



Technical Assistance Panel | June 21-22, 2023

COMPONENTS AND ACTIONS FOR THE DEVELOPMENT OF A DECARBONIZATION ROADMAP NET ZERO CARBON SAN PEDRO GARZA GARCÍA

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COVER PAGE: Panoramic view of the San Pedro Garza García
Municipality, in Nuevo León, México.

Credit: San Pedro Garza García Municipality

About the Urban Land Institute

The Urban Land Institute is a global organization that brings together more than 45,000 real estate and urban development professionals dedicated to furthering the Institute's mission. It operates through the dedication and expertise of its members. Throughout its history, the organization has been able to impose standards of excellence in the practice of real estate development.

ULI's mission is to shape the future of cities and the built environment for transformative impact in communities around the world by delivering on three commitments:

CONNECT our diverse, active, and passionate members through our global interdisciplinary network of professionals.

INSPIRE with best practices for sustainable land use through content exchange, training, meetings, mentoring and knowledge sharing.

LEAD the resolution of community and real estate challenges through the collective global applied expertise and philanthropic commitment of our members.

What does the Urban Land Institute do?

- Conducts research and publishes it in reports, books, and journals.
- Provides a forum for sharing best practices.
- Organizes two annual meetings for more than 4,000 participants.
- Conducts educational programs for communities around the world.
- Conducts Technical Assistance Panels (TAPs and ASPs).

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Since 1947, ULI's Advisory Services program has brought together more than 700 teams of ULI members to help clients find creative and practical solutions to complex land use challenges. A wide variety of public, private, and non-profit organizations have engaged ULI's advisory services. National and international panelists are specifically recruited to form a panel of experts, objective, independent, ULI's volunteer members, with the skills necessary to address the identified challenge. The program is designed to help overcome obstacles, initiate conversations, and resolve complicated situations that need an outside, independent perspective. Three- to five-day workshops are offered to ensure thorough consideration of the issues to be addressed.

Learn more at americas.uli.org/programs/advisory-services/.

TECHNICAL ASSISTANCE PANELS

Urban Land Institute leverages the technical expertise of its members to help communities solve complex land use, development, and redevelopment challenges. Technical Assistance Panels (TAPs): provide expert, multidisciplinary and unbiased advice to local governments, public agencies and non-profit organizations facing complex land use and real estate issues. Drawing from its professional membership base, ULI Mexico offers responsible guidance on a variety of land use and real estate-related issues, ranging from site-specific projects to public policy.

The process of a TAP is as follows:

1. The sponsoring organization defines the scope and geographic area of interest and develops three to four well-defined questions.
2. The district council brings together an informed and diverse panel of experts to address specific issues according to the particular needs of the sponsoring organization.
3. The panel addresses the topic in detail over two to three days of work. Ending with a presentation to the sponsoring organization that outlines the panel's recommendations.

TAPs provide expert, multidisciplinary and unbiased advice to local governments, public agencies and non-profit organizations facing complex problems

About ULI Mexico

ULI Mexico started 20 years ago and has more than 250 members in Latin America. ULI Mexico is uniquely positioned to bring industry leaders together and provide leadership in the region for smart and sustainable land use planning. We convene events designed to promote interaction among members and focus on land use and development issues. We invite you to learn more about ULI Mexico through our website <https://mexico.uli.org/>.



Figure 1: ULI México Membership Demography
Source: ULI México



About ULI Greenprint

The *ULI Greenprint Center for Building Performance* includes a global alliance of leading real estate owners, investors and strategic partners committed to improving the environmental performance of the global real

estate industry. Through measurement, benchmarking, knowledge sharing and best practice implementation, Greenprint and its members strive to reduce greenhouse gas emissions by 50 percent by 2030 and achieve net zero carbon operations by 2050.

For more information please visit, <https://americas.uli.org/research/centers-initiatives/uligreenprint/>

ULI NET ZERO IMPERATIVE

Net Zero Carbon Initiative (*Net Zero Imperative*)

Thanks to a generous donation from Owen Thomas, ULI has launched the **Net Zero Imperative**, a multi-year initiative to accelerate decarbonization in the built environment. Additional donations from Lynn Thurber, Joe Azrack, Franz Colloredo-Mansfeld and Dan Cashdan further support and strengthen the scale and impact of the NZI program.

The overarching goal of the effort is to provide concrete ideas and strategies to real estate owners, public sector leaders and our membership to decarbonize the built environment and achieve Net Zero Advocate Board (Consejo Impulsor Neto Cero). Through its work, the initiative will create global resources (research and toolkits) to help all ULI members accelerate decarbonization in their real estate operations and cities.

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- Chicagoland Metro Area, IL
- Berlin, Germany
- Central, Hong Kong
- Minneapolis, MN



Acknowledgment to Participants

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The contemporary architecture mixes with the natural environment in the heart of the city.
 Source: Municipality of San Pedro Garza García, Nuevo León



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INTRODUCTION

The city contrasts are reflected in its architecture and diversity of spaces.
Source: Municipality of San Pedro Garza García, Nuevo León

EXECUTIVE SUMMARY

The Municipality of San Pedro asked ULI Mexico for support through a Technical Assistance Panel (TAP) to bring together a group of international experts on the topic of creating a Net Zero Carbon Roadmap. The panel was tasked with defining the steps to follow, the sectors of society to involve in this process, the studies required for the creation of a Roadmap, as well as the initial actions to launch it.

Specifically, the panel was tasked with answering the following question:

How can the Municipality of San Pedro Garza García achieve carbon neutrality by 2050?

For two days, four national and international panelists immersed themselves in understanding San Pedro's current sustainability action plans. They interviewed 42 relevant public and private sector leaders and, drafted specific recommendations for the Municipality.

The key recommendations that emerged as a result of this panel were:

- The design of a governance framework necessary for the elaboration of the Roadmap.
- A framework for continuity through the different public administrations, to later elaborate a city vision that integrates sustainability in a transversal manner.
- The elaboration of a baseline diagnosis from which to start with measurable indicators and verification over time.

PANEL OBJECTIVE AND SCOPE OF WORK

The **main objective** of the panel is to define the initial elements and actions required to design and implement a **“Roadmap for Net Zero Carbon Buildings”** in the Municipality of San Pedro Garza García, N.L., Mexico. This would be the first Municipal Roadmap in the country.

The **scope** focuses on how to engage the public and private sectors in the creation of a “*Roadmap for Net Zero Carbon Buildings*” at the Municipal level in San Pedro Garza García (with potential replicability for the Monterrey Metropolitan Area). With the intention of identifying best practices related to possible incentives, regulatory framework, training, and collaboration, for the planning, design, construction and operation of sustainable, high-energy performance and net zero carbon buildings.

Guiding Questions for the Panel

1. What **public instruments, funds, incentives, regulations, and policies** should be adopted to **accelerate the decarbonization** of local **buildings** (developed by the public and/or private sector)?
2. What public sector inputs can **incentivize the ‘business case’** for “**Net Zero Carbon Buildings**” in the Municipality?
3. Who should **participate** in the creation of the **Roadmap**, with what roles and contributions?
4. How can the Government of San Pedro Garza García shape inclusive programs and/or working groups to foster a **long-term commitment to the decarbonization of the built environment**?
5. What are the **financial tools** and **business models** needed to promote the construction and operation of sustainable buildings (high energy performance and low environmental impact)?

The Municipality of San Pedro Garza García, covers 7,091 hectares.

ABOUT THE MUNICIPALITY OF SAN PEDRO GARZA GARCÍA

San Pedro Garza García is one of 18 municipalities that make up the metropolitan area of Monterrey, Nuevo León. It is located approximately 200 km from the southern border of the United States of America, which places it strategically on the trade route between Mexico, the U.S. and Canada. According to the 2030 Municipal Urban Development Plan of San Pedro Garza García, the municipality covers 7,091 hectares, bordered by the municipality of Monterrey to the north and east, and the municipality of Santa Catarina to the south and west. The population of San Pedro Garza García in 2020 was 132,169 inhabitants.

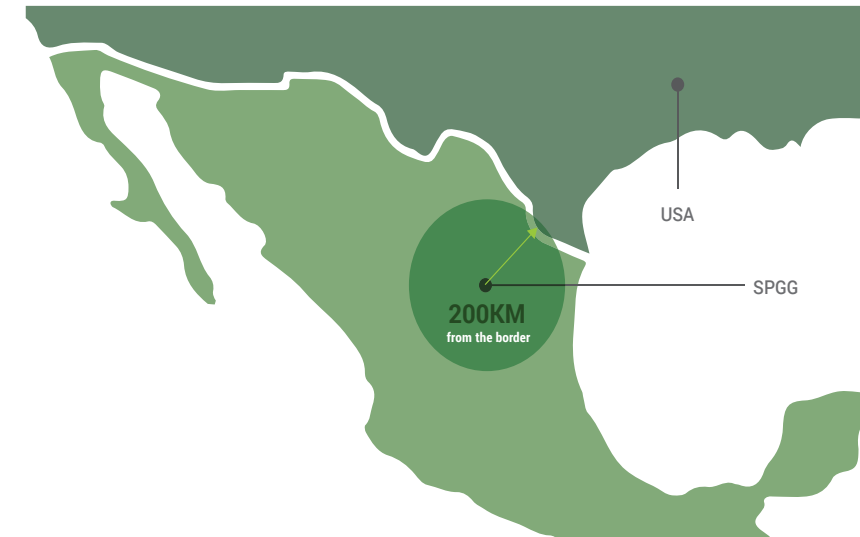


Figure 2: Map illustrating the location of San Pedro Garza García and the distance to the nearest U.S.A. Border.

