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# Mexico Green & Resilient Transport

*Urban Public Transport*

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1818 H Street NW, Washington DC 20433

Telephone: 202-473-1000; Internet: [www.worldbank.org](http://www.worldbank.org)



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### **Team**

This study was led by Abel Lopez Dodero and Aiga Stokenberga, with extensive inputs from numerous World Bank staff and consultants: Abelardo Arroyo Rincon, Ahmed Bouayad, Aitor Franco Arana, Alejandro Hoyos Guerrero, Cecilia Anette Ramirez Valenzuela, Edgar Amador, Fernanda Ruiz Nunez, Fernando Arechederra, Georges Darido, Gregor Wolf, Javier Rodrigo Pena Bastidas, Lincoln Flor, Manuel Luengo, Max Hamrick, Nancy Montes de Oca, Paolo Avner, Raquel Andrea Acosta Valle, and Said Dahdah. Overall guidance was provided by Mark Thomas, Maria Marcela Silva, and Bianca Bianchi Alves. Administrative support was provided by Licette Moncayo, Patricia Marrero, and Sonia Rousseau-López. Technical background studies were conducted by World Resources Institute (Mexico), Urbanistica, and Greenberg Traurig.



## The objective is to inform public policy strategies for the green and resilient recovery of the urban mobility subsector in Mexico.

This analytical and advisory activity does so by conducting:

- 1 Diagnosis of needs, responsibilities, and barriers for financing urban public transport
- 2 Resource mobilization strategy for urban public transport interventions at the sub-national level
- 3 Infrastructure financial mechanism for green and resilient transport projects
- 4 Roadmap for increasing investment in urban public transport, including policy recommendations



# DIAGNOSIS OF NEEDS



# Mexico has recognized the need to invest in Urban Public Transport to address crucial challenges.

## Urbanization










- **79%** of Mexico's population is concentrated in urban areas.
- The result of this urbanization is reflected in an increase in the total number of trips and in the total distance of trips made.
- The growth of Mexican cities has tended **towards metropolization**: in 2010, there were 59 metropolitan zones with 63.8 million inhabitants. By 2020, there are 74 with 92.6 million inhabitants.
- More than **80%** of Mexico's GDP and **77%** of its greenhouse gas (GHG) emissions are generated in urban areas.

## Motorization

- Widespread and rapid outward expansion of urban areas has led to challenges in terms of urban sustainability, efficiency, and quality of life.
- Urban sprawl has driven the number of automobiles to increase from 3.9 million to **34.7 million** in the last 40 years, which is not surprising given that **70%** of public spending on transport continues to go towards facilitating motorized private mobility.
- The growth of motorcycles has been particularly pronounced, soaring from 280,000 in 2001 to **6.8 million** in 2022, with important implications for road safety and noise pollution.

# Despite the growth in motorization public transport is still the main mode of transport in Mexico's cities, mostly provided using informal or semi-formal systems.

- Public transport is currently used by about **40%** of the population (50 million people) daily; it is the main mode used for commuting to work (33% of trips) and is important for households with monthly incomes below 7,000 pesos (~US\$400; corresponding to minimum wage).
- More than **270,000 jobs** depend on the sector, mainly drivers of transport vehicles.
- BRTs, trains and trolleybuses carried up to 2.5 billion trips annually prior to COVID-19 (and 30-40% below that in 2021-2022).

Public transport mode	Systems/ lines	Demand (trips/day)	
BRT	 23 corridors grouped into 9 systems (ACABUS, METROBUS, RUTA, VIVEBUS, ECOBUS, TUZOBUS, MEXIBUS, ECOVÍA, MACROBUS y RUTA EXPRESS)	2.2 million	 For every trip made in a formal/professionalized mode, 10 trips are made in conventional buses.
Trains	 20 lines grouped in 5 Systems (SITEUR, STC, METRORREY, TS, STE-TL)	6.7 million	
Cable cars	 3 lines (MEXICABLE)	13,000	
Trolleybuses	 2 systems (SITEUR and STE)	180,000	
Integrated Transport Systems (SIT)	 3 cities (León, Hermosillo and Querétaro)	1.6 million	 The costs associated with informality are transferred to the PT user population through <b>low professionalization</b> of the sector, <b>low fleet renewal, insecurity and uncertainty</b> about the service.
Buses and urban vans	 96 cities About 230 thousand vehicles	 92% ~110 million	



# Public Transport was one of the sectors hardest hit by the COVID-19 crisis.

## The Pandemic

Government quarantine and social distancing measures, and a drastic fall in economic activity, reduced transit demand by up to 90% compared to pre-pandemic numbers.

- Traditional bus systems had the highest share of the financial shortfall: mixed and informal bus operations lost US\$198 million and US\$106.2 million per month, respectively, during the peak of the pandemic.
- Metro systems also suffered combined losses of US\$19.2 million per month.
- With disruptions and shifts in work patterns, any systems have yet to fully reach pre-covid ridership numbers.

## The Response

Measures to manage the financial impact of the COVID-19 outbreak varied across systems, with limited financial support to informal systems during the peak of the financial stress caused by the COVID-19 outbreak in 2020 but were limited to fuel subsidies and local tax exemptions for a reduced number of months.

## Impacts on Public Transport Supply

- A lot has been understood about the reductions in demand in urban public and their impacts on transit systems. However, the consequences on the supply side have generally been less well understood: as public transport operations have adjusted to the demand shock and continued reduction, has there been consolidation and/or reduction of services provided?
- For this reason, we explored three case studies from cities from different typologies to better understand how these changes have impacted public transport.



# The Government has recently increased its attention to non-motorized transport (NMT).

## Role of active mobility in overall urban mobility & key challenges

- Depending on the city, walking and cycling represent between 15% and 50% of all trips and are disproportionately important for lower-income populations.
- 69% of women in Mexico feel insecure walking alone at night, compared to 53% of men, including due to how the streets and other public spaces are designed (illumination, visibility, ease of access).
- There were ~8,600 pedestrian and ~700 cyclist deaths in 2021, representing over half of all crash victims. The number of road traffic deaths affecting cyclists has increased by about 0.6% per year over the past two decades.

## Recent government initiatives to promote active mobility in Mexico's cities

- The Law of Mobility and Road Safety of May 2022 (LGMSV) for the first time defines a clear hierarchy of transport users whose mobility needs should be addressed through government policies and investment programs, prioritizing, first and foremost, users of NMT.
- Also in 2022, SEDATU (Secretariat of Agrarian, Land, and Urban Development) approved two major regulatory instruments to promote NMT:
  - i. Standardized minimum requirements for NMT infrastructure in public spaces, aimed to reduce encroachment of parked vehicles on pedestrian spaces and to increase bicycle parking in public spaces.
  - ii. Official guidelines for the planning and implementation of pedestrian infrastructure that is safe for women and girls, that include participatory planning processes, road safety design elements that clearly delineate pedestrian spaces, and “complete streets” principles that encourage efficient mobility.



# A typologies of cities in Mexico can be defined in terms of the urban connectivity and accessibility issues.

The country is very heterogenous in terms of topography, environment, climate and developmental history featuring wide variety of types of urban public transportation systems. **However, to understand urban connectivity and accessibility to public transport, Mexico's cities can be organized into 6 general types, based on their characteristics:**

