tecamachalco	Tecamachalco	18.88081411	-97.71904585
37	Jefatura De Policía De San Hipolito Xochiltenango	Presidencia Auxiliar De San Hipolito Xochiltenango	Tepeaca	18.93790025	-97.87541756
38	Módulo De Seguridad	Comandancia De Policía De Magdalena Cuayucatepec	Tehuacán	18.54857594	-97.48690295
39	Módulo De Vigilancia Policía Municipal	Secretaria De Seguridad Publica	Chietla	18.50927173	-98.60886024
40	Oficina Auxiliar De La Policía	Corporación Auxiliar De Policía De Protección Ciudadana	Zacatlán	19.94198517	-97.96632639
41	Oficina De La Comandancia De La Policía De Tecomatlán	Presidencia Municipal De Tecomatlán Puebla	Tecomatlán	18.10945205	-98.31209832
42	Oficina De La Corporación Auxiliar De Policía De Protección Ciudadana Delegación Atlixco	Gobierno Estado De Puebla	Atlixco	18.91098382	-98.44433217
43	Oficina De Policía Vial Estatal	Gobierno Del Esta De Puebla	Tehuacán	18.4674218	-97.41018053
44	Policía Auxiliar	Corporación Auxiliar De Policía Y Protección Ciudadana	Puebla	19.09626692	-98.20634763
45	Policía Auxiliar De San Miguel Tianguistenco	Presidencia Auxiliar De San Miguel Tianguistenco	Tlahuapan	19.28945713	-98.5317112
46	Policía Auxiliar De Santiago Acatlán	Presidencia Auxiliar De Santiago Acatlán	Tepeaca	18.99439022	-97.93170315
47	Policía De La Junta Auxiliar De San Sebastián Tepalcatepec	Municipio De San Pedro Cholula	San Pedro Cholula	19.09426781	-98.32844022
48	Policía Estatal	Policía Estatal	Venustiano Carranza	20.4613367	-97.70228643
49	Policía Estatal	Policía Estatal	Juan N. Méndez	18.54193449	-97.77218665
50	Policía Estatal Base De Operaciones Tehuitzingo Cecore	Secretaria De Seguridad Pública Del Estado De Puebla	Tehuitzingo	18.33827297	-98.28372596
51	Policía Estatal Preventiva	Gobierno Del Estado De Puebla	Tepeaca	18.98908416	-97.90633793
52	Policía Estatal Preventiva	Secretaría De Seguridad Pública Del Estado De Puebla	Izúcar de Matamoros	18.60048155	-98.48109268
53	Policía Estatal Preventiva Base De Operaciones Tulcingo De Valle	Gobierno Del Estado De Puebla	Tulcingo	18.04068844	-98.43289166
54	Policía Federal	Secretaría De Seguridad Y Protección Ciudadana	Teziutlán	19.82516864	-97.3491695
55	Policía Federal	Policía Federal De Libres	Libres	19.45650057	-97.68565207
56	Policía Federal	Gobierno Federal	Zacatlán	19.92129664	-97.96131381
57	Policía Federal De Caminos	Unidad Operativa De Seguridad Preventiva Estación Puebla	Puebla	19.09993898	-98.23535819
58	Policía Federal Estación Izúcar De Matamoros	Secretaria De Gobernación	Izúcar de Matamoros	18.58470737	-98.4534872
59	Policía Ministerial	Fiscalía General Del Estado De Puebla	Chalchicomula de Sesma	19.00090201	-97.45318839
60	Policía Ministerial Del Estado	Policía Ministerial Del Estado	San Salvador el Seco	19.13307366	-97.63905889

No.	Unit name	Company Name	Municipality	Coordinates	
61	Policía Ministerial Del Estado De Puebla Segunda Comandancia De Tehuacán	Gobierno Del Estado De Puebla	Tehuacán	18.46037733	-97.37927238
62	Policía Municipal De Ahuatlán	H. Ayuntamiento De Ahuatlán Puebla	Ahuatlán	18.57287997	-98.25569685
63	Policía Municipal	H. Ayuntamiento De Epatlan	Epatlan	18.64215893	-98.37024017
64	Policía Municipal	Municipio De Tecamachalco	Tecamachalco	18.8845714	-97.72863623
65	Policía Municipal	Ayuntamiento De Chalchicomula De Sesma	Chalchicomula de Sesma	18.98831912	-97.4483728
66	Policía Municipal	Gobierno Municipal	Tepexi de Rodríguez	18.58039986	-97.92594082
67	Policía Municipal	Gobierno	Huitzilan de Serdán	19.96556934	-97.69314638
68	Policía Municipal	Policía Municipal	Coltzingo	18.6152382	-98.17412281
69	Policía Municipal De Tepexco	Municipio Tepexco Puebla	Tepexco	18.63610499	-98.63474828
70	Policía Municipal Del Estado De Puebla	Municipio De Puebla	Puebla	19.01548474	-98.21041702
71	Policía Procesal	Secretaria De Seguridad Pública Del Estado De Puebla	Chalchicomula de Sesma	19.00011613	-97.45236794
72	Policía Vial Estatal	Secretaria De Seguridad Pública Del Estado De Puebla	Tecamachalco	18.87854179	-97.72445368
73	Secretaria De Seguridad Publica Base De Operaciones De La Policía	Policía Estatal Preventiva	Tepango de Rodríguez	20.003292	-97.79534986
74	Sub-Estación De Policía Federal San Martin Texmelucan	Secretaría De Gobernación	San Martín Texmelucan	19.27088082	-98.42968298