Source: Prepared by ULI México

The municipality was founded in the sixteenth century, with the emergence of the first houses in the so-called Valle de San Pedro de los Nogales. Its greatest territorial expansion took place from 1940 to 1955, growing 460%. This was due to the migration of wealthy families coming from the center of the city of Monterrey. In the following period from 1955 to 1970, it continued with an accelerated growth of single-family housing subdivisions, becoming a residential municipality for the wealthiest sector of the population. Since the 80's the municipality became the financial center of the Metropolitan Zone and experienced a great growth of triple A office buildings that were evolving in sophistication in terms of construction systems and height.

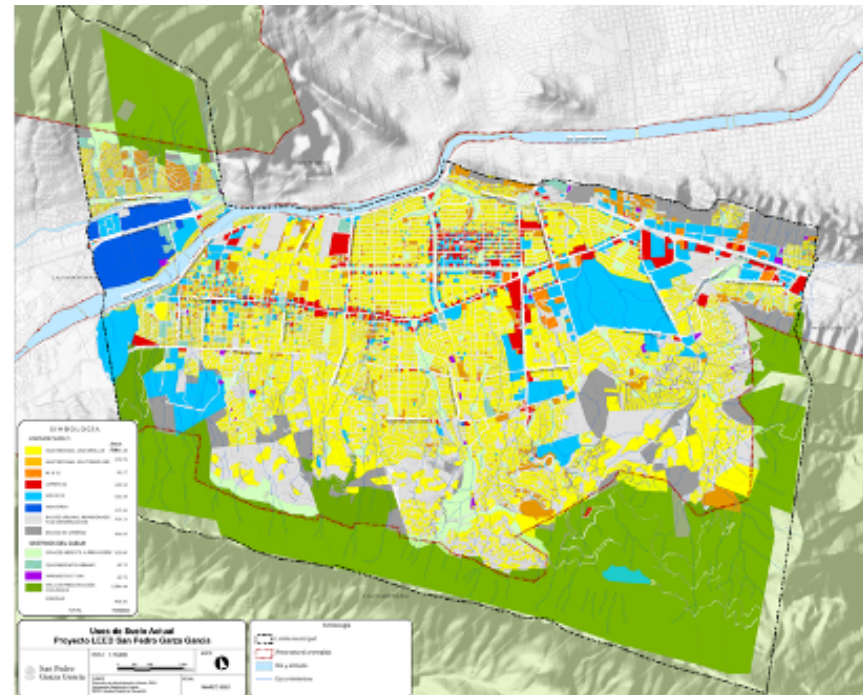


Figure 3: Current Land Use, municipality of San Pedro Garza García, N.L.
 Source: Prepared by the Urban Administration Office

The high income of the population has contributed to transform the municipality into a strong market for the supply and consumption of quality goods and services. In the last decade and with only 2.14% of developable land the municipality has seen a large growth of multi-family and mixed-use buildings.

As a result, the municipality has been in a rapid densification process for the past 15 years. In just two and a half years of this administration, 12 multi-family building projects and 26 commercial, service, and industrial projects have been received for approval.



Multifamily buildings reflect the population growth of the city, resulting from this growth, the need for constructions and buildings.
 Source: Municipality of San Pedro Garza García, Nuevo León

As for the municipality's industrial zone, it has expelled heavy industry and is in the process of being revitalized into a business zone with some light industry.

The Municipality's Urban Development Plan delimits 11 specific development districts, where the greatest densification of the Municipality is expected to occur.



Figure 4: Trade and service concentration zones, municipality of San Pedro Garza García, N.L.
 Source: Urban Development Department

San Pedro Garza García has excellent infrastructure; 100% of homes have access to drinking water, sewage, and electricity. However, due to the constant growth of the municipality, it requires two more electrical substations, pipes with greater capacity for rainwater, recovery of streams to manage rainwater, and additional water tanks for the latest growth area of the municipality.

San Pedro Garza García is recognized for having good facilities, education and health centers of first and second level of care, both public and private; as well as specialized clinics that successfully meet the needs of the population.

Some of the best schools have migrated to the municipalities of Santa Catarina or Monterrey following the expansion of the young population and better land prices. However, the municipality still has excellent public and private educational facilities.

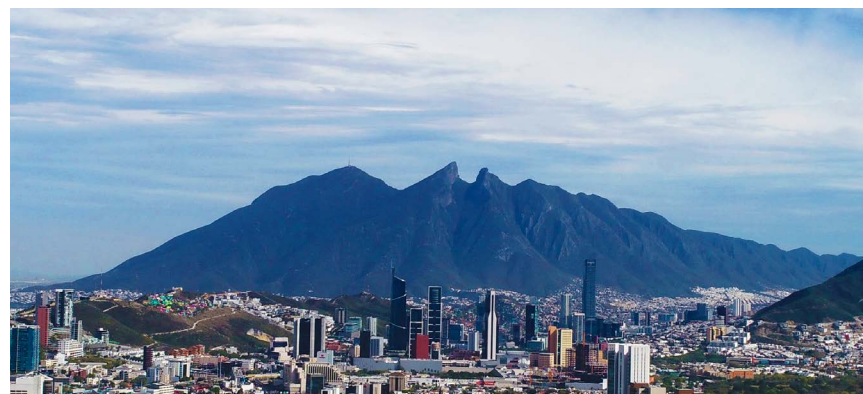
San Pedro Garza García has the privilege of being located between the slopes of the Sierra Madre Oriental and Cerro de Las Mitras, both of which have a very varied and profuse vegetation. According to the Municipal Urban Development Plan 2030, San Pedro Garza García maintains a significant amount of land for green areas, which total 3,232,653 square meters, representing 26 square meters per inhabitant, a figure that is above international standards.

The current administration has made a great effort to revitalize the most important parks such as Rufino Tamayo Park (22 acres), El Capitan Park (34 acres), Mississippi Park (3.7 acres), and Clouthier Linear Park (21 acres). This, through the hiring of the best landscape architects in Mexico, as well as the application of sustainability practices.



One of the most emblematic parks in the city: El Capitán. A recreational meeting point for many families
Source: Municipality of San Pedro Garza García, Nuevo León

The Municipality's Zoning and Land Use Regulations are intended to regulate the Mountain Zone District, where certain guidelines are in place, in an attempt to protect the natural environment. However, this has not been sufficient to avoid major impacts on slopes. It is important to note that the Municipality does not have a building construction code which could help not only to regulate natural areas more carefully, but also serve to guide sustainable construction orderly.



San Pedro Garza García, embraced by the magnificent mountains of the Sierra Madre Oriental
Source: Municipality of San Pedro Garza García, Nuevo León

GOVERNMENT STRUCTURE

The Republican City Council, constituted in accordance with the provisions of the Political Constitution of the Free and Sovereign State of Nuevo León and the Law, is the governing body of the Municipality of San Pedro Garza García, Nuevo León, autonomous, deliberative collegiate and the highest authority in the programming, regulation, monitoring and evaluation of the municipal administrative exercise, and whose members are elected by universal, free, equal, secret, and direct suffrage. It is integrated by the following members:

- The Mayor (*Presidente Municipal*);
- 2 trustees (*Síndicos*); and
- A body of 12 Councilors or Aldermen (*Regidores*).

The Councilors are elected by relative majority and those appointed according to the principle of proportional representation shall have the same rights and obligations.

The term of office of the members of the Republican City Council is three years, or six years in case of reelection, and it is solemnly and publicly installed on September 30th of the year corresponding to the celebration of elections for the renewal of the Republican City Council. The disappearance and suspension of the Republican City Council, as well as the revocation of the mandate of some of its members, may only be applied by the State Congress according to the corresponding causes and procedures set forth in the law.

The members of the Republican City Council must reside in the Municipality of San Pedro Garza García, Nuevo León.

The current administration will finish its term on September 30th, 2024. After having legislated for two administrations for a total of six years.

SPGG, maintains a significant amount of land for **green areas**, which result in a total of 3,232,653 square meters, representing **26 square meters per resident**.

Source: Secretary of Urban Development of San Pedro Garza García.

MAIN CHALLENGES

Accelerated Urbanization in San Pedro Garza García

In recent years, this municipality has experienced a great growth of its real estate with a strong densification process, which has resulted in the accelerated construction of new multi-family buildings, shopping centers, class A offices and mixed-use properties. In the same period of time, there has been a potable water crisis, which has caused temporary supply cuts.

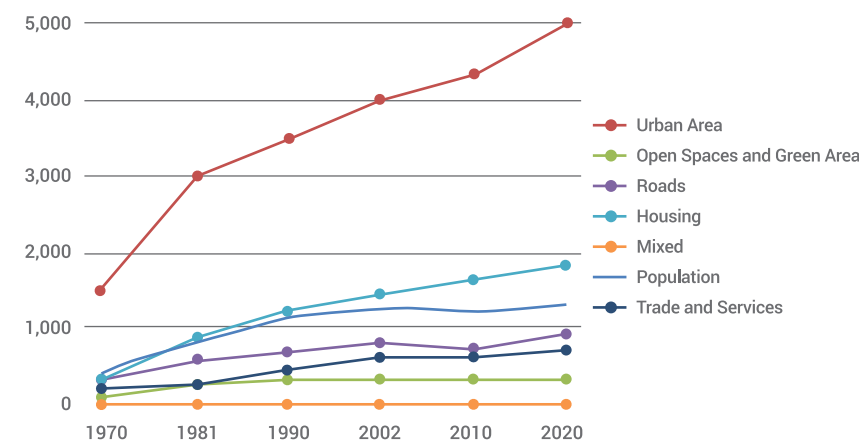


Figure 5: Growth of population, urban area, housing, commerce and services, and natural area, municipality of San Pedro Garza García, N.L.
Source: [Urban Development Plan, IMPLAN San Pedro Garza García](#)

Energy Demand

Due to the region's dry and hot climate, buildings in San Pedro Garza García require cooling and air conditioning systems to achieve thermal comfort. This causes an increase in energy consumption and carbon emissions. In 2021, the municipality's total consumption was 823,805 MWh, which represents 5% of the statewide average consumption for the same year. Considering that the annual average of the state's total consumption was 16,880 GWh. (<https://sie.energia.gob.mx/>) This is a high consumption when compared to the state of Jalisco, which has a similar metropolitan area, where a total of 13,194 GWh was consumed. Considering that power outages have been experienced in different areas of the municipality, it is of outmost importance to intervene in lowering electricity consumption,

otherwise energy demand will continue to increase due to population growth, development, and the increase in temperature due to climate change.