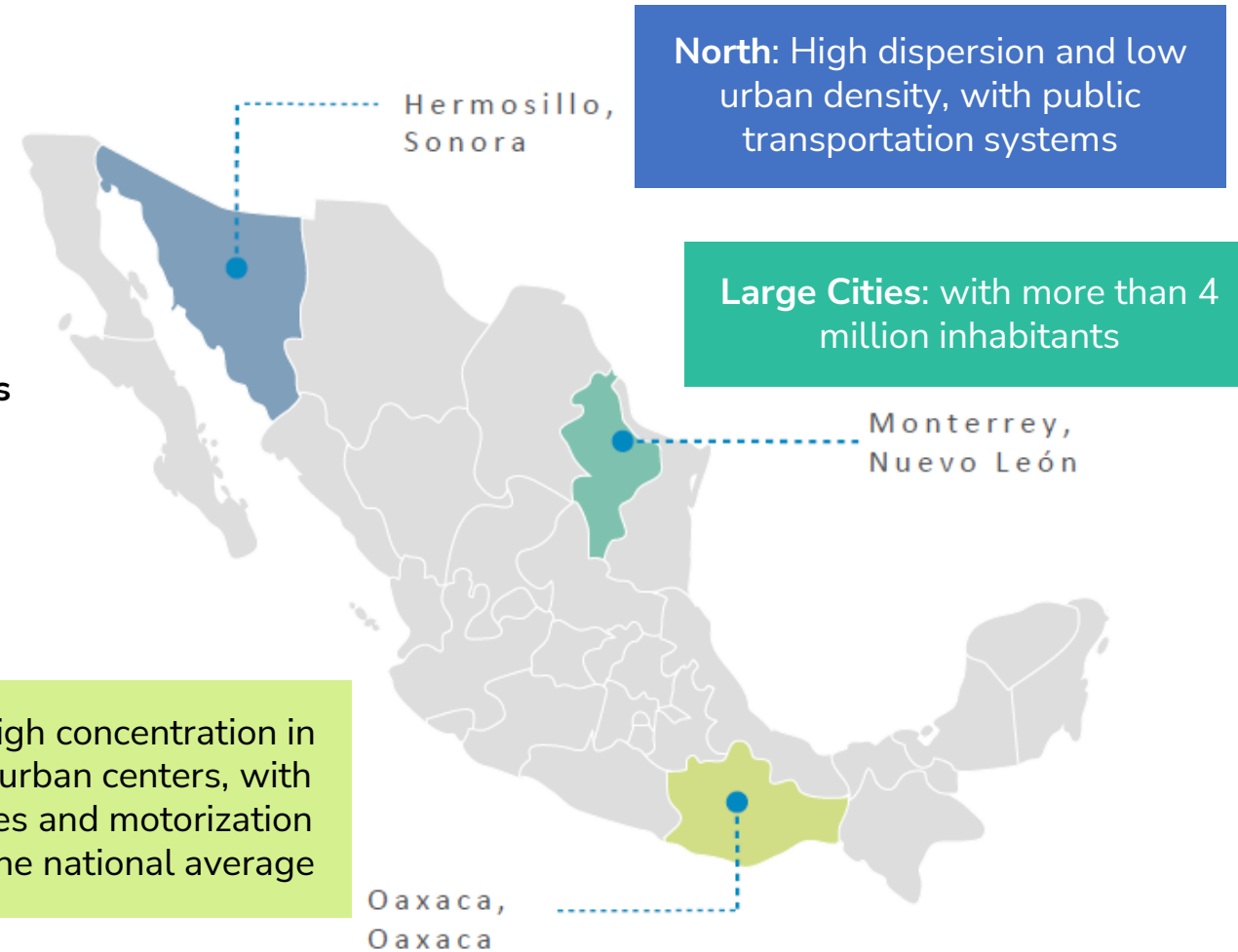
<b>Large Cities:</b> with more than 4 million inhabitants	<b>Northern border:</b> Dispersed urban layout and predominance of automobiles as transportation	<b>North:</b> High dispersion and low urban density, with public transportation systems
Mexico City, <b>Monterrey</b> , and Guadalajara	Tijuana, Ciudad Juárez, Sonora, Mexicali	<b>Hermosillo</b> , Chihuahua, Durango, Zacatecas, Torreón, Saltillo
<b>Center:</b> High concentration in consolidated urban centers, with urban densities and motorization rates above the national average	<b>Southeast:</b> High concentration in consolidated urban centers, with urban densities and motorization rates below the national average	<b>Coastal touristic cities:</b> High floating population
Querétaro, Puebla, León, Toluca, Morelia, San Luis Potosi, Aguascalientes	Veracruz, <b>Oaxaca</b> , Chilpancingo, Campeche, Villahermosa, Tuxtla Gutiérrez	Los Cabos, San Carlos, Mazatlán, Puerto Vallarta, Manzanillo, Acapulco, Cancún



## Three case study cities - Hermosillo, Monterrey, and Oaxaca – were analyzed, representing different typologies.

Key milestones between 2010 and 2020 are related to **institutional strengthening hand in hand with a legislative work**, changing the paradigm that privileged the private vehicle over public and cargo transportation.

This institutional strengthening took place with the **promotion of new mass transit systems, the organization of routes, and a professionalization and specialization of decision makers**, seeking to improve the user travel experience.



# Large Cities: with more than 4 million inhabitants (MONTERREY, NUEVO LEÓN)

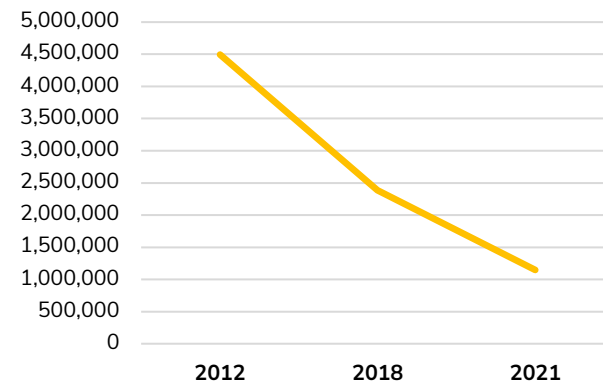
## Population and urban growth

- In 2010, the Monterrey Metropolitan Area had 4.15 million inhabitants; by 2020 it had 5.26 million (23% increase).
- Since 2010, Monterrey's urban area has grown by 17%, while public transport network coverage grew by 42%.
- Population density is highest on the **urban periphery**.
- **Marginalization has declined over time**, including due to Monterrey having better public services compared to other metropolitan areas.
- Growth in commercial establishments has occurred mostly on the northern and eastern boundary. The number of economic units increased by 39% in 2010-2020.

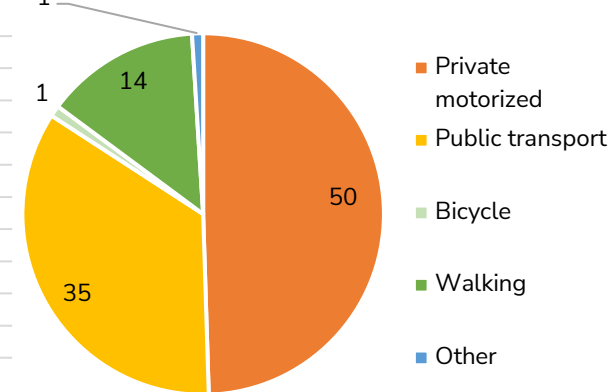
## Public transport demand

- **Public transport ridership has declined continuously** in the last decade, from 4.49 million daily trips in 2012 to 2.39 million in 2018 and reached 1.15 million in 2021.
- 62% of population and 81% of firms have easy access to public transport.
- Travel to work is mostly by private vehicles and increased its **modal share** from 45% in 2015 to 50% in 2020. Public transport (including taxi) declined from 40% to 35%.
- 38% of trips to work in 2020 were 31-60 minutes long; 26% took over 1 hour.

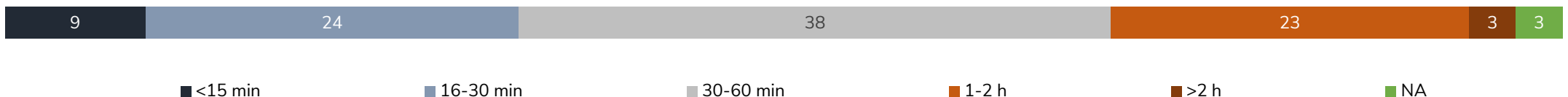
Daily passengers (public transport)



Modal shares, work trips (2020)

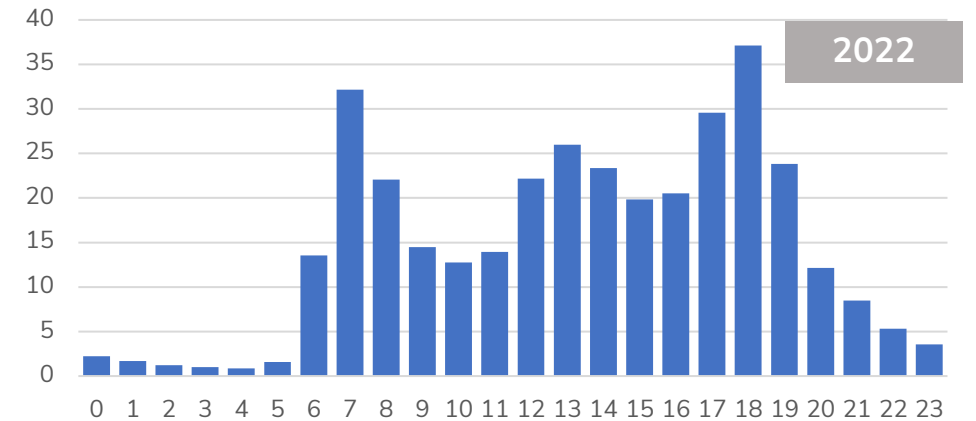
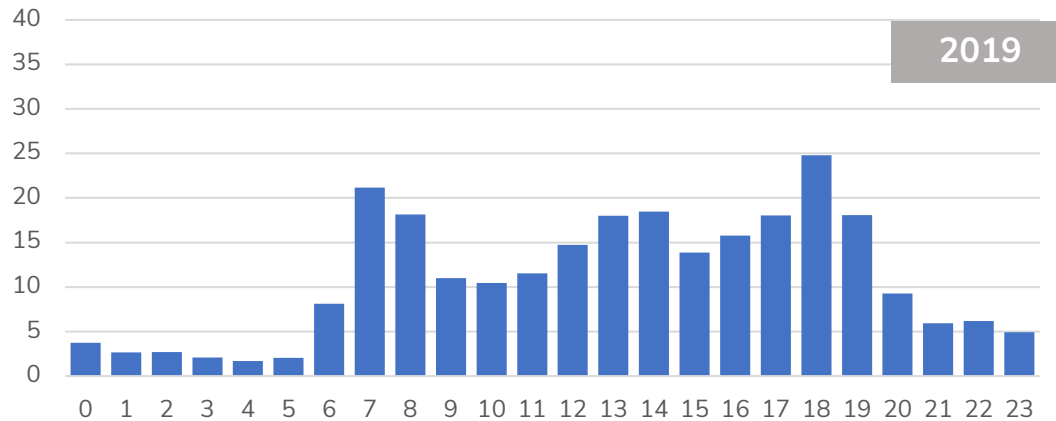