Annex 4. TDPA from 2019 to 2021

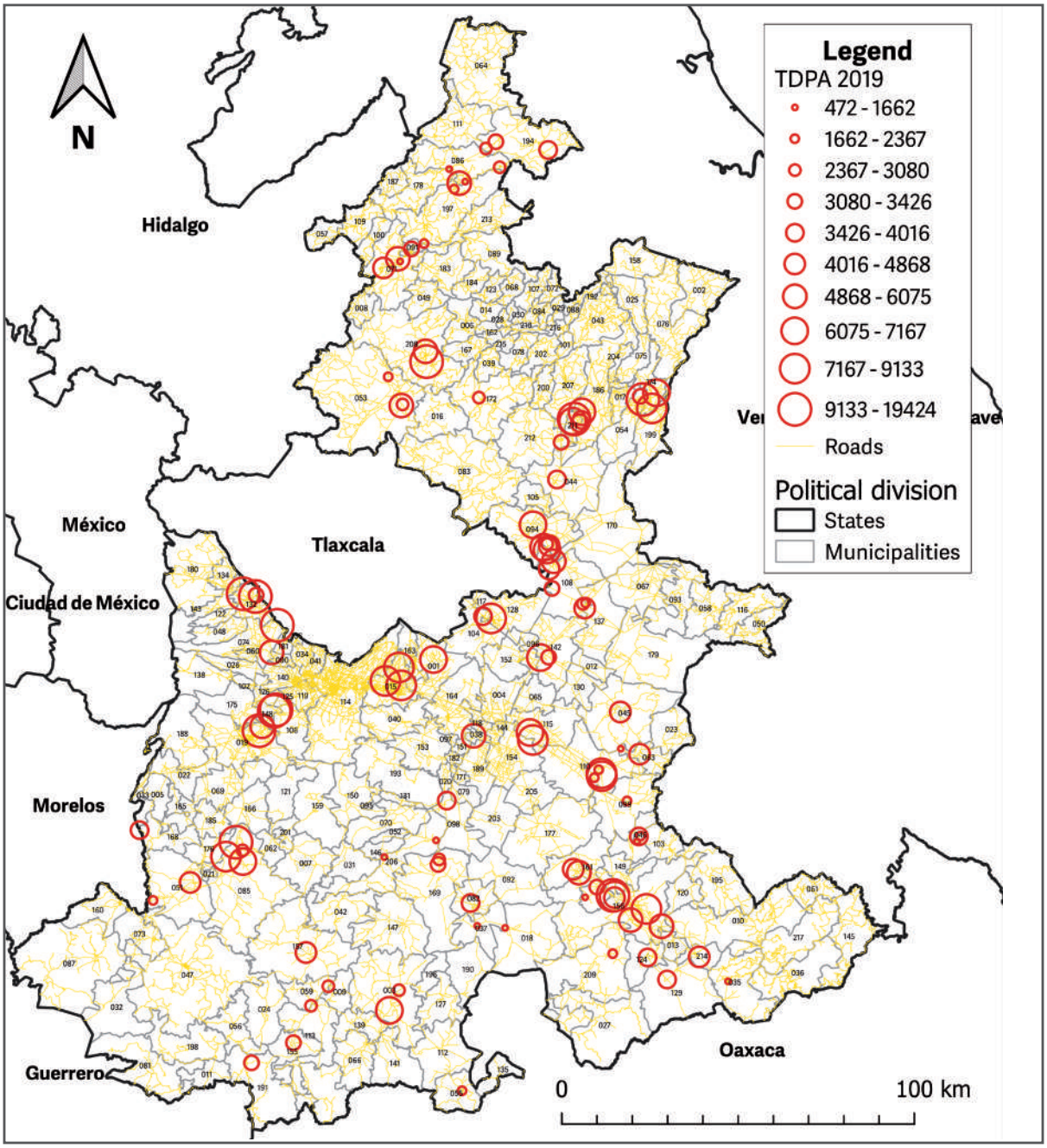

Figure 21. TDPA 2019 in Puebla.
Source: Own elaboration with information from the SCT.