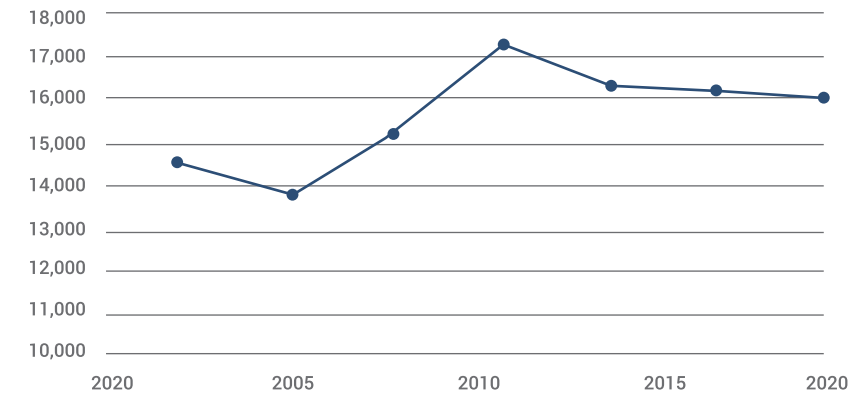


Figure 6: Electricity Consumption in Gigawatt hours in the State of Nuevo León
Source: *Ministry of Economy of Nuevo León (2023)* <http://datos.nl.gob.mx/1407-2/>

Lack of Incentives and Policies

As in the rest of Mexico, there are currently no clear policies in the municipality that encourage building owners to adopt energy efficiency and renewable energy measures to reduce their carbon emissions. However, it is of great importance to highlight that before resorting to the use of renewable energies, energy demand must be reduced, and efficiencies must be increased in order to make use of solar panels. This is mentioned because there is a human tendency when installing renewable energy, to change their habits and start consuming more energy than they did before installing the technology.

“In 2021, the municipality's total energy consumption was 823,805 MWh, which represents 5% of the statewide average consumption for the same year.”

Incentives Overview in Mexico

Incentive	Type	Benefit	Beneficiary	Who grants it	Effectiveness
Green bonds	Financial	Public debt financing mechanism for sustainable construction.	Builder	Private Sector	Medium
Loans and interest rates	Financial	Granting of mortgage loans based on the incorporation of eco-technologies in housing.	End user	Financial Entities National Funds	High
Taxes	Financial	Reduction in Income Tax (ISR), benefits in the payment of property tax and other taxes or payment exemption for green construction.	End user and/or builder	Government	High
Discounts on license fees	Financial	Reduction of the cost of the construction permit/procedure.	Investor	Municipality	Low
Budget programs	Financial	Direct financial or in-kind support for the incorporation of sustainable building measures.	End user and/or builder	Financial Entities	
Procedures and services	Non-Financial	Reduction in construction processing time.	Investor/builder	Municipality	High

Table 1: Incentives overview in México
 Source: [Feasibility study for building sustainable building incentives into the subnational regulatory framework. November 2022](#)

Incentives Overview in Mexico

Incentivo	Tipo	Beneficio	Beneficiario	Quien lo otorga	Efectividad
Awards and recognitions	Non-Financial	Recognition for compliance with frameworks, standards and certifications that establish sustainable building requirements.		Government	
Market	Non-Financial	Granting of cards with benefits, concessions, etc.			
Technical assistance	Non-Financial	Training for local authorities.			
Project bonds	Non-Financial	Flexibility to building regulations and land use plans, after presenting a highly efficient building project.	Builder/Developer	Government	
Loans and interest rates	Non-Financial	Green Mortgage.	End user	Government and recently Commercial Banking	



PANEL RECOMMENDATIONS



The iconic “Puente atirantado” (cable bridge) of San Pedro Garza García rises majestically over the river.
Source: Municipality of San Pedro Garza García, Nuevo León

METHODOLOGY

The TAP (Technical Assistance Panel) sessions took place on June 21st and June 22nd, 2023. During these two days, the TAP team, consisting of four national and international experts, the TAP chair, the San Pedro Garza García municipal team, the ULI team, and local key actors, met to carry out a series of activities that culminate in this report. In the morning of the first day, the sponsor, the Municipality of San Pedro, gave a presentation on the current sustainability action plans of the municipality. Afterwards, the panelists divided into four working groups to interview 42 key actors, that included representatives of the administration, developers, industry, financial institutions, and academia. Subsequently, the panelists collected the observations and comments of the key actors interviewed and developed a series of recommendations for the Municipality of San Pedro Garza García to develop its Decarbonization Roadmap. At the end of the two days, the TAP team presented their recommendations to the team from the municipality, which are summarized in this report.

What we heard

During the interviews, relevant information and participants’ points of view were obtained, which are summarized below:

“Fines do not win votes.”

“No regulation, no change”

Public Policy

- An institution is required to drive the route through the different political administrations over time (Net Zero Driving Council).
- A clear building code with objectives, timelines and transition periods is required.
- It is necessary to have a list of urban biodiversity and a plan for urban renaturalization.
- There is a great need for affordable housing.

Education

- It is necessary to create social awareness.
- Training designers, architects, engineers, and builders on the subject, would be necessary to support the roadmap.

Finance

- There are not enough incentives neither support to promote sustainable building or for net zero carbon projects.
- Greater procurement and dissemination of information on existing private funds is required.
- It is not a lack of education, but rather a lack of dissemination.

Materials and Technology

- Premium materials are more expensive and not all are available in México.

Others

- Lack of promotion of net zero and sustainability certifications.
- There is a need to promote energy labeling both for buildings and for household appliances and building systems.
- Integration of resilience into the buildings that can serve as pilot projects.
- It is necessary to start at home, with government buildings, that can serve as pilot projects. .

WHY PREPARE A ROADMAP FOR THE MUNICIPALITY OF SAN PEDRO GARZA GARCÍA?

Climate change is the most critical problem society is facing today and most likely for the next 100 years.

The planet is warming to alarming proportions. The Intergovernmental Panel on Climate Change (IPCC) Report of August 2021 reveals that

the planet is very likely to exceed the 1.5° C baseline by 2052, or sooner, if we fail to abate the current temperature increase¹. The report also confirms that warming is a direct result of human-generated emissions of which 38% globally are from buildings (28% from operational energy and 10% from building materials)².

Globally, cities are the economic, demographic and innovation centers. As such, they consume 66% of the energy produced, and therefore generate 70% of greenhouse gas emissions³.

In addition, the built environment will experience the largest wave of urban growth in history, with built square meters expected to increase by 65% by 2050⁴.

There is a growing global recognition of this existential threat that has resulted in countries and companies setting ambitious decarbonization targets. Many of these commitments have been captured by the UN's Race to Zero initiative, which aims to achieve a Net Zero Carbon Roadmap by 2050 at the latest. To achieve this goal, a Decarbonization Roadmap is proposed to identify milestones over the remaining years to the goal with timely actions and verifications to adjust course when necessary. For the time being, San Pedro Garza García seeks to focus on decarbonizing the building sector, although it recognizes that other issues relevant to decarbonization such as mobility and industrial processes will have to be addressed.

¹ Intergovernmental Panel on Climate Change, *Climate Change 2021: The Physical Science Basis, August 2021*, <https://www.ipcc.ch/sr15/>.

² UN Environment Program 2020, *Global Status Report for Buildings, and the Construction Sector: Towards Zero Emissions, Efficient and Resilient Buildings and the Construction Sector, 2020*, https://globalabc.org/sites/default/files/inlinefiles/2020%20Buildings%20GSR_FULL%20REPORT.pdf.

³ World Bank (<https://www.bancomundial.org/es/topic/urbandevelopment/overview#:~:text=That%20expansion%20exerts%20press%20pressure%20on%20land%20and%20greenhouse%20emissions%20and%20emissions%20of%20greenhouse%20gases%20>)

⁴ *Global Alliance for Buildings and Construction Sector*

As in any plan, it is necessary to identify a prioritization of actions. The following is an example of an Action Plan for the Decarbonization of Buildings:

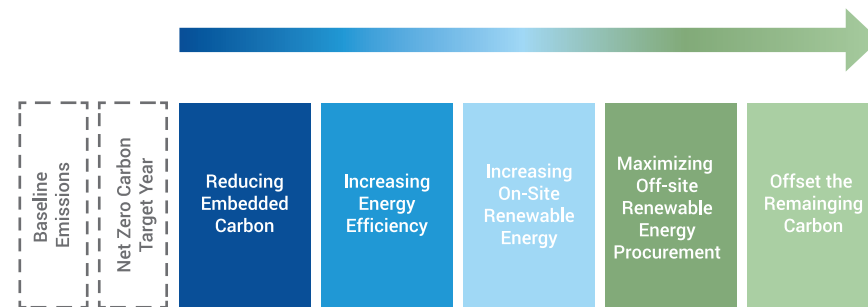


Figure 7: The Green Building Principles: The The Zero Carbon Net Buildings Action Plan
Source: World Economic Forum, October 2021

BENEFITS OF NET ZERO CARBON BUILDINGS

The benefits that can be expected from Net Zero Carbon buildings are numerous. Below are a few:

- Improving public health
- Better building codes
- Savings on utility bills
- Reducing and optimizing energy demand
- Increase network resiliency and reliability
- Increased thermal comfort
- Improved quality of life
- Reduce emissions

CONSEQUENCES OF NOT ACHIEVING THE OBJECTIVES OF MITIGATION AND ADAPTATION TO CLIMATE CHANGE

If, as a society and as a planet, we fail to achieve the science-based objectives, disastrous consequences are expected, including:

- Climate change
- Impacts on the natural environment and biodiversity

- Reduced community resilience to cope with the effects of climate change
- Increases in social inequality
- Displacement of inhabitants
- Slowdown in economic growth
- Reduced quality of life

PROPOSAL FOR THE CREATION OF THE DECARBONIZATION ROADMAP FOR THE BUILT ENVIRONMENT

Two of the panelists have previous experience in the development of Roadmaps for their home countries and the other two have participated in similar processes.