Travel time to work (2020)

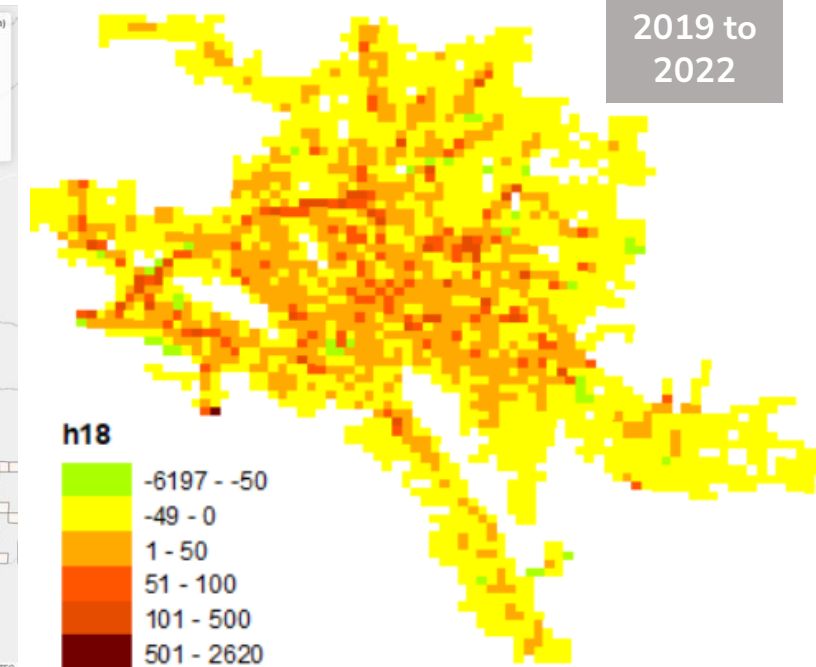
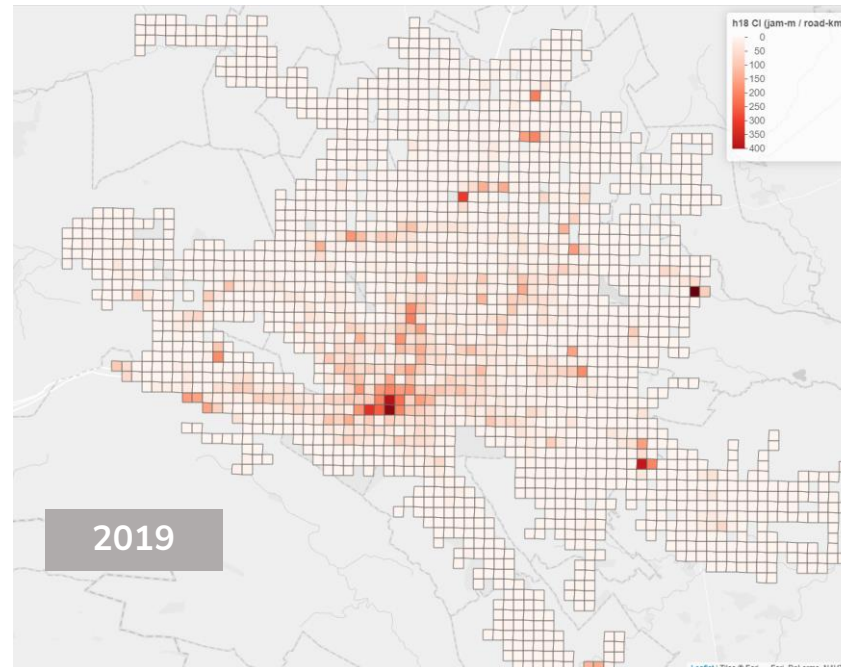


# Large Cities: with more than 4 million inhabitants (MONTERREY, NUEVO LEÓN)

Based on Waze for Cities data, overall **Congestion Index in 2022** was already significantly above the pre-pandemic level.



- **Congestion at peak hour (18h) is mostly concentrated in downtown Monterrey**, but pockets of congestion are spread throughout the metropolitan area.
- Compared to 2019, **congestion during peak hour in 2022 had increased in most of the metropolitan area**, with minor decreases in the outlying areas.



Congestion patterns

# Large Cities: with more than 4 million inhabitants (MONTERREY, NUEVO LEÓN)

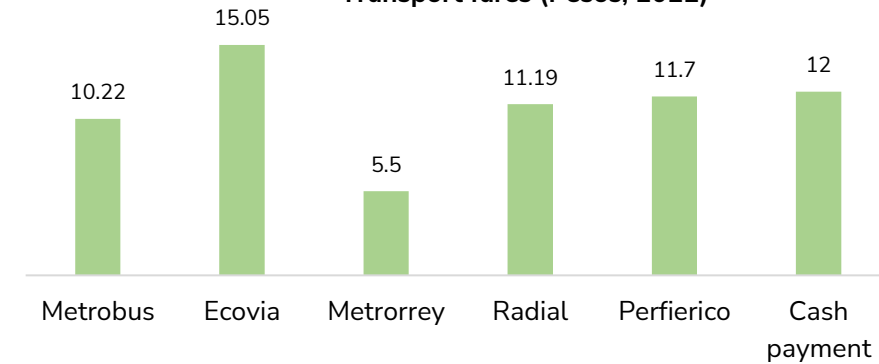
## Fare and payment system

- Monterrey has a differentiated fare under the operating rule that required the concessionaire to enter into a bus renewal program.
- Payment by card (Feria card – 2010) and cash payment.
- The groups that are supported are people with disabilities, senior citizens and students.
- In 2012-2022, the public transport fare increased by 29%.

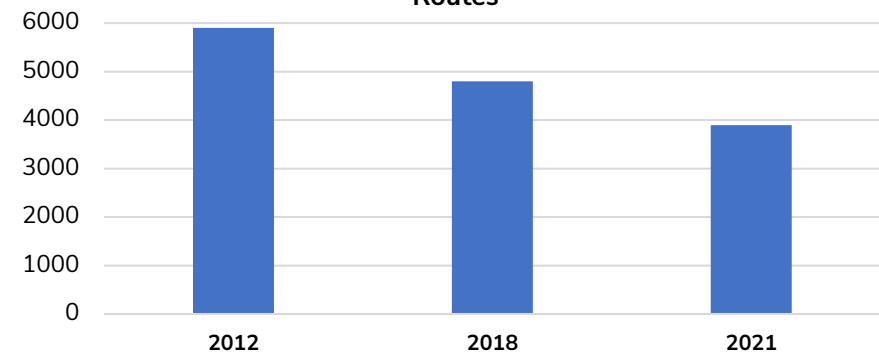
## Operating conditions

- Since the 1990s, the public transport system added Metrorrey (3 metro lines) and TransMetro / Ecovia (buses)
- Public transport has seen a reduction in the number of units through the implementation of the **Transportation and Road Sector Plan** and the **Integrated Sustainable Urban Mobility Plans**.
- The **2008-2030 Sectoral Plan for Transportation and Roads** shows a broad vision of urban development and links to mobility policies (e.g., focus on densification along transport routes).
- The average age of the fleet in 2018 was 6 years, growing over time.
- 92% of the vehicle fleet of the integrated transportation system are **diesel vehicles** and the remaining 8% are **CNG vehicles**.
- In 2012-2021, the price of diesel doubled. The price of CNG had an exponential increase, from 4.50 Pesos to 17.97 Pesos. It still offered the most competitive price for the operation of transportation systems.