Annex 4. TDPA 2020

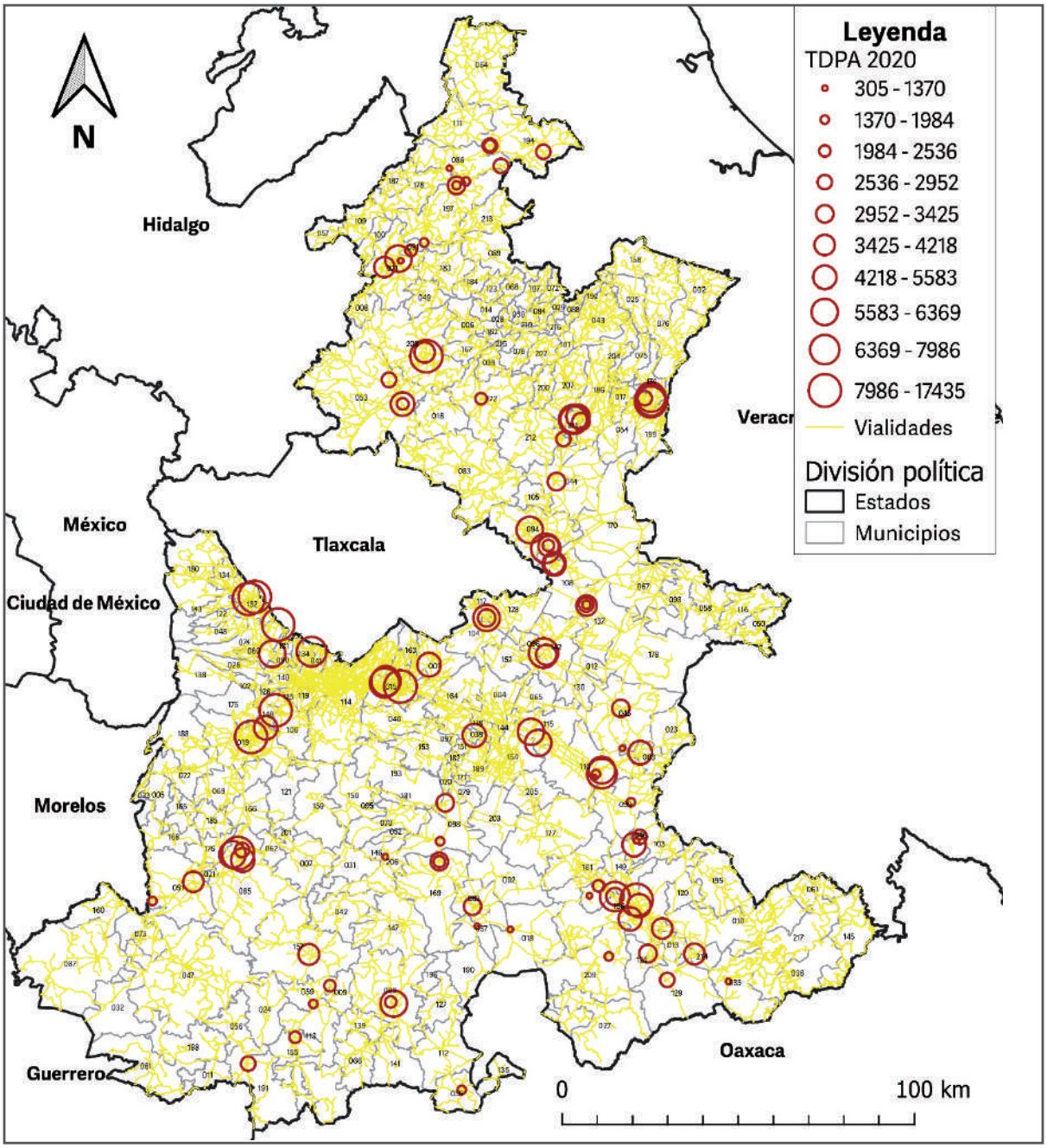

Figure 22. TDPA 2020 in Puebla.
Source: Own elaboration with information from the SCT.