Based on the previous experiences of the panelists and with support from the TAP team, the following key steps were identified to generate a Decarbonization Roadmap for the Built Environment for the Municipality of San Pedro Garza García:

Preliminary Activities:

1. Identify stakeholders and create a governance framework to drive the roadmap forward.
2. Create a city vision, with a clear scope and glossary of key definitions.

Development Activities:

3. Understand current conditions to establish a diagnosis and baseline.
4. Develop localized transformative actions, impact assessments and scenarios.
5. Effective communication of the adoptions.

Preliminary Activities

RECOMMENDATIONS FOR THE STAKEHOLDER MAP

The first step is creating a Citizen Council that convenes key decision-makers to help shape future municipal policies. The main role of the council would be to participate in the creation of the roadmap as leaders and guide its implementation through different administrations. The working period of a municipal administration is very short, it is necessary to create a decentralized and permanent council. The main role would be to guide the implementation process.

Recommended list of stakeholders that need to be included in this process:

- **Municipal Government**
 - Public Services and Environment Department (*Secretaría de Servicios Públicos y Medio Ambiente*)
 - Urban Development Department (*Secretaría de Desarrollo Urbano*)
 - Finance and Treasury Department (*Secretaría de Finanzas y Tesorería*)
 - Strategic Communications Unit (*Unidad de Comunicación Estratégica*)
 - Ministry of Culture (*Secretaría de Cultura*)
 - Infrastructure and Public Works Department (*Secretaría de Infraestructura y Obras Públicas*)
 - Aldermen (*Regidores*)
 - Municipal Institute of Urban Planning and Management (*Instituto Municipal de Planeación y Gestión Urbana*)
- **Developers and Entrepreneurs**
- **Manufacturers, Designers, and Architects**
- **Chambers and Real Estate Associations** (CAPROBI, CANADEVI, CAINTRA, etc.)
- **Professional Associations**
- **Universities**
- **Financial Sector** (Banks, insurance companies, investment funds, etc.)
- **Technical Secretariat - Nuevo León Council**
- **Civil Society**
- **Utility Companies** (electricity, gas, water and sewage)
- **National and International Cooperation Entities** (WRI, ULI, SUMe, GBCI, ALENER, etc.)

The creation of a sustainability council in which key actors of the society have the capacity to make decisions and influence the future of the municipality participate.

- **Unusual suspects** (influential members of society, e.g., parish priest, doctor, and other social leaders)
- **Media and Communications**

GOVERNANCE FRAMEWORK RECOMMENDATIONS

A clear governance framework will facilitate decision making and the acceptance and applicability of the roadmap. The panel recommends working with citizen-based committees with the participation of some members of the government who report to an executive entity. Each committee should have specific objectives and should be made up of citizen experts on the subject.

Additionally, it is recommended to have a Citizen's Council that can transcend administrations and safeguard compliance with the roadmap, reporting to a Net Zero Driving Council (Consejo Impulsor Neto Cero) which answers to the city and decision makers.

The recommended organizational chart is as follows:

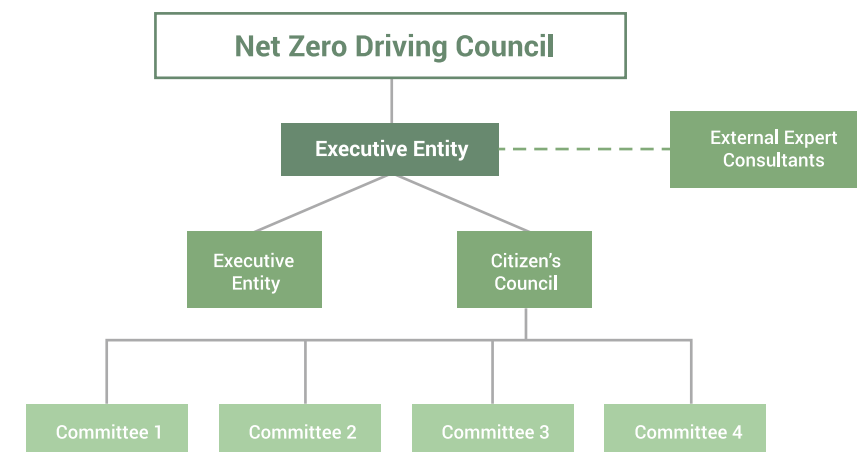


Figure 8: Net Zero Driving Council proposed Organization Chart
Source: Panel Recommendations

Where each group is described below:

Net Zero Driving Council: General Council formed by leading members of the community who have influence in society in order to drive the Net Zero Driving Council regardless of the present and future political parties of the administration.

Executive Entity: Decentralized public-private organization responsible for executing the work necessary to develop the Net Zero Driving Council, implement it, measure its impact, and evaluate changes.

Citizen´s Council: Citizen Council chaired by a member of the Net Zero Driving Council that integrates other members of the Council, professional associations, and citizens. With the responsibility to review and provide an opinion on the Net Zero Driving Council.

Committees: Voluntary working groups made up of citizen council members and experts on different topics that voluntarily support the definition and fulfillment of specific objectives. The types of committees will depend on the categories of impact and the defined enablers.

Expert Consultants: Possibility of contracting external consulting firms that, through projects, allow for quantitative analyzes to inform the decisions of the Councils.

RECOMMENDATIONS FOR CREATING A SHARED VISION FOR THE CITY WITH THE COMMUNITY

Once the working committees have been formed and the stakeholders have been identified, the Net Zero Driving Council will proceed to work on a shared vision for the city.

It is recommended that the developed vision for the city provides:

- Maintain continuous leadership
- Be a pioneer and innovator
- Be apolitical
- Be resilient
- Take care of the health and well-being of the inhabitants
- Transcend administrations
- Be clear
- Be inclusive
- Create a sense of belonging
- Resonate with citizens
- Invite the collective imagination
- Manage climate risk
- Be zero carbon and sustainable
- Visualize the city as a whole

- Be localized and shared by the community

SCOPE RECOMMENDATIONS

Defining the scope of the decarbonization roadmap is very important to know which sectors and strategies will be incorporated. It is recommended to at least include the following criteria:

- **A systemic sustainability** approach for all areas; city design, infrastructure, building, design and construction, among others.
- Coverage of **new** and **existing** buildings:
 - Government and private buildings
 - Housing (affordable and market rate), retail, service, equipment, and industrial buildings
 - All others
- That it encompasses **sustainable urban planning**.
- That it promotes **sustainable infrastructure**.

DEFINITIONS TO BE MADE

As part of defining the scope, it is necessary to be clear on key terminology that will give meaning to the scope of the project. At a minimum, it is recommended that the following concepts are defined for the municipality and for this Roadmap:

- **Sustainable City Model.**
- **Net Zero Full Cycle including in its definition:**
 - Livability and Comfort
 - Energy Efficiency
 - Responsible Consumption
 - Renewable and nearby low-impact sources
 - Carbon Offsetting

To develop these definitions, it is recommended to review the following frameworks:

- *GlobalABC*
- Roadmaps for Colombia, Spain, and Australia

For reference, we mention below two examples of Net Zero Full Cycle definitions that were developed during the TAP with the technical experts:

“A building achieves Net Zero Total Life Cycle status when, and maintains it until, the measure of carbon emissions associated with both operational and embodied emissions impacts over the defined *nominated service life* are zero or negative.”

“The building achieves Net Zero status when unavoidable carbon emissions are offset through renewable energy generation, preferably that removes carbon through naturally based solutions or equivalent.”

A Net Zero portfolio is very efficient and is supported by on-site and off-site renewable energy sources or offsets.

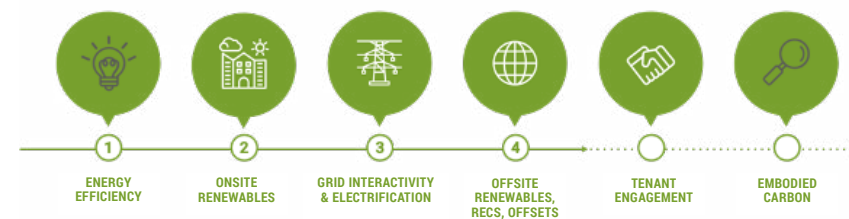


Figure 9: Road to a Net Zero Total Life Cycle Portfolio
Source: Urban Land Institute

Carbon in buildings occurs at different points in the life of projects. The diagram below explains where this carbon is found:

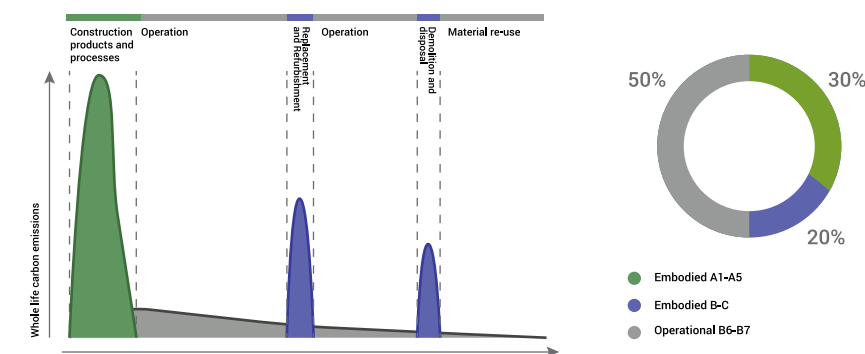


Figure 10: Estimated distribution of CO₂ emissions by life cycle stage
Source: Net-Zero buildings. Where do we stand? WBCSD and Arup, 2021

In average, 30% of the carbon produced by buildings corresponds to construction, i.e., it comes from the products and processes that are carried out to create a new building. Afterwards, the operation stage begins, and the carbon produced by this stage is generated through the consumption of fossil fuels as the building's main source of energy (electricity). After the years of use of the building, it is expected that replacements or renovations will take place, where another percentage of emissions is generated through the embedded carbon of the elements and systems used in the renovation. Subsequently, it is expected that the building will be more efficient in its operation, but it will continue to generate emissions through energy consumption in its operation. Later in the life of the building, demolition and disposal of the construction elements is expected, which also generates emissions and some of the materials are expected to be reused, generating minimal additional emissions. In general, it can be estimated that, throughout the life of a building, 50% of the emissions are operational and 50% of the emissions correspond to the embedded carbon of the materials and systems that make up the building. Therefore, it is recommended that the scope of the Net Zero Roadmap be Full Cycle to cover all possible emissions generated by buildings.