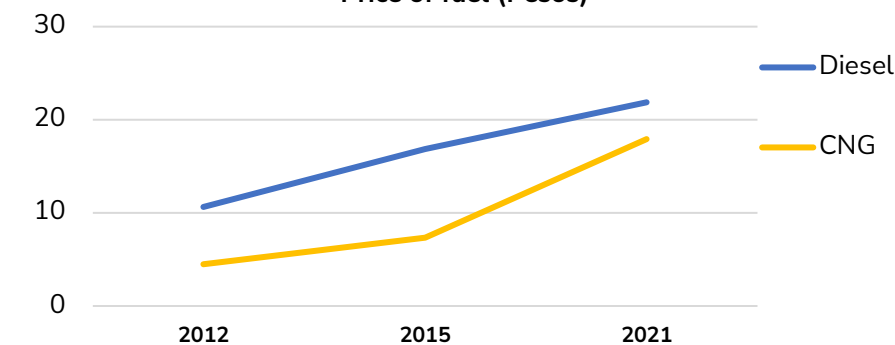
Transport fares (Pesos, 2022)



Routes



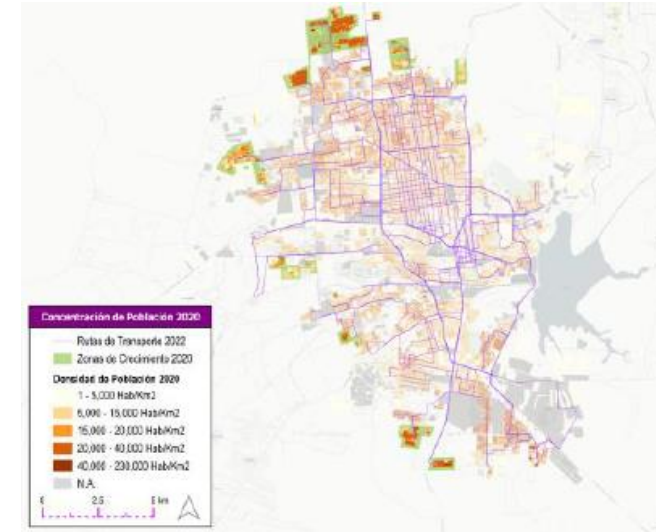
Price of fuel (Pesos)



# North: High dispersion and low urban density, with public transportation systems (HERMOSILLO, SONORA)

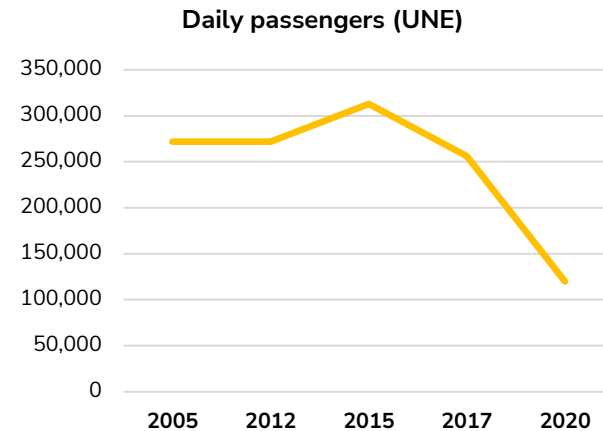
## Population and urban growth

- Hermosillo population increased from 718,000 inhabitants in 2010 to 862,292 in 2020 (21% increase). The urban area has grown by 14%, while **public transportation coverage grew 28%**.
- With the **consolidation of urban areas**, marginalization (as defined by CONPES) was reduced through access to education, gradual improvement in housing, proximity to public services and paid work.
- Poverty remains highest in the south and other border areas.

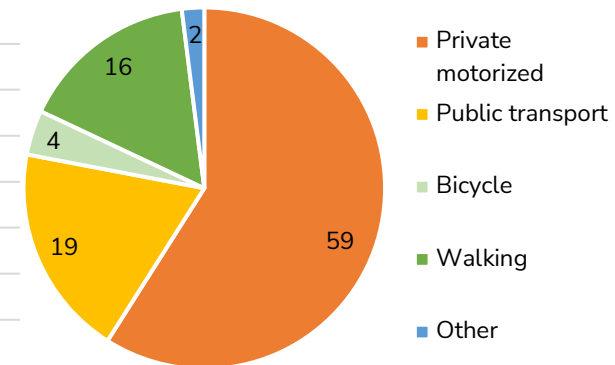


## Public transport demand

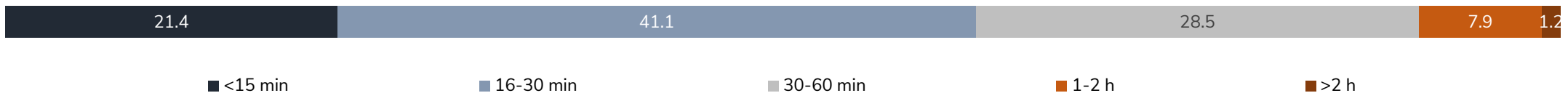
- Hermosillo has an integrated transportation system (UNE).
- **Demand** was relatively stable before COVID-19 and was more than halved in 2020.
- 67% of population and 85% of firms have easy access to public transport
- Travel to work is mostly by private vehicles, although reducing its **modal share** from 64% in 2015 to 59% in 2020. **Public transport (including taxi) declined from 21% to 19%**, while walking increased from 8% to 16%.
- 41% of trips to work in 2020 were 15-30 minutes long; about 10% took over 60 minutes.



Modal shares, work trips (2020)

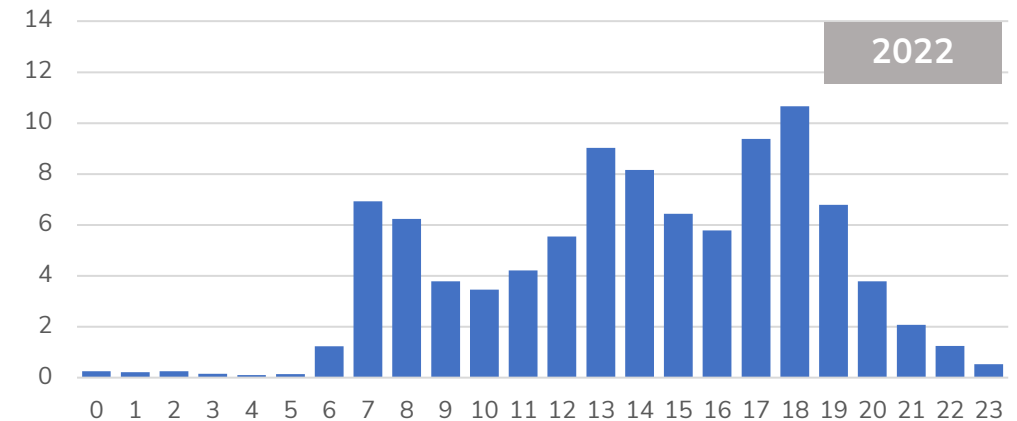
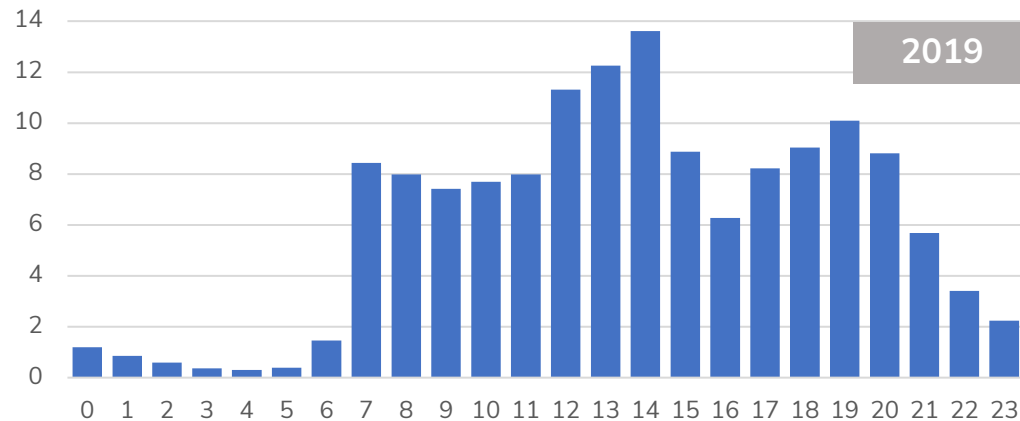


Travel time to work (2020)