Annex 4. TDPA 2021

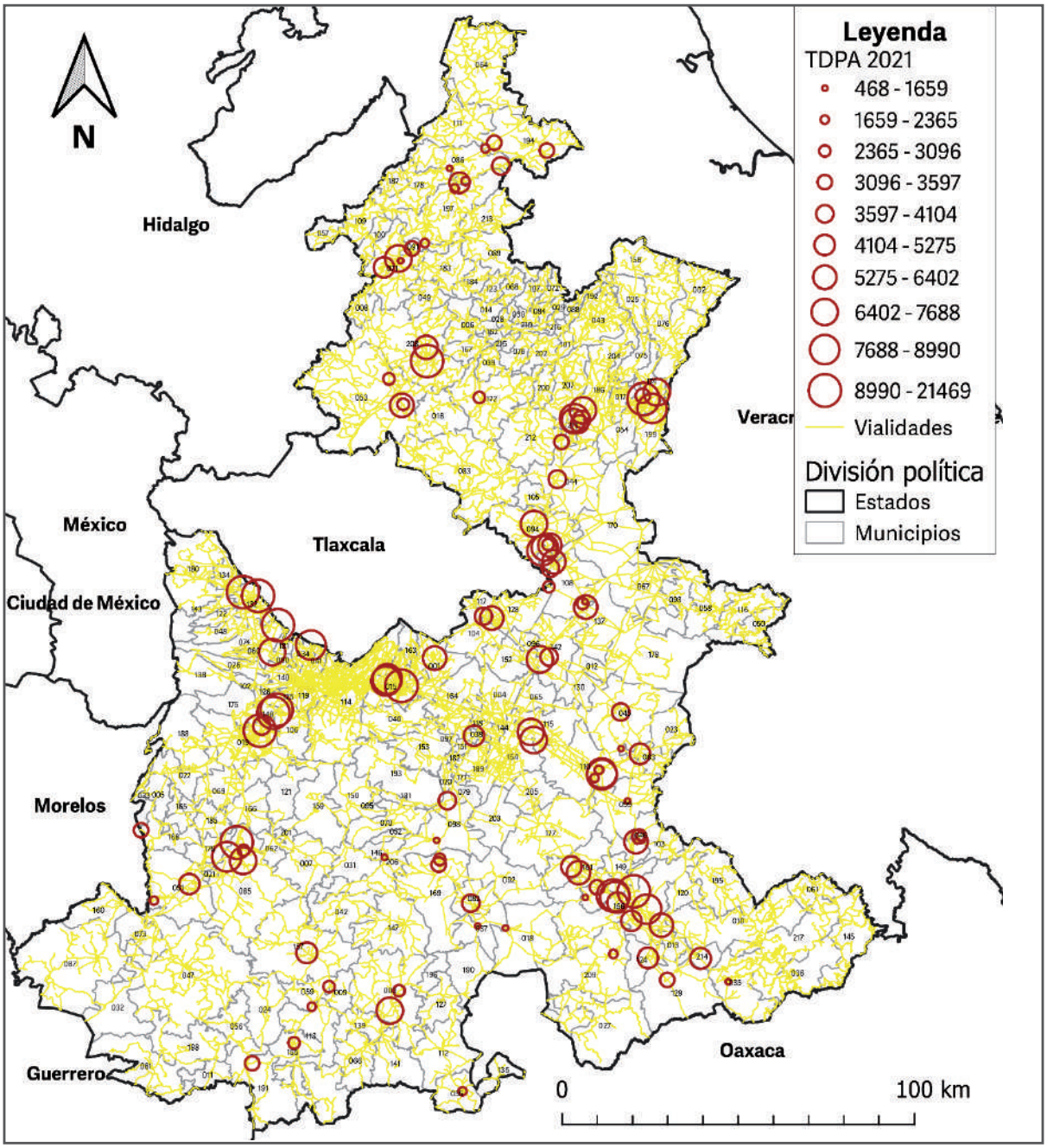

Figure 23. TDPA 2021 in Puebla.
Source: Own elaboration with information from the SCT.

Annex 5. Municipalities Information

ID	Municipality	Current Population	CVE	ICVE	CVEId	CVEI	Routas	Potential Zone
21156	Tehuacán	327,312	1	0.3	10	9	P	7,28,52,69,72,73,74
21015	Amozoc	125,876	0	0	4	4		32,33,34
21140	San Pedro Cholula	138,433	0	0	4	4		3
21001	Acajete	72,894	0	0	3	3	P	0
21010	Ajalpan	74,768	0	0	3	3		
21019	Atlixco	141,793	1	0.7	4	3		51
21071	Huauchinango	103,946	0	0	3	3		48
21074	Huejotzingo	90,794	0	0	3	3		8
21085	Izúcar de Matamoros	82,809	0	0	3	3		11
21154	Tecamachalco	80,771	0	0	3	3		16
21164	Tepeaca	84,270	0	0	3	3		26,65
21197	Xicotepec	80,591	0	0	3	3		
21208	Zacatlán	87,361	0	0	3	3	P	45,46,47,49
21003	Acatlán	37,955	0	0	2	2	P	14
21004	Acatzingo	63,743	0	0	2	2		
21043	Cuetzalan del Progreso	49,864	0	0	2	2	P	58
21045	Chalchicomula de Sesma	47,410	0	0	2	2		
21051	Chietla	37,030	0	0	2	2	P	
21053	Chignahuapan	66,464	0	0	2	2		
21094	Libres	37,257	0	0	2	2	P	
21106	Ocoyucan	42,669	0	0	2	2	P	
21110	Palmar de Bravo	50,226	0	0	2	2		27
21115	Quecholac	57,992	0	0	2	2	P	
21174	Teziutlán	103,583	1	1	3	2		13
21177	Tlacotepec de Benito Juárez	54,757	0	0	2	2		
21180	Tlahuapan	41,547	0	0	2	2		
21186	Tlatlauquitepec	55,576	0	0	2	2		67
21199	Xiutetelco	42,943	0	0	2	2	P	
21207	Zacapoaxtla	57,887	0	0	2	2		
21002	Acateno	9,170	0	0	1	1		
21005	Acteopan	3,070	0	0	1	1	P	
21006	Ahuacatlán	14,542	0	0	1	1	P	51
21007	Ahuatlán	3,162	0	0	1	1		
21008	Ahuazotepec	11,439	0	0	1	1		
21009	Ahuehuetitla	2,207	0	0	1	1		
21011	Albino Zertuche	1,885	0	0	1	1	P	
21012	Aljojuca	6,591	0	0	1	1		
21013	Altepexi	22,629	0	0	1	1	P	
21014	Amixtlán	4,812	0	0	1	1	P	

ID	Municipality	Current Population	CVE	ICVE	CVEId	CVEI	Routes	Potential Zone
21016	Aquixtla	9,021	0	0	1	1		
21017	Atempan	29,742	0	0	1	1		
21018	Atexcal	3,859	0	0	1	1		
21020	Atoyatempan	7,704	0	0	1	1		
21021	Atzala	1,512	0	0	1	1		
21022	Atzitzihuacán	12,857	0	0	1	1	P	
21023	Atzitzintla	9,051	0	0	1	1		
21024	Axutla	976	0	0	1	1		
21025	Ayotoxco de Guerrero	8,208	0	0	1	1	P	
21026	Calpan	15,271	0	0	1	1		
21027	Caltepec	4,128	0	0	1	1		
21028	Camocuautla	2,758	0	0	1	1		
21029	Caxhuacan	3,811	0	0	1	1		
21030	Coatepec	772	0	0	1	1		
21031	Coatzingo	2,820	0	0	1	1		
21032	Cohetzala	1,382	0	0	1	1		
21033	Cohuecan	5,403	0	0	1	1		
21035	Coxcatlán	20,653	0	0	1	1		
21036	Coyomeapan	14,806	0	0	1	1	P	
21037	Coyotepec	2,334	0	0	1	1	P	
21038	Cuapiaxtla de Madero	10,542	0	0	1	1	P	
21039	Cuautempan	9,837	0	0	1	1		
21040	Cuautinchán	12,340	0	0	1	1	P	
21042	Cuayuca de Andrade	3,315	0	0	1	1	P	
21044	Cuyoaco	17,139	0	0	1	1	P	
21046	Chapulco	8,193	0	0	1	1		
21047	Chiautla	21,699	0	0	1	1	P	15
21048	Chiautzingo	22,039	0	0	1	1		
21049	Chiconcuautla	17,382	0	0	1	1		
21050	Chichiquila	26,928	0	0	1	1		
21052	Chigmecatitlán	1,215	0	0	1	1		
21054	Chignautla	35,223	0	0	1	1	P	
21055	Chila	5,082	0	0	1	1		
21056	Chila de la Sal	1,317	0	0	1	1		
21057	Honey	6,687	0	0	1	1		
21058	Chilchotla	21,002	0	0	1	1		
21059	Chinantla	2,846	0	0	1	1	P	
21060	Domingo Arenas	7,982	0	0	1	1		
21061	Eloxochitlán	14,461	0	0	1	1		
21062	Epatlán	4,943	0	0	1	1		
21063	Esperanza	14,766	0	0	1	1	P	30