Another way to explain this would be through the three scopes defined in an emissions inventory.

Scope 1

Refers to direct greenhouse gas (GHG) emissions that occur from sources controlled by the organization (e.g., emissions associated with the burning of fuels for electricity generation, or vehicles owned by the organization).

Scope 2

Are indirect GHG emissions associated with the purchase of electricity. Although Scope 2 emissions do not physically occur at the facility where they are generated, they are accounted for in an organization's GHG inventory because they result from the organization's energy use (e.g., the generation of electricity, heating, cooling, and steam purchased and used by the organization).

Scope 3

Are also considered indirect emissions, i.e., those not produced by the company itself, but differ from Scope 2 in that they cover a company's value chain, i.e., those produced by users of the organization's products or those produced by suppliers that manufacture the products used by the company (e.g., business travel, procurement, waste and water, and the use and end-of-life phases of the products and services the organization produces).

“Throughout the life of a building, **50% of the emissions are operational** and **50% of the emissions correspond to the embedded carbon** of the materials and systems that make up the building. .”

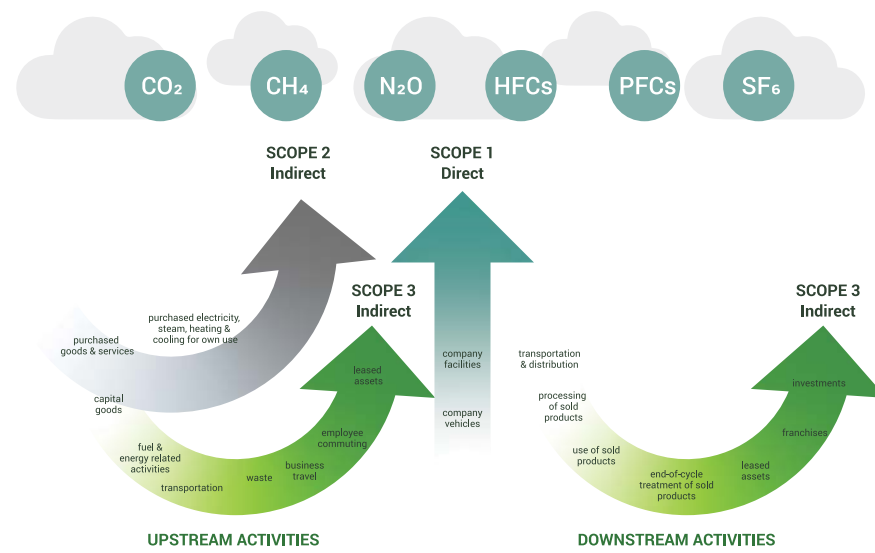


Figure 11: Overview of the scopes and emissions of the GHG Protocol across the entire value chain
Source: Environmental Protection Agency, 2020

Identify infrastructure, financing, policy, and other needs by zone, within the municipality.

Development Activities

DIAGNOSIS AND BASELINE

The baseline of the Decarbonization Roadmap is based on existing conditions of emissions generation (e.g., direct, and indirect energy consumption, transportation, waste decomposition, etc.) as well as existing public policies and financing. Currently, there is information that is part of the baseline in the Municipality of San Pedro Garza García, but other information will need to be developed, either with the municipality's internal capabilities, or through hiring of external specialists.

The panel identified the following documents and/or research as relevant for the creation of the diagnosis and baseline Roadmap for San Pedro Garza García:

- Risk Map (existing document).
- Identify existing policies related to sustainability and decarbonization.
- Identify existing funding focused on decarbonization practices.
- Inventory of current emissions landed on buildings.
- Identify infrastructure, financing, policy, and other needs by zone, within the municipality.

- Comparative map of energy consumption vs construction characteristics.
- Social map of urban vulnerability.
- Urban island map.
- Risk identification map (climate change, seismic zones, contaminated soils, etc.).
- Identify exemplary design practices.

It is important to recognize that the data will never be perfect or complete, and that some estimation will be required, thus, we must allow for flexibility and adjustments to the baseline as more information is obtained. Once the baseline has been calculated, it must be accepted that the carbon footprint tends to change over time, especially due to factors such as the potential for decarbonization of the grid, improvements in energy efficiency, or increases in renewable energy supply.

OTHER ELEMENTS TO CONSIDER IN THE ROADMAP

After the Diagnosis and the development of the baseline, it is recommended to continue with the following activities based on the structure and the key actors mentioned above, coordinated by the Net Zero Driving Council:

Development of Transformative Actions, Impact Assessment and Scenarios:

Based on the definitions developed and the objectives established by the Net Zero Driving Council, the transformative actions to be worked on in a delimited period should be enlisted. Based on the baseline information and the objectives, milestones should be determined to generate quantitative impact evaluations to assess the performance of the roadmap, and determine whether the actions implemented have been sufficient, or whether more actions should be implemented, or if it's necessary to adjust the criteria. All of the above must take into account population growth, since these are actions to be applied in a real and active environment. Plans for decarbonization must consider the direct relationship that exists between population growth, with an increase in energy use, constructions, and the rehabilitation of spaces, and therefore, the generation of emissions.

Scenario Design: It will be necessary to generate transition scenarios towards decarbonization. The first would be "business as usual", i.e., if we continue with the current trend, what would be the conditions in the future, and another one that focuses on the ambitious decarbonization scenario

based on achieving the proposed measures on the proposed dates. These scenarios should have milestones or medium-term objectives.

If feasible, a third scenario could be generated which includes intermediate cases in which progress is made, but where it is considered that the more complex measures will not be achievable. This scenario seeks to be conservative.

The scenarios should include carbon budgets, estimating how many emissions are generated at each stage of the pathway based on the actions determined.

Effective Communication of the Adoptions: Along the roadmap, quantitative milestones should be included to verify the alignment of the municipality's status with the decarbonization objectives. These verifications seek to identify a possible requirement for change or adjustment in the pathway in a timely manner, based on the results that are obtained as we move forward in time. An example of these follow-up and verification milestones could be the recertification of *LEED for Cities* reaching a higher level of performance or improving the criteria related to decarbonization.

Presentation, Adoption and Communication: It is imperative that, once the transformational actions and the impact assessment of each of them have been established, they are widely communicated with society, and with the stakeholders who can influence the achievement of the objectives. Plans should be developed to adopt the new requirements and involve citizens in the initiative to increase the chances of achieving the objectives. Similarly, it will be crucial to create alliances with neighboring governments to encourage the replicability of actions and promote openness in the implementation of new regulations.

Other recommendations, based on previous experiences that are relevant to mention are:

- Prioritizing actions and solutions based on mitigation scenarios.
- Setting recognizable milestones in time.
- Designing performance monitoring indicators as part of the roadmap.
- Developing and complying with the governance for the implementation of the roadmap.
- Creating a financial model that includes potential risks.
- Developing a short-term Action Plan (imminent actions).
- Creating projections of different scenarios to assess risks and future needs.

“Designing performance monitoring indicators as part of the roadmap.”

MAIN CHALLENGES AND OPPORTUNITIES IN THE CREATION OF A ROADMAP FOR SAN PEDRO GARZA GARCÍA

MAIN CHALLENGES

Through the conversations with the specialists and the working groups, the following challenges were identified in the creation of the Roadmap for the Municipality of San Pedro Garza García:

- State air quality monitoring.
- Federal control of electricity through CFE (there is no data sharing).
- There are no clear rules for energy policy in the country.
- Infrastructure feasibility requests are greater than what is necessary for a sustainable project.
- There is a culture of “non-compliance”, because no authority is in charge of supervising the application of the codes and regulations.
- There is a lack of coordination between municipal and metropolitan areas.
- There is a lack of competencies within federal agencies.

MAIN OPPORTUNITIES

Today, there are several opportunities that indicate that the time is right for the development of a Roadmap for long-term planning for the decarbonization of the municipality of San Pedro Garza García. The following is a description of the opportunities by type:

Policies and Regulations:

- Current municipal government is willing to commit and execute objectives.
- There is a possibility for depoliticizing the roadmap.
- The municipality is willing to develop a Building Code with energy efficiency elements focused on the local climate.
- There is willingness for the development of energy labeling.

- There is willingness to create an energy efficiency standard or build on existing ones such as the Energy Conservation Code for Buildings in México (IECC - 2016).
- There is local experience and possibilities to create energy audits for existing buildings.
- There is a possibility for using the Mexican Taxonomy, and make it mandatory for climate investment.
- We have a consistent administration.
- There is a possibility of creating green public bidding policies.
- There is a possibility of creating a rehabilitation policy to improve the operation of public buildings.

Education and Training

- A campaign to educate and raise awareness can be carried out.
- A training program can be created for workers (masons) and professionals (possible ally - the construction chamber).
- There is a possibility of involving the Valuation Colleges to establish protocols that include monetary values for energy efficiency.
- Work can be done to improve public higher education plans by integrating aspects such as bioclimatic architecture, energy efficiency and sustainability.
- There is an opportunity to introduce building values for sustainability in basic education.