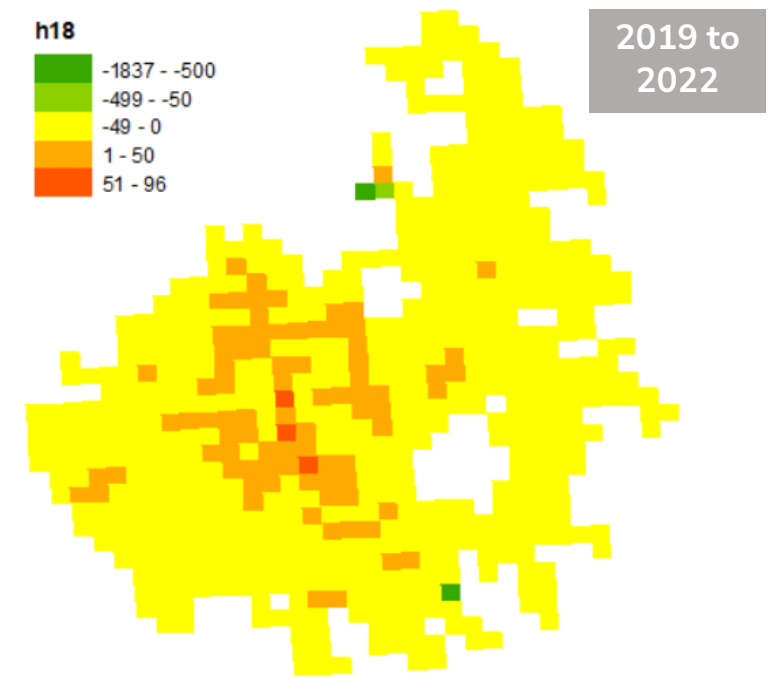
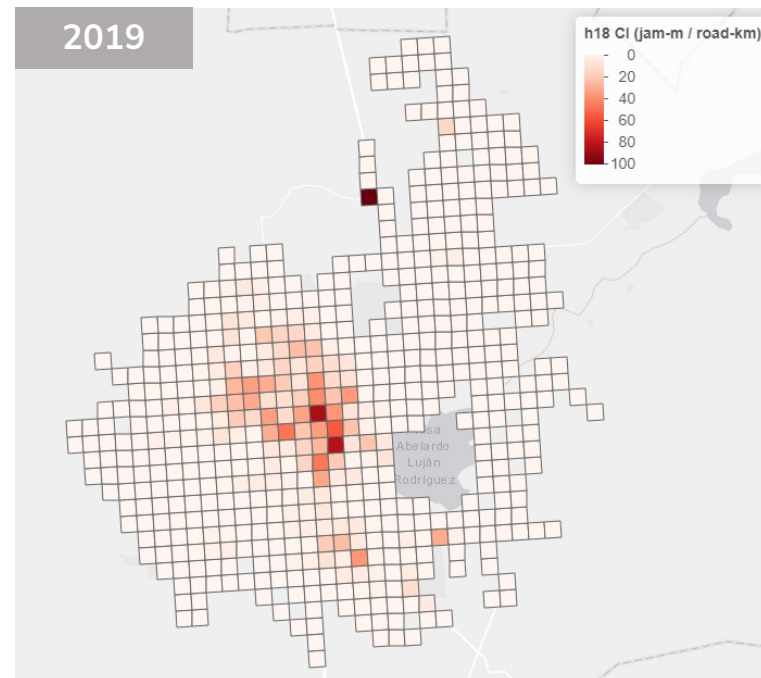
# North: High dispersion and low urban density, with public transportation systems (HERMOSILLO, SONORA)

Based on Waze for Cities data, overall **Congestion Index in 2022** was still below the pre-pandemic level.



## Congestion patterns

- **Congestion at peak hour (18h) is mostly concentrated in the central part** of the metropolitan area.
- Compared to 2019, **congestion during peak hour in 2022 had increased in some central areas** but was below the pre-pandemic level everywhere else.



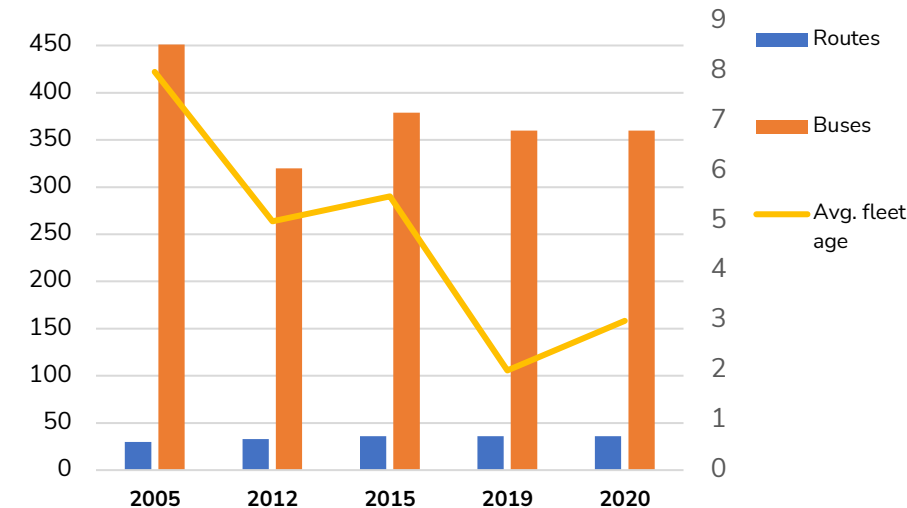
# North: High dispersion and low urban density, with public transportation systems (HERMOSILLO, SONORA)

## Fare and payment system

- There is a differentiated fare under the operating rule that required the concessionaire to enter into a bus renewal program.
- There is a card payment system (UNE), but cash payment is still accepted.
- The groups that are supported are senior citizens and students. In 2020 there was a subsidy of 2.96 Pesos for the ordinary fare and 1.83 Pesos for groups with support.

## Operating conditions

- The **transition from “man-truck” schemes to companies** favored improvements in the operation of the public transport service.
- Public transport fleet size has declined in the last 15 years.
- The average age of the fleet by 2020 was 3 years due to **vehicle renewal** in 2017.
- 100% of the vehicle fleet of the integrated transportation system are **diesel vehicles**. The cost of diesel increased from 8.68 Pesos/l in 2010 to 21.74 Pesos in 2020.



## Key milestones in the creation of the integrated transport system

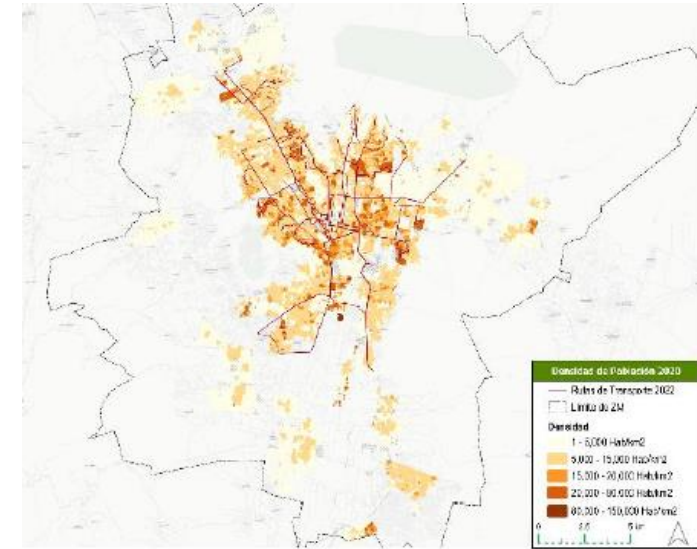
- Since 2005, fleet renewal and route reorganization was done hand in hand with the implementation of the **Comprehensive Plan for Sustainable Urban Mobility**, consolidation of 2 operating companies of the integrated public transport system and focus on continuous improvement.
- Currently, the sector is managed by the General Directorate of Transportation through various plans and programs such as the Transportation Operating Plan.



# Southeast: High concentration in consolidated urban centers; densities & motorization rates < national average (OAXACA, OAXACA)

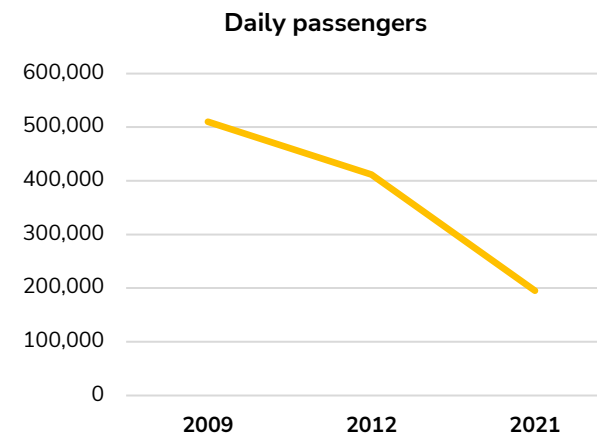
## Population and urban growth

- Oaxaca in 2010 had 571,880 inhabitants; by 2020, there were 641,079 (12% increase).
- Since 2010, Oaxaca's urban area grew by 3.5%, while **public transport network coverage declined** by 13%.
- Population density is relatively even across the metropolitan area. Urban growth – and the growth of economic establishments (by 32% in 2010-2010) – occurred around the entire periphery.
- Poverty remains highest in the south and other border areas of the city.