ID	Municipality	Current Population	CVE	ICVE	CVEId	CVEI	Routes	Potential Zone
21064	Francisco Z. Mena	17,824	0	0	1	1		
21065	General Felipe Ángeles	22,694	0	0	1	1	P	
21066	Guadalupe	6,451	0	0	1	1	P	
21067	Guadalupe Victoria	18,784	0	0	1	1		
21068	Hermenegildo Galeana	7,011	0	0	1	1		
21069	Huaquechula	29,233	0	0	1	1		
21070	Huatlatlauca	6,111	0	0	1	1	P	
21072	Huehuetla	17,082	0	0	1	1	P	
21073	Huehuetlán el Chico	9,760	0	0	1	1		
21075	Hueyapan	13,080	0	0	1	1	P	
21076	Hueytamalco	27,600	0	0	1	1		
21077	Hueytlalpan	5,951	0	0	1	1	P	
21078	Huitzilan de Serdán	15,928	0	0	1	1		
21079	Huitziltepec	5,782	0	0	1	1		
21080	Atlequizayan	2,633	0	0	1	1		
21081	Ixcamilpa de Guerrero	4,065	0	0	1	1		
21082	Ixcaquixtla	8,804	0	0	1	1		
21083	Ixtacamaxtitlán	25,319	0	0	1	1		
21084	Ixtepec	6,950	0	0	1	1	P	
21086	Jalpan	12,050	0	0	1	1	P	
21087	Jolalpan	13,308	0	0	1	1		
21088	Jonotla	4,457	0	0	1	1	P	
21089	Jopala	12,131	0	0	1	1		
21090	Juan C. Bonilla	23,783	0	0	1	1	P	24
21091	Juan Galindo	9,828	0	0	1	1		
21092	Juan N. Méndez	5,293	0	0	1	1		
21093	Lafragua	7,650	0	0	1	1	P	
21095	La Magdalena Tlatlauquitepec	650	0	0	1	1		
21096	Mazapiltepec de Juárez	3,176	0	0	1	1		
21097	Mixtla	2,668	0	0	1	1		
21098	Molcaxac	6,668	0	0	1	1	P	
21099	Cañada Morelos	20,659	0	0	1	1		
21100	Naupan	9,310	0	0	1	1		
21101	Nauzontla	3,317	0	0	1	1	P	
21102	Nealtican	14,075	0	0	1	1		
21103	Nicolás Bravo	6,644	0	0	1	1		
21104	Nopalucan	32,772	0	0	1	1	P	
21105	Ocotepec	5,077	0	0	1	1		
21107	Olintla	11,993	0	0	1	1		
21108	Oriental	19,903	0	0	1	1		
21109	Pahuatlán	20,274	0	0	1	1		66

ID	Municipality	Current Population	CVE	ICVE	CVEId	CVEI	Routes	Potential Zone
21111	Pantepec	18,528	0	0	1	1		
21112	Petlalcingo	9,350	0	0	1	1		
21113	Piaxtla	4,627	0	0	1	1	P	
21116	Quimixtlán	22,855	0	0	1	1	P	
21117	Rafael Lara Grajales	15,952	0	0	1	1	P	
21118	Los Reyes de Juárez	30,021	0	0	1	1	P	
21120	San Antonio Cañada	5,938	0	0	1	1	P	
21121	San Diego la Mesa Tochimiltzingo	1,270	0	0	1	1		
21122	San Felipe Teotlalcingo	11,063	0	0	1	1	P	
21123	San Felipe Tepatlán	3,793	0	0	1	1	P	
21125	San Gregorio Atzompa	9,671	0	0	1	1		
21126	San Jerónimo Tecuanipan	6,597	0	0	1	1		
21127	San Jerónimo Xayacatlán	3,606	0	0	1	1	P	
21128	San José Chiapa	10,443	0	0	1	1	P	
21129	San José Miahuatlán	14,018	0	0	1	1		29
21130	San Juan Atenco	3,604	0	0	1	1		
21131	San Juan Atzompa	975	0	0	1	1		
21132	San Martín Texmelucan	155,738	4	2.6	5	1	P	35
21133	San Martín Totoltepec	692	0	0	1	1		
21134	San Matías Tlalancaleca	20,974	0	0	1	1		
21135	San Miguel Ixitlán	526	0	0	1	1		
21136	San Miguel Xoxtla	12,461	0	0	1	1	P	
21137	San Nicolás Buenos Aires	10,464	0	0	1	1	P	
21138	San Nicolás de los Ranchos	11,780	0	0	1	1		43
21139	San Pablo Anicano	3,759	0	0	1	1	P	
21141	San Pedro Yeloixtlahuaca	3,488	0	0	1	1		
21142	San Salvador el Seco	30,639	0	0	1	1	P	
21144	San Salvador Huixcolotla	16,790	0	0	1	1		
21145	San Sebastián Tlacotepec	13,189	0	0	1	1	P	
21146	Santa Catarina Tlaltempan	749	0	0	1	1		
21147	Santa Inés Ahuatempan	6,341	0	0	1	1	P	
21148	Santa Isabel Cholula	11,498	0	0	1	1		63
21149	Santiago Miahuatlán	30,309	0	0	1	1		
21150	Huehuetlán el Grande	6,105	0	0	1	1		
21151	Santo Tomás Hueyotlipan	9,315	0	0	1	1	P	
21152	Soltepec	12,631	0	0	1	1	P	
21153	Tecali de Herrera	23,625	0	0	1	1		64
21155	Tecomatlán	6,830	0	0	1	1		
21157	Tehuitzingo	12,672	0	0	1	1		
21158	Tenampulco	6,743	0	0	1	1		
21159	Teopantlán	3,836	0	0	1	1	P	