Technologies

- There is a possibility for testing new technologies in pilot projects (e.g., former police and transit building).
- Technology allows us to visualize consumption for comparison between buildings in kWh/sqft/year.
- It is feasible to implement elements of circular economy in buildings.
- There is a possibility of increasing the secondary energy market in search of energy independence.
- Passive solutions can be enhanced.

Financial

- There is a possibility for designing a new fiscal framework.
- New business models can be explored (public-private partnerships and product as a service).
- There are multiple examples that make it feasible to seek financing

mechanisms for ecotechnologies.

- Green credits and green mortgages can be promoted.
- Non-monetary incentives can be offered (one-stop shop, density, height, building coefficients, permitting times, etc.).
- Investment is currently attracted by ESG (Environment, Social and Governance) criteria.

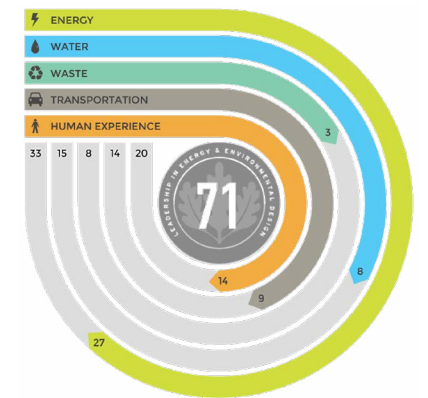


Figure 12: Example of performance graphic on the ARC Skoru platform for measuring the operational performance of buildings and cities.

Source: www.arcskoru.com

BUILDING A NET ZERO CARBON ECOSYSTEM

The Municipality of San Pedro Garza García has to develop a Net Zero Carbon ecosystem, with the organizations and committees formed for this purpose, to coordinate and ensure the implementation of Net Zero Carbon Route works in the municipality. ULI can play an active role in the formation of this ecosystem. A team of experts can provide feedback on issues that may occur, as well as share resources and support required to ensure that the objectives are met. In general, each group could:

- Provide advice on the development of a Climate Action Plan and support building owners with the implementation of low-carbon activities (e.g., conducting energy audits, setting targets, recommending standards, making action plans, and applying technology focused on decarbonization).
- Consider how to screen and select companies in the municipality that already incorporate sustainability concepts, creating a cluster effect among low carbon companies in the city.
- Support capacity building of the different stakeholders in the municipality.

Creating a low-carbon ecosystem requires flexibility. This is crucial because building owners require multiple options depending on the building typology, the age of the building, the condition of the roof, who the tenant is, etc. In addition, there should be clear timelines and staggered objectives based on their feasibility to achieve the goal. Building owners should focus on the ultimate goal - decarbonization.

NEXT STEPS, SHORT, MEDIUM AND LONG TERM

It is recommended to start as soon as possible to achieve the objectives in the time frame determined by the science-based objectives. To this end, the activities to be carried out in the short, medium, and long term are listed below:

First Steps	2 Months – 9 Months	Continuous / Long Term
Make timetable for the drafting of the roadmap, to be completed by Mar 24	Generate a vision of the city. Net Zero Definition and Scope of the route	Official signature and compliance commitment
Identify funds for the route	Diagnosis and preparation of baseline	Development of mechanisms for follow-up
Identify city decision-makers and stakeholder mapping	Development of the route with actions and transformation	Implement and communicate the roadmap
How it is consolidated and who participates (Governance)	Impact assessment and scenario development	Short-term Action Plan
Form council/promoting body	Definition of monitoring and verification milestones	Generate pilot projects (starting with public buildings)
	Public consultation	

Table 2: Next steps - short, medium, and long term
Source: Panel Recommendations



The Technical Assistance Panel is conformed by a group of international experts in the creation of Net Zero Carbon Routes.

ABOUT THE PANEL

MARÍA DEL CARMEN ELOSUA, PANEL CHAIR

Arista Design
Founding Partner

María del Carmen Elosua is an architect, urban designer, and planner with over 20 years of extensive experience. Her professional training and experience includes work in both Mexico and the United States. She holds a Bachelor of Architecture degree from TEC de Monterrey and a double Bachelor of Science degree in Architecture and Urban Planning from MIT. She has extensive experience in Mexico and the United States on projects of varying scales, from small architectural projects to large Master Plans. Over the past 20 years, María del Carmen has worked as director of the Municipal Planning Institute of the city of San Pedro Garza García, Mexico, as director of Mexican operations for Wallace Roberts and Todd in Philadelphia, junior architect at DHK in Boston, and as founder and CEO of her own construction and development firm in Mexico, Arista Design. She currently serves on the board of directors of LAMOSA, a manufacturer of floor coverings and cladding, and the Steel Museum in Monterrey, Mexico. María del Carmen is an active member of ULI Mexico and belongs to the Monterrey leadership committee.

DOLORES HUERTA

Green Building Council España
Chief Executive Officer

Dolores Huerta Carrascosa is a Spanish architect specializing in energy efficiency and sustainability in buildings. Since December 2020 she has been the general director of Green Building Council España (GBCe). Huerta studied architecture at the Escuela Técnica Superior de Arquitectura de Madrid (ETSAM) and has been an architect since 1999 at the Universidad Politécnica de Madrid (UPM), specializing in Buildings. She continued her training in Germany at the RWTH Aachen, the Technical University of Aachen.

Huerta was technical secretary at the Green Building Council España (GBCe) from 2009 to 2020, coordinating the research areas in this council for sustainable buildings in Spain, and following the guidelines of GBCs, as the existing organizations in each country, for example, of the U.S. Green Building Council in the United States. She participated in the development of environmental assessment tools for the built environment such as VERDE, as well as in training and communication activities.

FAIRUZ LOUTFI

World Resources Institute México
Circular Economy and Energy Efficiency Manager

Fairuz is the Circular Economy and Energy Efficiency Manager at WRI México. She is responsible for collaborating in the development of projects and studies on energy efficiency, circular economy, and plastic waste management, as well as coordinating the activities of the Building Efficiency Accelerator (BEA) of the UN's Sustainable Energy for All (SEforALL) initiative.

She served as Technical Advisor in the Energy Efficiency component of the Sustainable Energy Program of the GIZ (German Cooperation for Sustainable Development) in México, has been a lecturer at the Universidad Iberoamericana, México City and Associate Researcher at the Center for Business and Environment (CBEY) and the Center for Industrial Ecology (CIE) at Yale University. She was a member of the United Nations Economic Commission for Latin America and the Caribbean (ECLAC) delegation to the Climate Change Conference (COP21) in Paris, France. She collaborated for four and a half years as Advisor to the Undersecretary of Electricity of the Mexican Ministry of Energy. She is a Mechatronics and Production Engineer with honors, graduated from the Universidad Iberoamericana in México

City, and holds a master's degree in environmental management with a specialization in Energy and Environment from Yale University, in the United States of America.

ANGELICA OSPINA

Colombian Sustainable Construction Council Technical Director

Angélica is a civil and environmental engineer from Universidad de los Andes. She holds a master's degree and a PhD from Georgia Tech. With over 14 years in the green building industry, she has been a cutting-edge leader in the adoption of green building practices and LEED certifications in Colombia. Her technical rigor and integrative approach has brought together the work of academia, industry, professional associations, and government to advance the field. She is one of the founders of the Colombia Green Building Council (*Consejo Colombiano de Construcción Sostenible*) and has volunteered her knowledge and experience since its founding, serving as a member of the board of directors and executive committee and as director of the technical committee. She joined the Consejo Colombiano de Construcción Sostenible as Technical Director in 2019, where she leads public policy work, technical development work and education work. Prior to joining, she was co-owner of Setri Sustentabilidad and led the company's technical department. Since 2012 she has been a part-time professor at Universidad de los Andes and leads the sustainable construction area in the master's degree in construction engineering and management at the School of Civil and Environmental Engineering.

Angélica has been a LEED AP since 2008, LEED AP BD+C since 2009 and LEED AP O+M since 2013. Due to her commitment, leadership, and technical rigor she was designated LEED Fellow as part of the 2017 class.

MAGALY VILLARREAL

ALENER Architect and Master in Valuation, specialist in Energy Efficiency and Project Management.

She has collaborated in both the Technical Component and the Financial Cooperation Component of the NAMA for New Housing in Mexico, on behalf of Sociedad Hipotecaria Federal and the German Development Bank KfW, as well as in projects, working groups and cross-cutting roundtables on energy

efficiency issues with national organizations such as INFONAVIT, CONUEE, ONNCCE and international organizations such as the German Development Cooperation and the México chapter of the Global Alliance for Buildings and Construction. Consultant for GOPA Infra, a division of GOPA Consultants, a German company, world leader in the execution of technical assistance and international cooperation projects.

She is the general director of the *Asociación de Empresas para el Ahorro de la Energía en la Edificación*, currently ALENER, Alliance for Energy Efficiency, a civil association whose main objectives are energy efficiency and energy savings in buildings.