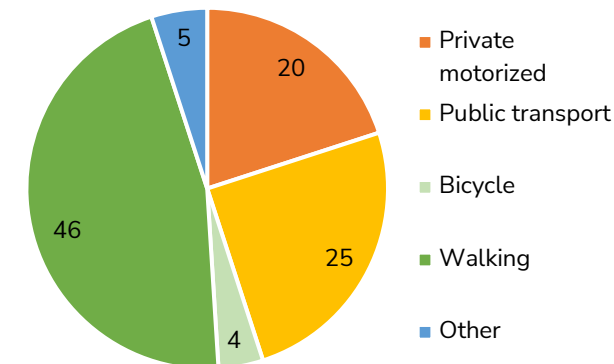


## Public transport demand

- Daily public transport ridership declined in 2009-2021**, from 510,000 to below 200,000.
- Commute to work is mostly by walking** (46% in 2020, up from 43% in 2015), **while public transport accounts for about one-quarter**. Private vehicles increased their share from 16% to 20%.
- In 2020, 31% of work commutes took less than 15 minutes, while about 9% took over an hour.



Modal shares, work trips (2020)

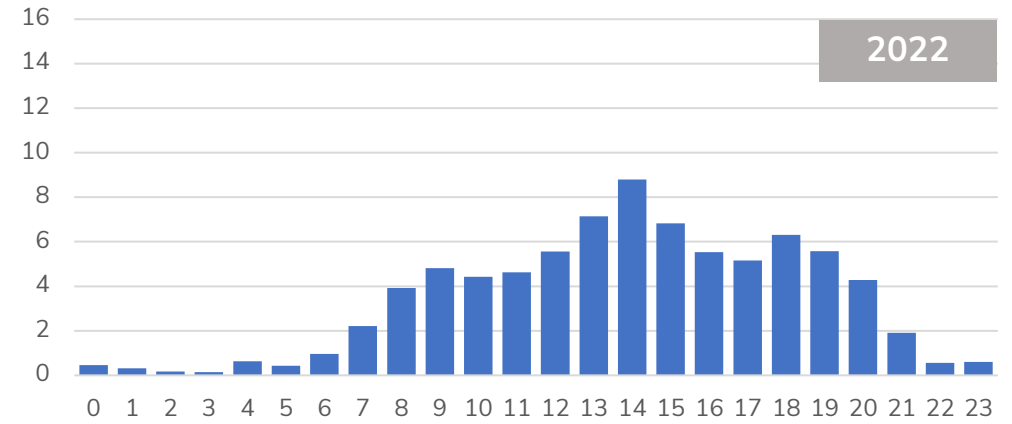
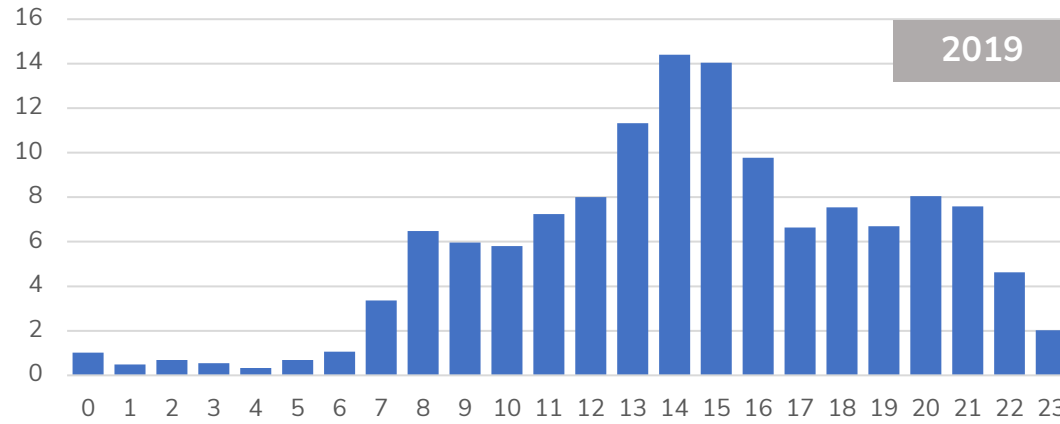


Travel time to work (2020)



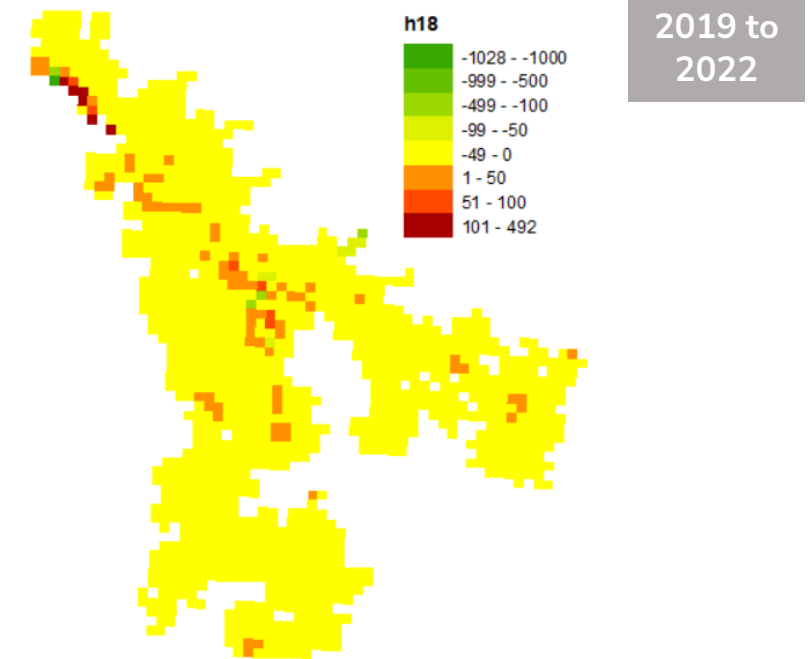
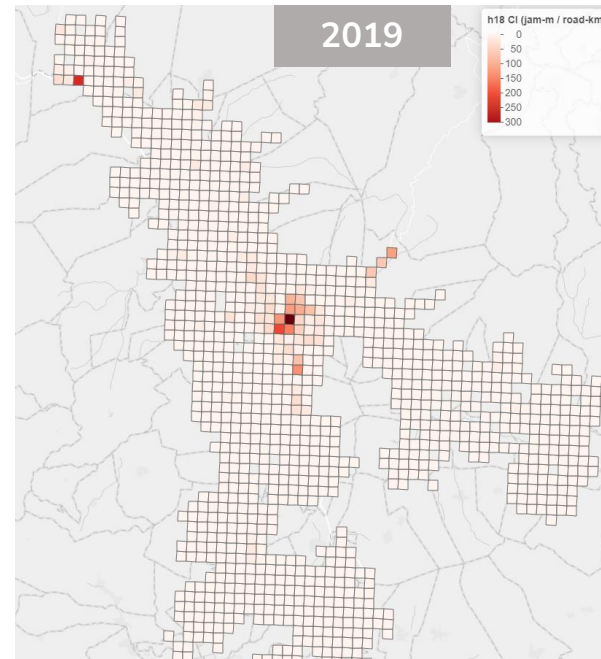
**Southeast:** High concentration in consolidated urban centers; densities & motorization rates < national average (**OAXACA, OAXACA**)

Overall Congestion Index in 2022 was still below 2019 (after declining significantly in 2020).



**Congestion patterns**

- Congestion at peak hour (18h) is concentrated in a specific – central – area of Oaxaca.
- Compared to 2019, **congestion during peak hour in 2022 had increased on a corridor connecting to the central city**, while in the rest of the metropolitan area it was still below the pre-pandemic level.