ID	Municipality	Current Population	CVE	ICVE	CVEId	CVEI	Routes	Potential Zone
21160	Teotlalco	3,689	0	0	1	1		
21161	Tepanco de López	22,218	0	0	1	1	P	
21162	Tepango de Rodríguez	4,155	0	0	1	1		
21163	Tepatlaxco de Hidalgo	18,854	0	0	1	1	P	
21165	Tepemaxalco	1,216	0	0	1	1		
21166	Tepeojuma	8,918	0	0	1	1		
21167	Tepetzintla	10,373	0	0	1	1	P	
21168	Tepexco	7,523	0	0	1	1	P	
21169	Tepexi de Rodríguez	22,331	0	0	1	1		12
21170	Tepeyahualco	19,200	0	0	1	1		17,31,59
21171	Tepeyahualco de Cuauhtémoc	3,851	0	0	1	1	P	
21172	Tetela de Ocampo	27,216	0	0	1	1		10
21173	Teteles de Avila Castillo	6,653	0	0	1	1		
21175	Tianguismanalco	14,432	0	0	1	1		
21176	Tilapa	9,664	0	0	1	1		
21178	Tlacuilotepec	15,977	0	0	1	1		
21179	Tlachichuca	31,639	0	0	1	1		42
21181	Tlaltenango	7,425	0	0	1	1		
21182	Tlanepantla	5,390	0	0	1	1		
21183	Tlaola	20,433	0	0	1	1	P	
21184	Tlapacoya	6,422	0	0	1	1	P	
21185	Tlapanalá	10,344	0	0	1	1		
21187	Tlaxco	4,934	0	0	1	1		
21188	Tochimilco	19,315	0	0	1	1	P	
21189	Tochtepec	22,454	0	0	1	1		
21190	Totoltepec de Guerrero	1,187	0	0	1	1		
21191	Tulcingo	9,871	0	0	1	1		
21192	Tuzamapan de Galeana	5,924	0	0	1	1	P	
21193	Tzicatlacoyan	6,476	0	0	1	1	P	
21194	Venustiano Carranza	28,395	0	0	1	1	P	
21195	Vicente Guerrero	26,559	0	0	1	1		
21196	Xayacatlán de Bravo	1,570	0	0	1	1		
21198	Xicotlán	1,312	0	0	1	1		
21200	Xochiapulco	3,443	0	0	1	1		
21201	Xochiltepec	3,375	0	0	1	1		
21202	Xochitlán de Vicente Suárez	13,025	0	0	1	1		
21203	Xochitlán Todos Santos	7,178	0	0	1	1		
21204	Yaonáhuac	7,926	0	0	1	1	P	
21205	Yehualtepec	26,392	0	0	1	1		
21206	Zacapala	4,647	0	0	1	1		
21209	Zapotitlán	8,595	0	0	1	1		75

Clave	Municipio	Población	CVE	ICVE	CVEId	CVEI	Rutas	Lugares Potenciales
21210	Zapotitlán de Méndez	5,675	0	0	1	1	P	
21211	Zaragoza	16,752	0	0	1	1	P	
21212	Zautla	20,717	0	0	1	1	P	
21213	Zihuateutla	11,967	0	0	1	1	P	
21214	Zinacatepec	18,359	0	0	1	1		
21215	Zongozotla	4,539	0	0	1	1	P	
21216	Zoquiapan	2,452	0	0	1	1	P	
21217	Zoquitlán	20,335	0	0	1	1	P	
21034	Coronango	46,836	8	17.1	2	0	P	45
21041	Cuautlancingo	137,435	4	2.9	4	0		
21114	Puebla	1,692,181	48	2.8	48	0		1,2,4,5,18,22,23,25,38,39,40,44,60,68,70,71,76,77,78
21119	San Andrés Cholula	154,448	16	10.4	5	0		6,19,20,21,36,37,57
21124	San Gabriel Chilac	15,954	2	12.5	1	0	P	
21143	San Salvador el Verde	34,880	2	5.7	1	0	P	63

Notas

Clave: Clave geoestadística del municipio.

CVE: Cargadores de vehículos eléctricos instalados.

ICVE: Indicador de cargadores de vehículos eléctricos per cápita (por cada 100 mil habitantes.

CVEId: Cargador de vehículos eléctricos ideales, para cumplir con el indicador del municipio de referencia (Puebla de Zaragoza).

CVEI: Cargadores de vehículos eléctricos para instalar en los municipios.

Rutas: P – municipio prioritario.