ANNEXES



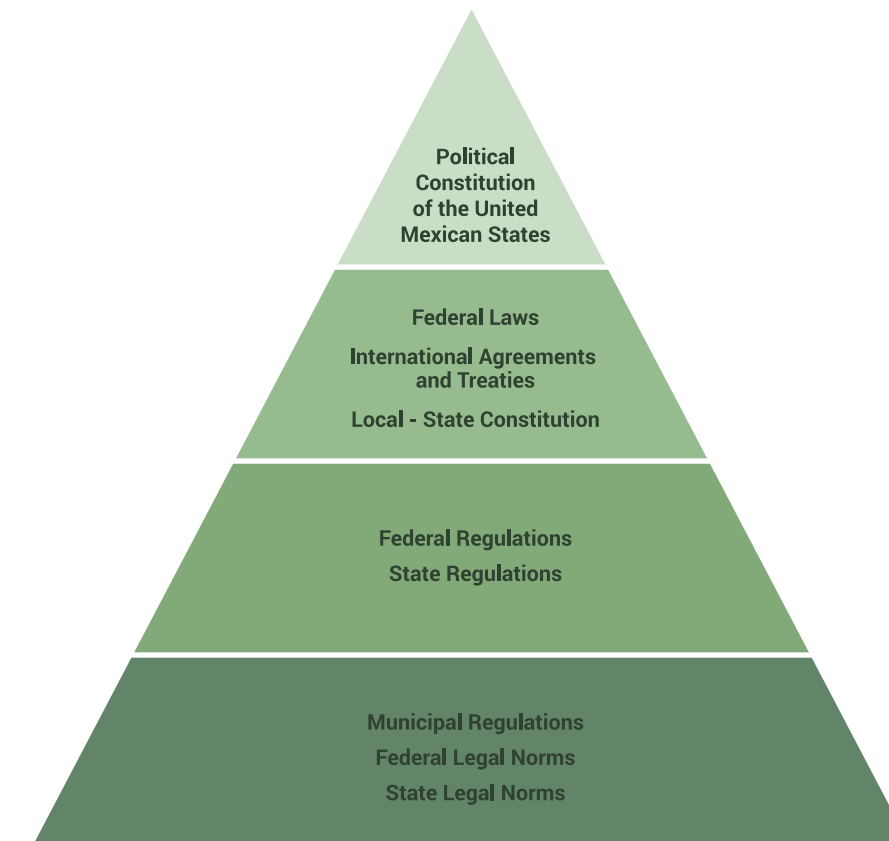
Bosques del Valle park in San Pedro Garza García, is an extensive green space of 25 hectares.
Source: Municipality of San Pedro Garza García, Nuevo León

NATIONAL, STATE AND MUNICIPAL SUSTAINABILITY POLICIES

Hierarchy of the Legal Framework in México

In México, the hierarchy of the legal framework at the state level is made up of a base and three levels: First, there is the Political Constitution of the United Mexican States, which is the supreme law of the country establishing the fundamental principles to be followed and is the basis from which the rest of the regulations and legislation emerge. Next, the first level is made up of Federal Laws, International Agreements and Treaties, and the Local Constitution of each state. At the second level are the Federal and State Regulations. And, finally, at the third level are the Municipal Regulations and the Federal and State Legal Norms.

<https://archivos.juridicas.unam.mx/www/bjv/libros/1/146/12.pdf>



NATIONAL LEGAL FRAMEWORK

At a national level, there is still no Net Zero Driving Council or equivalent, however, there are several programs and initiatives related to decarbonization and sustainable buildings, such as the following:

Agenda 2030: Promoted by the Ministry of Environment and Natural Resources (SEMARNAT).

In September 2015, the Member States of the United Nations (UN), including México, approved the 2030 Agenda for Sustainable Development. México's 2030 Agenda is a roadmap that sets a common horizon in order to guide multisectoral actions in favor of people, the preservation of the planet, economic prosperity, and the reduction of inequalities, as well as to promote peace and partnerships.

It includes 17 Sustainable Development Goals (SDGs), 169 targets and 230 global indicators. More information at: <https://agenda2030.mx/#/home>

NDCs 2022: Promoted by SEMARNAT.

México submitted to the United Nations Framework Convention on Climate Change the update of its Nationally Determined Contribution (NDC). In this NDC, México establishes an increase in ambition with new greenhouse gas mitigation commitments and endorses its commitments to adapt to climate change. Based on the best available science, contained in the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), it is imperative that the international community increases its ambition to maintain the possibility of stopping global warming at 1.5° C. This requires global greenhouse gas emissions to be reduced by 43% by 2030, peaking in 2025. With this in mind, Mexico increases its greenhouse gas reduction target from 22% to 35% in 2030, with respect to its baseline, with domestic resources contributing at least 30% and 5% with international cooperation and financing foreseen for clean energy. On a conditional basis, México can increase its 2030 target to 40%, with respect to its 2030 baseline, if international financing, innovation, and technology transfer are scaled up, and if other countries, mainly the largest emitters, make efforts commensurate with the more ambitious goals of the Paris Agreement. Finally, it ratifies the net carbon emissions reduction target of 51% unconditionally in 2030, and 70% conditionally. More information: <https://unfccc.int/documents/624282>

“At a national level, there are several programs and initiatives related to decarbonization and sustainable buildings.”

Sustainable Taxonomy of México: Promoted by the Ministry of Finance and Public Credit (SHCP).

In March of this year, the first edition of México's Sustainable Taxonomy report was published. This classification tool was created during a participatory and coordinated process of more than three years with the participation of more than 200 experts from the public, private, financial, academic, and civil society sectors. Its objective is to define the activities that have positive effects on the environment and society, using technical criteria and international standards. This document presents perspectives on climate change mitigation from the construction sector. More information: <https://www.gob.mx/shcp/documentos/taxonomia-sostenible-de-mexico?state=published>

Transversal Building Program: Promoted by the Ministry of Energy and the National Commission for the Efficient Use of Energy (SENER-CONUEE).

This program involves a series of interrelated actions that promote decarbonization. Among them, it seeks to promote standardization, energy management systems, sustainable transportation, efficient buildings through energy audits, the use of solar water heating, and energy efficiency statistics, modeling, and indicators. More information at: <https://www.gob.mx/conuee/acciones-y-programas/programas-transversales>.

National Housing Program: Promoted by, Territorial and Urban Development Agrarian Ministry (SEDATU).

It comprises a series of axes and actions that different institutions of the Government of Mexico will develop between 2019 and 2024 so that more than 5 million families have a home. The Ministry of Agrarian and Territorial Development (SEDATU) is in charge of public leadership in housing, with the participation of:

- Federal Mortgage Company (SHF)
- National Institute of Sustainable Soil (INSUS)
- Instituto del Fondo Nacional de la Vivienda para los Trabajadores (INFONAVIT) (National Workers' Housing Fund Institute)
- Fondo Nacional de Habitaciones Populares (FONHAPO) (National Fund for Popular Housing)
- Fondo de la Vivienda del Instituto de Seguridad y Servicios Sociales para los Trabajadores del Estado (FOVISSSTE) (Housing Fund of the Institute of Security and Social Services for State Workers)
- National Housing Commission (CONAVI)

More information at: <https://www.gob.mx/shf/documentos/plan-nacional-de-vivienda-pnv-2019-2024#:~:text=El%20Programa%20Nacional%20de%20Vivienda%20de%20familias%20tengan%20un%20hogar%20>.

National Zero Waste Vision: Promoted by SEMARNAT.

México generates more than 44 million tons of waste per year and this number is expected to reach 65 million tons by 2030. To address the waste problem in the country, the objective is to transform the traditional waste management scheme into a circular economy model, for the rational use of natural resources and to favor sustainable development in the country. More information at: https://www.gob.mx/cms/uploads/attachment/file/435917/Vision_Nacional_Cero_Residuos_6_FEB_2019.pdf

Circular Economy General Law Initiative: Promoted by the Senate of the Republic.

The Senate proposes to issue a General Law of Circular Economy that will aim to guarantee the right of every person to live in a healthy environment for their development, health, and well-being. It will reduce the environmental impact derived from economic activities, minimizing the waste of materials, and decreasing the consumption of virgin raw materials through reuse, recycling, and redesign. More information at: https://www.senado.gob.mx/65/gaceta_del_senado/documento/101326

General Law of Human Settlements, Land Planning and Urban Development.

It establishes the basic norms and management instruments to order the use of the territory and human settlements in the country. More information at: https://www.senado.gob.mx/65/gaceta_del_senado/documento/101326

STATE LEGAL FRAMEWORK

At the state level, there are the following laws and regulations focused on sustainability in the building sector:

Law of Human Settlements, Land Management and Urban Development of the State of Nuevo León (2017): It seeks to establish rules and tools to plan, regulate and order the use of territory and human settlements

in the State. This law was reformed in 2017 to follow the objectives of the General Law of Human Settlements, Territorial Ordering and Urban Development of México. This law aims to reduce the sprawl of Mexican cities by concentrating new projects in existing urban areas and in particular, densify in areas with access to public transportation. This has resulted in a strong interest in reducing single-family housing and increasing the number of vertical multi-dwelling units.

Climate Change Law of the State of Nuevo León (2019): Promote the transition to a competitive, sustainable, and low-carbon state economy.

NAE-SDS-002-2019 (2019): Technical operating guidelines to be complied with by individuals or legal entities that carry out all types of construction, urbanization and demolition works.

LEGAL FRAMEWORK AND MUNICIPAL REGULATIONS

The municipality of San Pedro Garza García has a Zoning and Land Use Regulation and an Urban Development Plan, which together, regulate land use and basic urban guidelines, such as land use, density, height, maximum area, maximum square meters and alignments or setbacks. There are still no building regulations in place to regulate important elements of sustainable buildings. However, the municipality has already begun to outline certain sustainability objectives and goals in other regulations and research.

Zoning and Land Use Regulations of the Municipality of San Pedro Garza García: Its objective is to regulate, together with the Urban Development Plan, the Partial Plans or Programs, and other federal and state laws, urban development throughout the municipality, promoting healthy coexistence among the spaces that house the different activities, the protection of nature, sustainability, economic development, and the quality of life of its inhabitants.

Climate Change Regulation for the Municipality of San Pedro Garza García, Nuevo León: It aims to establish rules and principles to address climate change in the municipality. It is based on several state laws and regulations related to the environment and urban development. It is based on principles of co-responsibility and environmental responsibility.

Mitigation actions are established, such as the promotion of eco-technologies and sustainable construction. Adaptation actions are also included, such as the obligation for new real estate developments to use rainwater collection systems. Through this regulation, the municipality is responsible for preventing and controlling atmospheric pollution. In addition, an environmental leadership program is established to improve the environmental performance of the facilities and operations of existing buildings.