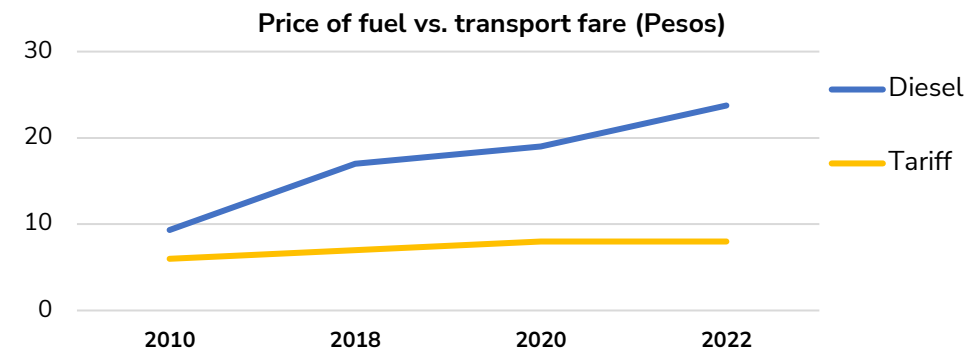
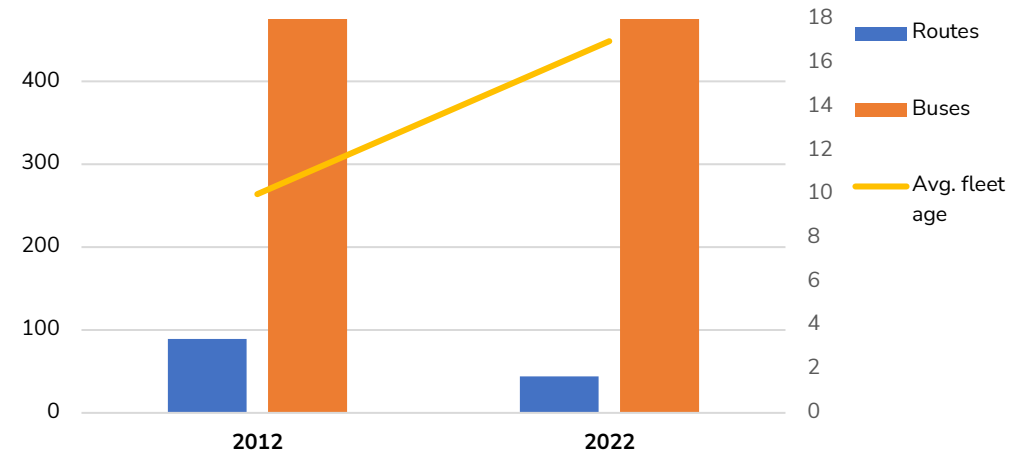
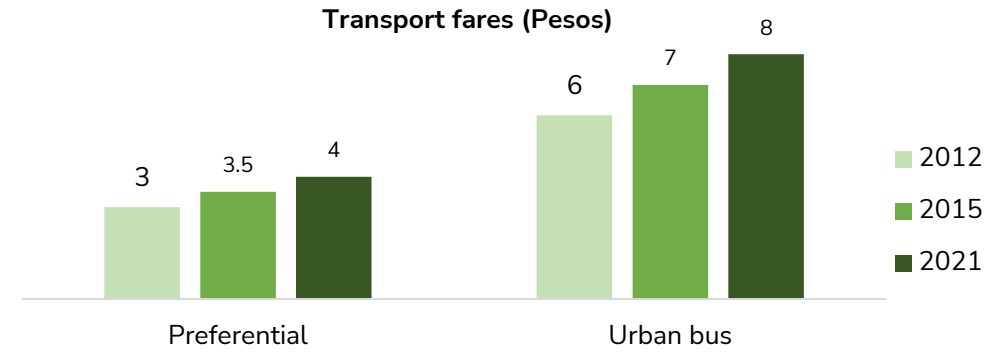
## Southeast: High concentration in consolidated urban centers; densities & motorization rates < national average (OAXACA, OAXACA)

### Fare and payment system

- Oaxaca has a **preferential tariff rate under the rule of support for vulnerable groups**: people with disabilities, senior citizens and students with a 50% discount.
- Since 2012, public transport fare has increased by 33%.
- The social tariff has seen a moderate increase, controlled by SEMOVI.
- A card payment system (CITYBUS) and the traditional cash payment system are both available.

### Operating conditions

- The Metropolitan Zone of Oaxaca has several modes of public transport: traditional routes, collective cabs, motorcycle cabs (over 13,000 units), and the Citybus system (BRT) as of 2021.
- Public transport in the city of Oaxaca is operated by 4 companies and has seen a **reduction in the number of routes between 2012 and 2022; at the same time, there has been an increase in the fleet.**
- The average age of the fleet in 2022 was **17 years**, increasing steeply over the last decade.
- 100% of the vehicle fleet that provides transportation services are **diesel-powered**.
- While the cost of diesel increased from 9.32 Pesos in 2010 to 23.75 Pesos in 2022, a concurrent increase was not seen in the transport fare, thus generating an **operating gap** for the transport companies.
- The biggest challenge for the system currently is how to recover lost demand.