Annex 6. Specifications of potential locations for the installation of electric vehicle charging centers

No.	Zone	Municipality	Coordinate	Highway Name	Distance to Highway (km)
I. LUGARES ESTRATEGICOS					
1	Angelópolis Puebla	Puebla	19.03146, -98.23264	Puebla - Tehuacán MEX-150	3.7
2	Estadio Cuauhtémoc	Puebla	19.07782, -98.16441	Puebla - Acatzingo (Cuota)	0.3
3	Explanada Puebla	San Pedro Cholula	19.07285, -98.27665	Puebla - Tehuacán MEX-150	5
4	Central De Autobuses CAPU	Puebla	19.07332, -98.20481	México - Puebla (Cuota)	1.4
5	Galerías Serdán	Puebla	19.0715, -98.22536	México - Puebla (Cuota)	2.1
6	Lomas De Angelópolis Acceso Sonata	San Andrés Cholula	18.99974, -98.26118	Puebla - Tehuacán MEX-150	0.1
7	Aeropuerto Nacional De Tehuacán	Tehuacán	18.49578, -97.42206	Tehuacán - Huajuapan de León	1.8
8	Aeropuerto Internacional De Puebla PBC	Huejotzingo	19.16372, -98.37679	Puebla - Acatzingo (Cuota)	5.5
9	Nuevo Necaxa	Juan Galindo	20.2113, -98.00739	Pachuca - Tuxpan	1
10	Tetela De Ocampo	Tetela de Ocampo	19.81485, -97.80663	Apizaco - Tejocotal	20
11	Izúcar De Matamoros	Izúcar de Matamoros	18.59702, -98.47268	Puebla - Huajuapan de León	0.38
12	Tepexi De Rodríguez	Tepexi de Rodríguez	18.58087, -97.92644	Cuapiaxtla - Acatlán de Osorio	1.2
13	Teziutlán	Teziutlán	19.81754, -97.35844	Amozoc - Teziutlán	0.6
14	Acatlán De Osorio	Acatlán	18.21438, -98.04435	Puebla - Huajuapan de León	2.4
15	Chiautla De Tapia	Chiautla	18.30037, -98.60439	Puebla - Huajuapan de León	30
16	Tecamachalco	Tecamachalco	18.88379, -97.72848	Puebla - Tehuacán MEX-150	0.3
17	Laguna De Alchichica	Tepeyahualco	19.40304, -97.40074	San Hipólito - Xalapa	0.11
18	CIS, Centro Integral De Servicios. Edificio Norte.	Puebla	19.0339, -98.2271	Puebla - Tehuacán MEX-150	3.16
19	CIS, Centro Integral De Servicios San Andrés Cholula	San Andrés Cholula	19.03893, -98.27073	Puebla - Tehuacán MEX-150	2
20	Hospital Para El Niño Poblano	San Andrés Cholula	19.0347, -98.24439	Puebla - Tehuacán MEX-150	1.2
21	Centro De Innovación, Emprendimiento Y Negocios (CIEN)	San Andrés Cholula	19.05726, -98.30036	Puebla - Tehuacán MEX-150	5.8
22	Secretaría De Planeación Y Finanzas	Puebla	19.0339, -98.18667	Puebla - Acatzingo (Cuota)	4.8
23	Hospital General Zona Norte De Puebla	Puebla	19.07901, -98.18476	Puebla - Acatzingo (Cuota)	0.4
24	Clínica IMSS	Juan C. Bonilla	19.11164, -98.3303	México - Puebla (Cuota)	6
25	Secretaria De Movilidad Y Transporte	Puebla	19.05539, -98.2333	Puebla - Tehuacán MEX-150	3.6
26	Hospital General De Tepeaca	Tepeaca	18.99339, -97.90447	Acatzingo - Cd. Mendoza (Cuota)	1.3
II. CASETAS DE COBRO					
27	Arco De Seguridad Palmar De Bravo	Palmar de Bravo	18.84785, -97.53218	Acatzingo - Cd. Mendoza (Cuota)	0
28	CAPUFE - Plaza De Cobro No. 76 Tehuacán	Tehuacán	18.48724, -97.45616	Cuacnopalan - Oaxaca (Cuota)	0
29	CAPUFE- Plaza De Cobro No. 77 Miahuatlán	San José Miahuatlán	18.26465, -97.31557	Cuacnopalan - Oaxaca (Cuota)	0