Regulation for Environmental Protection and Sustainable Development of the Municipality of San Pedro Garza García, Nuevo León: Its purpose is to protect the environment and promote sustainable development in the municipality. It regulates waste management, the protection of urban trees, the efficient use of natural resources and the prevention of pollution. It promotes the separation and proper handling of waste, the conservation of trees, energy and water, and compliance with environmental standards. This regulation contains the following points:

- Current Municipal Development Plan.
- Principle regarding the preservation and restoration of ecological balance.
- Environmental impact statement.
- Regulation and control of industrial, commercial, and service activities.
- Prevention and control of atmospheric pollution.
- Pollutant release and transfer register.
- Violations and penalties.

San Pedro Garza García GHG Emissions Inventory: San Pedro Garza García has a Greenhouse Gas Emissions Inventory conducted in 2021, which will be used as the Baseline for this panel. The purpose of this inventory is to identify the main sources of pollutants that affect the municipality's air quality and contribute to global warming, thus guiding action plans in a more strategic manner.

It reports the generation of carbon dioxide (CO₂), methane (CH₄) and nitrogen oxide (N₂O) from activities in the 'Stationary Energy', 'Transportation', 'Waste' and 'Land Use' sectors.

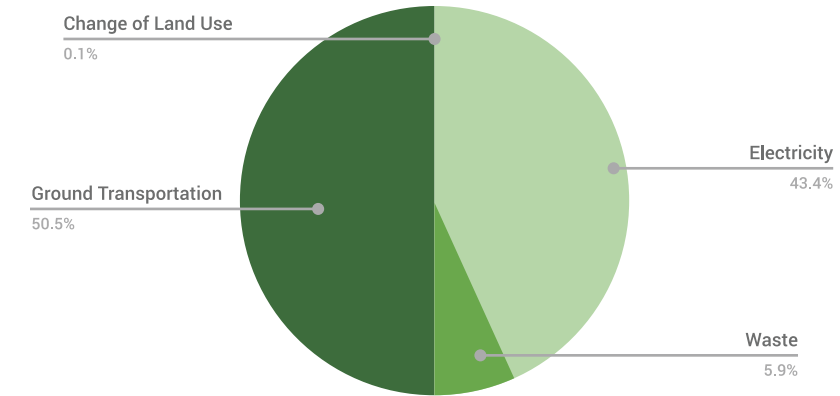


Figure 13: Emissions emitted by sector

Source: Prepared based on Greenhouse Gas Emissions Inventory of San Pedro Garza García.

LEED for Cities Certification

In 2022, San Pedro Garza García was recognized as the first city in México to obtain *LEED for Cities* Gold Level certification with 68 points out of a possible 110.

LEED for Cities is an international tool that helps local leaders create and implement responsible, sustainable, and targeted plans for natural systems, energy, water, waste, transportation, and many other factors that contribute to quality of life, revolutionizing the way cities and communities plan, develop and operate to improve their overall sustainability and quality of life.

San Pedro Garza García stood out in the following indicators:

- 1,119 sqft of green areas per person (considering natural reserves within the municipality's territory), exceeding the level recommended by the UN.
- 5,149.6 acres dedicated to the protection and conservation of natural resources.
- 35% of the municipal area manages to infiltrate water into the aquifers.
- 157 tons of garbage sent for recycling in a pilot program.
- There are 12 collection centers for different recyclable materials.
- 53,820 sqft of green areas are irrigated with recycled water.
- 74% of citizens say they have a positive impact on the community.
- An average of 24 recreational activities are offered to citizens in the

municipality's parks on a monthly basis.

- It has the 1st own inventory of greenhouse gas emissions.

Cities Race to Zero: The municipality of San Pedro Garza García joined the Race to Zero initiative with a commitment to carbon neutrality by 2050.



Commitments:

- Keep global warming below the 1.5°C target under the Paris Agreement.
- Place inclusive climate action at the center of all urban decisions to create prosperous and equitable communities for all.
- Achieve (net) zero by the 2040s or earlier, or by mid-century at the latest, in line with global efforts to limit warming to 1.5°C.

Targeting a
reduction of
15,000 tons of CO₂
by **2024**



The city stands out for its dynamic economy, serving as the headquarters for numerous important companies and corporations.
Source: Municipality of San Pedro Garza García, Nuevo León

Municipal goals according to Race to Zero focused on Zero Carbon Buildings.

Roadmap	Achieve zero carbon emissions from new buildings by 2030.
Incentives for energy efficiency	Implement efficiency and incentives pilot programs for building energy efficiency with tools that facilitate access to data and data analysis (benchmarking) of building energy use by 2025.
Energy use	Evaluate existing buildings and implement efficiency programs throughout the municipality with an approved roadmap to achieve zero carbon emissions by 2050.
Policies	Meet the commitment to own, occupy and develop municipal assets with net carbon emissions by 2030.
Planning Regulations	Ensure that new buildings operate with zero net carbon emissions by 2030.
Regulations and Policies	Ensure that all buildings operate with zero net carbon emissions by 2050.

Table 3: Municipal goals according to Race to Zero, focused on Zero Carbon Buildings
Source: San Pedro Garza García, Cities Race to Zero, 2021

Although the municipality of San Pedro, through **Race to Zero**, aims to reduce 15,000 tons of CO₂ by 2024. It is necessary to ensure compliance with current policies, as well as integrate net zero carbon, and a set of targets and taxes, implemented by the municipality's government.

Additionally, the municipality of San Pedro has implemented multiple sustainable strategies that promote a better quality of life and encourage citizen participation in environmentally friendly and responsible behaviors, which, in turn, help mitigate negative environmental effects. The following is a list of some of the actions implemented:



Vía libre: It is a corridor along one of the main avenues of the city, which seeks the coexistence and balance of car, bicycle, and pedestrian transportation. Each one agile, safe and with universal accessibility. All with the objective of improving and guaranteeing road safety for all users. More information at: <https://www.sanpedro.gob.mx/vialibre>

Collection centers and recycling route: The Recycling Route began as a participatory budget project and is expanding to include a larger collection area. The strategy encourages citizen participation in proper waste management, with the intention of measuring and evaluating the impact to generate environmental benefits. In addition to the recycling route, there are multiple collection centers for depositing different types of waste. More information at: <https://sanpedro.gob.mx/centros-de-acopio>

San Pedro Parks: The creation of six connected parks preserves natural assets and infrastructure intact. In addition, the parks offer safe, clean spaces with high quality services. As part of the cultural promotion, multiple activities and recreational events are offered, with the intention of strengthening citizen participation in public spaces and generating community. More information at: <https://sanpedroparques.mx/>

The Mississippi park, is a green space for recreation and relaxation in the midst of the urban environment.
Source: Municipality of San Pedro Garza García, Nuevo León

EXAMPLES OF GLOBAL INCENTIVES

EXAMPLES OF THE PROMOTION OF GREEN BUILDINGS THROUGH GLOBAL INCENTIVES

Uruguay - Reduction of IRAE and VAT taxes

It can be applied in commercial or service constructions. It consists of the exoneration of the Income Tax on Economic Activities (IRAE) and VAT (Value Added Tax) between 30% and 100%. The IRAE exoneration period depends on the amount of the investment between 16 and 25 years.

Colombia - Income tax and VAT reduction

It can be applied to all types of construction. Incentives for Efficient Energy Management and for the acquisition of Non-Conventional Renewable Energy Sources.

Municipality of Salvador, Brazil - Discounts in IPTU and onerous concession

IPTU discounts vary from 5% to 10% for buildings of any type depending on the certification category (5% for Bronze, 7% for Silver and 10% for Gold) and from 5% to 10% for homes depending on the certification category proportional to the photovoltaic energy generation for electricity savings (5% for Bronze with 50% savings; 7% for Silver with 70% savings and 10% for Gold with 90% savings).

Discount of 25 to 40% in the Onerous Concession of the Right to Construct for buildings that have market certification, or the Sustainability Seal created under the Sustainable Certification Program".

Municipality of Piura, Peru - Term Reduction, Height Bonus and Service Rate Discounts

- Applicable to all types of constructions.
- Reduction to 20 days of the term for the issuance of the Building Permit.
- Height bonuses from 1 to 2 stories.
- 30% reduction in fees for urban cleaning services and maintenance of public roads for social housing.

India - Increase in Buildability Index

Applies to Homes and Businesses in the Municipality of Pune.

- 3% additional land use coefficient to achieve 30% less energy, water, and embodied energy in materials.
- 5% to achieve a 40% improvement.
- 7% to achieve a 50% improvement.

Philippines - Reduction of property taxes and increase in the buildability index

Applicable to Residential and Commercial buildings throughout the City of Mandaluyong. To developers who exceed the code standard, the municipality offers lower property taxes and the opportunity to add floor space.

Spain - Measures to promote energy rehabilitation

As a consequence of the application of the European Next Generation funds, measures have been implemented such as a reduction in income tax for investments in energy rehabilitation, or direct aid for the preparation of rehabilitation projects and for the execution of the works themselves. All the aids can be consulted in Royal Decree 853/2021, dated October 5, 2021, which regulates the aid programs for residential rehabilitation and social housing of the Recovery, Transformation and Resilience Plan.

"30% reduction in fees for urban cleaning services and maintenance of public roads for social housing."

ADDITIONAL RESOURCES

- ULI AMERICAS (2022). <https://americas.uli.org/research/centers-initiatives/greenprint-center/city-engagement/ulis-net-zero-imperative/>
- MEXICO2. (2022). Carbon taxes in Mexico: Development and trends. Mexico City: Plataforma Mexicana de Carbono.
- WRI Mexico, Efficient Buildings Challenge, 2022 <https://wrimexico.org/our-work/projects/reto-de-edificios-eficientes>
- GBCe (January, 2022). *Roadmap for the decarbonization of buildings throughout their life cycle.*



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