No.	Zone	Municipality	Coordinate	Highway Name	Distance to Highway (km)
30	CAPUFE - Plaza De Cobro No. 27 Esperanza Pue	Esperanza	18.87072, -97.38587	Acatzingo - Cd. Mendoza (Cuota)	0
31	Caseta De Cobro "Cantona"	Tepeyahualco	19.50756, -97.49782	Amozoc - Perote (Cuota)	0
32	Plaza De Cobro No. 26 Amozoc	Amozoc	19.04987, -98.03228	Puebla - Acatzingo (Cuota)	0
33	Caseta De Cobro Amozoc II	Amozoc	19.06361, -98.06902	Amozoc - Perote (Cuota)	0
34	CAPUFE- Plaza De Cobro No. 26b Amozoc	Amozoc	19.04921, -98.02911	Puebla - Acatzingo (Cuota)	0
35	CAPUFE Plaza De Cobro No. 8 - San Martín	San Martín Texmelucan	19.24111, -98.38575	México - Puebla (Cuota)	0
36	Caseta De Cobro Atlixco - Puebla	San Andrés Cholula	19.00389, -98.27263	Puebla - Huajuapan de León	0
37	Caseta De Cobro Vía Atlixcáyotl	San Andrés Cholula	19.00537, -98.27056	Puebla - Huajuapan de León	0
38	Caseta De Peaje "Villa Frontera", Segundo Piso De La Autopista México-Puebla	Puebla	19.08308, -98.18364	México - Puebla (Cuota)	0
39	Caseta De Cobro	Puebla	19.0768, -98.14909	Puebla - Acatzingo (Cuota)	0
40	Caseta Libramiento Puebla	Puebla	19.07695, -98.15006	Puebla - Acatzingo (Cuota)	0
41	Caseta De Cobro Segundo Piso Carretera A Orizaba	Coronango	19.1305, -98.26712	México - Puebla (Cuota)	0
III. AREAS NATURALES					
42	Centro Ecoturístico Citlaltépetl	Tlachichuca	19.09281, -97.31586	San Salvador El Seco - Azumbilla	17.5
43	Parque Nacional Iztaccíhuatl - Popocatépetl	San Nicolás de los Ranchos	19.12818, -98.61613	México - Puebla (Cuota)	23
44	Africam Safari	Puebla	18.93715, -98.13685	Puebla - Tehuacán MEX-150	7
45	Parque Ecológico Tuliman	Zacatlán	19.87056, -97.97995	Apizaco - Tejocotal	2
46	Zacatlán - Mirador Barranca De Los Jilgueros	Zacatlán	19.93185, -97.95564	Apizaco - Tejocotal	0.6
47	Zacatlán - Zacatlán Adventure	Zacatlán	19.93066, -97.98658	Apizaco - Tejocotal	0
48	Huauchinango - Campestre Las Truchas	Huauchinango	20.16979, -98.05664	Pachuca - Tuxpan	0.5
49	Valle De Las Piedras Encimadas	Zacatlán	20.03453, -98.0457	Apizaco - Tejocotal	5.4
50	Santuario De Las Luciérnagas, Puebla	San Salvador el Verde	19.24862, -98.58004	México - Puebla (Cuota)	10
IV. CENTROS CULTURALES FEDERALES Y MUNICIPALES					
51	Atlixco De Las Flores	Atlixco	18.91286, -98.43754	Puebla - Huajuapan de León	2.3
52	Ndajchian Tehuacán	Tehuacán	18.45153, -97.3454	Tehuacán - Huajuapan de León	6
56	Cuetzalan - Casa De Cultura	Cuetzalan del Progreso	20.01935, -97.5233	Amozoc - Teziutlán	18
57	Zona Arqueológica De San Andrés Cholula	San Andrés Cholula	19.05632, -98.3016	Puebla - Tehuacán MEX-150	5
58	Zona Arqueológica De Yohualichan	Cuetzalan del Progreso	20.06172, -97.50307	Amozoc - Teziutlán	23
59	Zona Arqueológica De Cantona	Tepeyahualco	19.55284, -97.49332	Amozoc - Teziutlán	5
60	Zona Arqueológica De Manzanilla	Puebla	19.08723, -98.13368	Puebla - Acatzingo (Cuota)	2
62	Exhacienda De Chautla	San Salvador el Verde	19.31698, -98.47068	México - Puebla (Cuota)	2.5
63	Tianguismanalco	Santa Isabel Cholula	18.98207, -98.34706	Puebla - Huajuapan de León	1

No.	Zone	Municipality	Coordinate	Highway Name	Distance to Highway (km)
64	Tecali De Herrera	Tecali de Herrera	18.90277, -97.97167	Puebla - Tehuacán MEX-150	9.5
65	Tepeaca	Tepeaca	18.96531, -97.90537	Puebla - Tehuacán MEX-150	0.7
66	Pahuatlán	Pahuatlán	20.27572, -98.15042	Nuevo Necaxa - Tihuatlán (Cuota)	12.5
67	Tlatlauquitepec - Zócalo	Tlatlauquitepec	19.85118, -97.49594	Amozoc - Teziutlán	0.5
V. CENTROS CULTURALES ESTATALES					
68	Museo Internacional Del Barroco	Puebla	19.01879, -98.24628	Puebla - Huajuapan de León	1.9
69	Museo De La Evolución/ Museo De Mineralogía Tehuacán	Tehuacán	18.47736, -97.44062	Puebla - Tehuacán MEX-150	1
70	Museo Internacional Del Barroco	Puebla	19.01877, -98.24628	Puebla - Huajuapan de León	2
71	La Casa Del Medrugo	Puebla	19.04174, -98.19594	México - Puebla (Cuota)	5
72	Museo Del Valle De Tehuacán	Tehuacán	18.46616, -97.39391	Tehuacán - Huajuapan de León	1
73	Manantiales Peñafiel Museo Hidro mineral Tehuacán	Tehuacán	18.48293, -97.4012	Tehuacán - Córdoba	1
74	Museo De Sitio Tehuacán	Tehuacán	18.44611, -97.35038	Tehuacán - Huajuapan de León	5.5
75	Paleoparque Las Ventas Tehuacán	Zapotitlán	18.35733, -97.43403	Tehuacán - Huajuapan de León	0.5
76	Zona Cultural Fuertes De Loreto Y Guadalupe	Puebla	19.0572, -98.18322	México - Puebla (Cuota)	3
77	Ciudad Universitaria Buap	Puebla	18.9993, -98.19983	Puebla - Tehuacán MEX-150	3
78	Museo Poblano De Arte Virreinal	Puebla	19.04409, -98.19499	México - Puebla (Cuota)	5

PLAN FOR THE DEPLOYMENT OF ELECTRIC VEHICLE CHARGERS IN THE STATE OF PUEBLA

June 2022

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Secretaría
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Gobierno de Puebla

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del Estado de Puebla