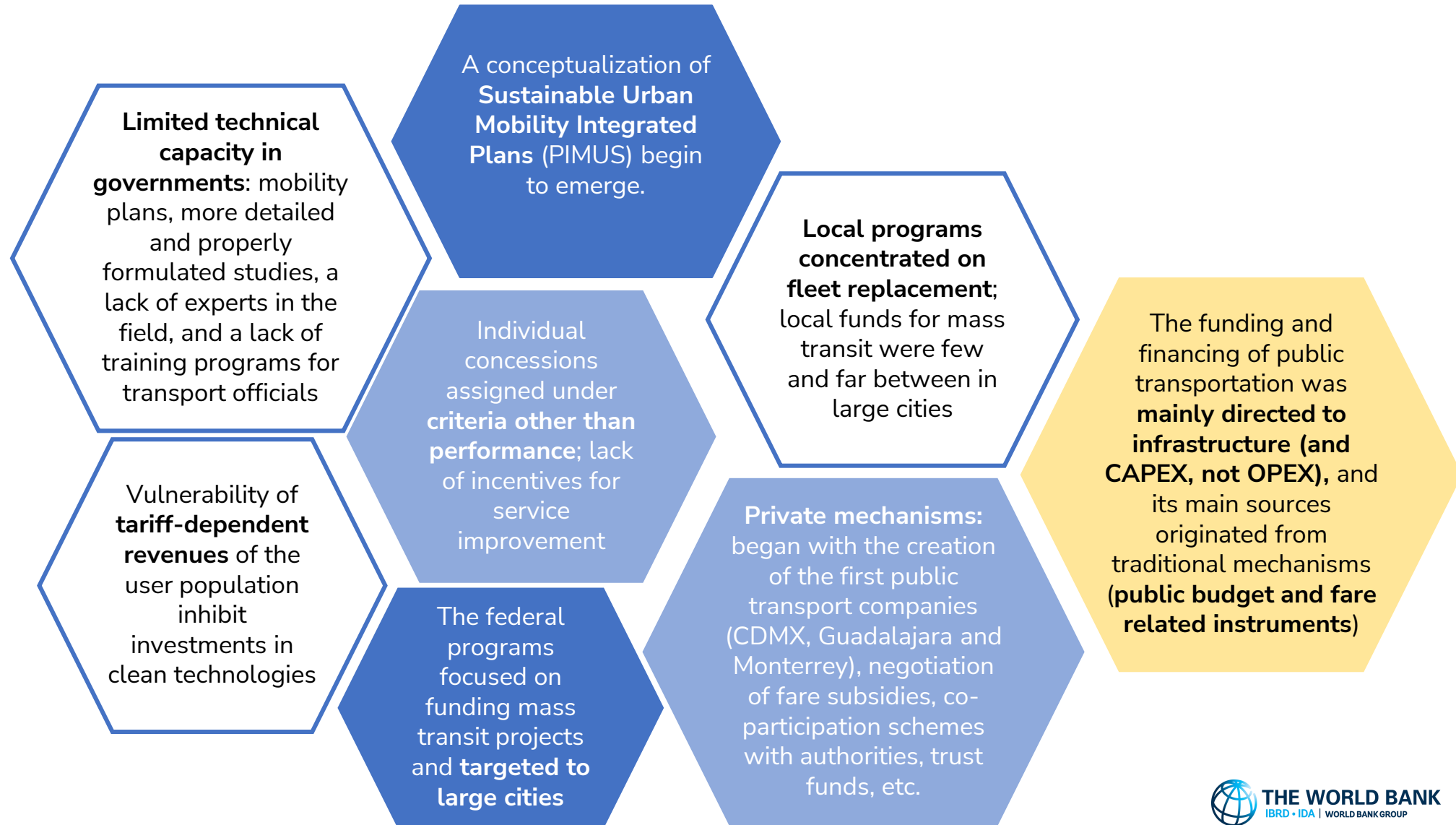




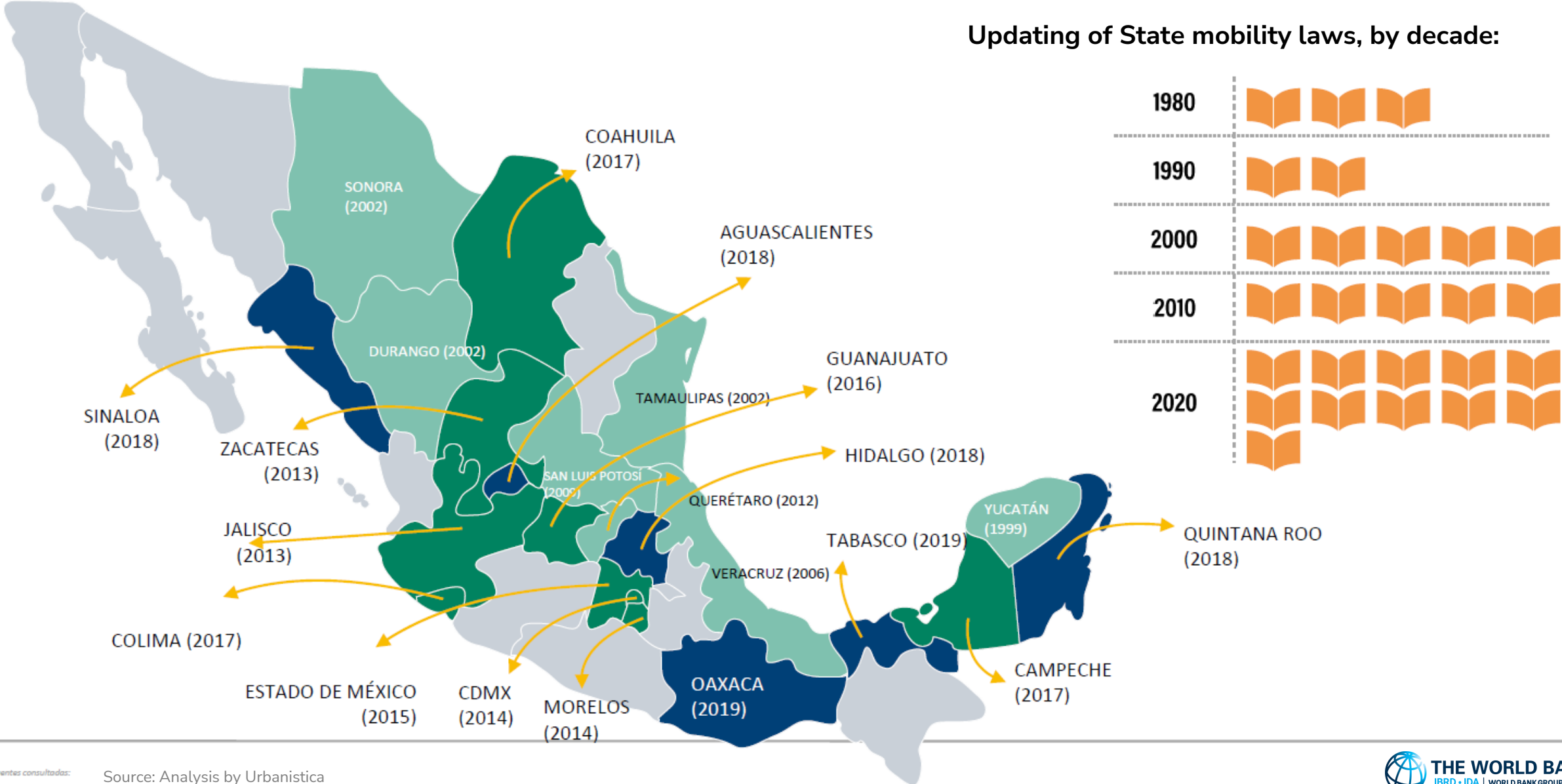
# **INSTITUTIONAL RESPONSABILITIES & FINANCING PROGRAMS**



The early 2000s saw the beginning of the development of normative instruments and the inclusion of technical criteria to counterbalance political decisions.



# By 2020, many States had updated / created Mobility Laws with innovations for Public Transport

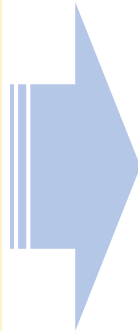


entres consultados: Source: Analysis by Urbanistica

# Provision of public transport services: Programs & Actions

In the early 2000s, urban public transport planning was characterized by:

- **Residual jurisdiction:** in the absence of general legislation at the federal level on public transport, cities take the federal level legislation on public transport, cities take the initiative to generate their own regulatory and planning instruments.
- **Non-binding institutional framework:** there was no obligation for the federal entities to update or develop regulatory and planning instruments for transportation to answer key questions.



The transformation of urban transportation took place through the participation of the federal government in transportation and mobility issues. **The Federal Support Program for Mass Transportation (PROTRAM)**, established in 2008, is the Mexican government's most important effort to catalyze sustainable transportation projects in cities.

PROTRAM has promoted urban public transport projects and has contributed to the development of value chains in an integrated manner. Benefits can be seen in the assemblers established in the country, in consulting, in private participation in infrastructure projects, and in the organization of transportation companies.

- **Through guidelines** to ensure that projects are carried out in accordance with established and best practices
- **Projects have been framed in the State Development Plans**, demonstrating their contribution to competitiveness and economic growth, quality of life, social inclusion, and greenhouse gas reduction
- **In the Environmental and Social Safeguards Framework for Urban Transportation (MASTU)**, facilitating and regulating the inclusion of social and environmental policy guidelines consistent with best practices in the assessment, categorization, preparation, and implementation of environmental and social management plans.

## Programs in place by 2010

Federal	Local	Concessionaries
PROTRAM	Vehicle scrapping programs	Co-participation schemes with authorities
BANOBRAS / FONADIN	Fleet replacement programs	Trusts

## National Bank of Public Works and Services (BANOBRAS)

2010

### Urban Transport Transformation Program (UTTP)

#### BRT project financing

**Objective:** to promote low-carbon transport

Included US\$200 million from the Clean Technology Fund (CTF) that offered below-market interest rates, as well as US\$150 million of World Bank resources, resulting in attractive financing costs

- BANOBRAS participated in 11 BRT projects through non-recoverable support from FONADIN.
- In 4 of these (in Baja California, Jalisco, Nuevo Leon, and Guanajuato), financing was granted under the UTTP.

#### Supported projects (examples):

- Monterrey BRT corridor (Lincoln-Ruiz Cortines), “ECOVI A”
- Tijuana BRT corridor (Puerta Mexico-El Florido)
- Jalisco: Acquisition of 12 trains for the Urban Electric Train System (SITEUR)

#### Lessons learned for optimizing project execution:

- Need for simple institutional arrangement and leverage existing successful instruments and processes
- Inflexible technical requirements can lead to technical solutions that are not adequate for the local context; need for flexible processes that can be adapted to operator characteristics
- Important to identify areas of opportunity for operators within their regulatory frameworks



## National Bank of Public Works and Services (BANOBRAS)

2020

### Instruments

Financing to States, municipalities, and decentralized public entities

Project financing

National Infrastructure Fund (FONADIN)



Technical assistance

### Characteristics

Addresses infrastructure needs to contribute to regional development through financial mechanisms

Financing to projects with own source of payment and PPPs for the following sectors: **transport** and communications, energy, water, solid waste, social and urban infrastructure

Assistance to the planning, design, construction, and transfer of infrastructure projects with a social impact and economic feasibility

Cadastral modernization, Bank of municipal projects, Capacity building of municipal officials

### Programs

- BANOBRAS – FAIS
- Simple credit, restructuring, refinancing
- Current account credit
- Financial guarantee
- Guaranteed refinancing

- Credit
- Co-financing
- Syndicated credit
- Refinancing
- Financial guarantee
- Guaranteed refinancing

- Venture Capital Fund
- **PROTRAM**
- PROMAGUA
- PRORESOL

BANOBRAS by itself accounted for **48%** of the overall 511 billion Peso (~US\$30 billion) credit pipeline to States and municipalities in 2020.

Still, there are **challenges for the development of transportation infrastructure at the local level:**

1. Need of long maturing projects in a short planning process.
2. Complex regulatory framework, which hinders access to financing.
3. Strengthening own revenues to relieve pressure on public finances.
4. Fiscal space that allows access to financing for infrastructure
5. Greater coordination among the various stakeholders

Only 17 of the country's municipalities have some form of bank financing.

## National Bank of Public Works and Services (BANOBRAS)

### Going forward

Committed to sustainable development, BANOBRAS published a **Sustainable Banking Strategy** (2020), which includes diverse lines of action, including emission of sustainable bonds and accreditation for the Green Climate Fund (GCF)



Additionally, to promote projects in strategic sectors, BANOBRAS has a **flexible policy of return on investment** that allows giving preferential yield to operations such as Financing of Integrated Mass Transit Systems with low GHG emissions and their components (BRT, electric light rail, metro, etc.) and development of non-motorized infrastructure



#### Objective:

- Provide financing to projects with high impact potential that accelerate sustainable development, address the needs of the target beneficiaries, and represent an efficient, effective, and replicable solution
- Channel concessional resources up to US\$250 million

The GCF requires that its executing entities demonstrate **competencies, policies, and processes to implement gender, environmental & social policies.**

The recently published **Gender and E&S Policies** incorporate indicators of the social impact of projects financed by BANOBRAS.

#### Type of accreditation:

- **Fiduciary activities and functions:** loans and combination of funds with favorable conditions
- **Amount of projects to be financed:** medium (US\$50 million to US\$50 million)
- **Level of project risk:** medium (implies limited and few adverse impacts that are generally specific to the area, mostly reversible and manageable with mitigation measures)

#### Areas of opportunity:

- **Sustainable transport units and modal transfer centers**
- **New strategic alliances for catalyzing opportunities in the sustainable transport sector**

# Mobility in Mexico has evolved significantly since the creation of PROTRAM

## Planning paradigm

### → Mass Transportation

2008

- Pedestrian recognition.
- **Public transport as the most used means**, high levels of road congestion.
- **High demand for the service**, challenge to solve.
- **2007 - 2012 - Investment in infrastructure** was opted for; creation of PROTRAM
- Uncertainty of the private sector to invest in infrastructure and services.

### → Sustainable mobility

2013

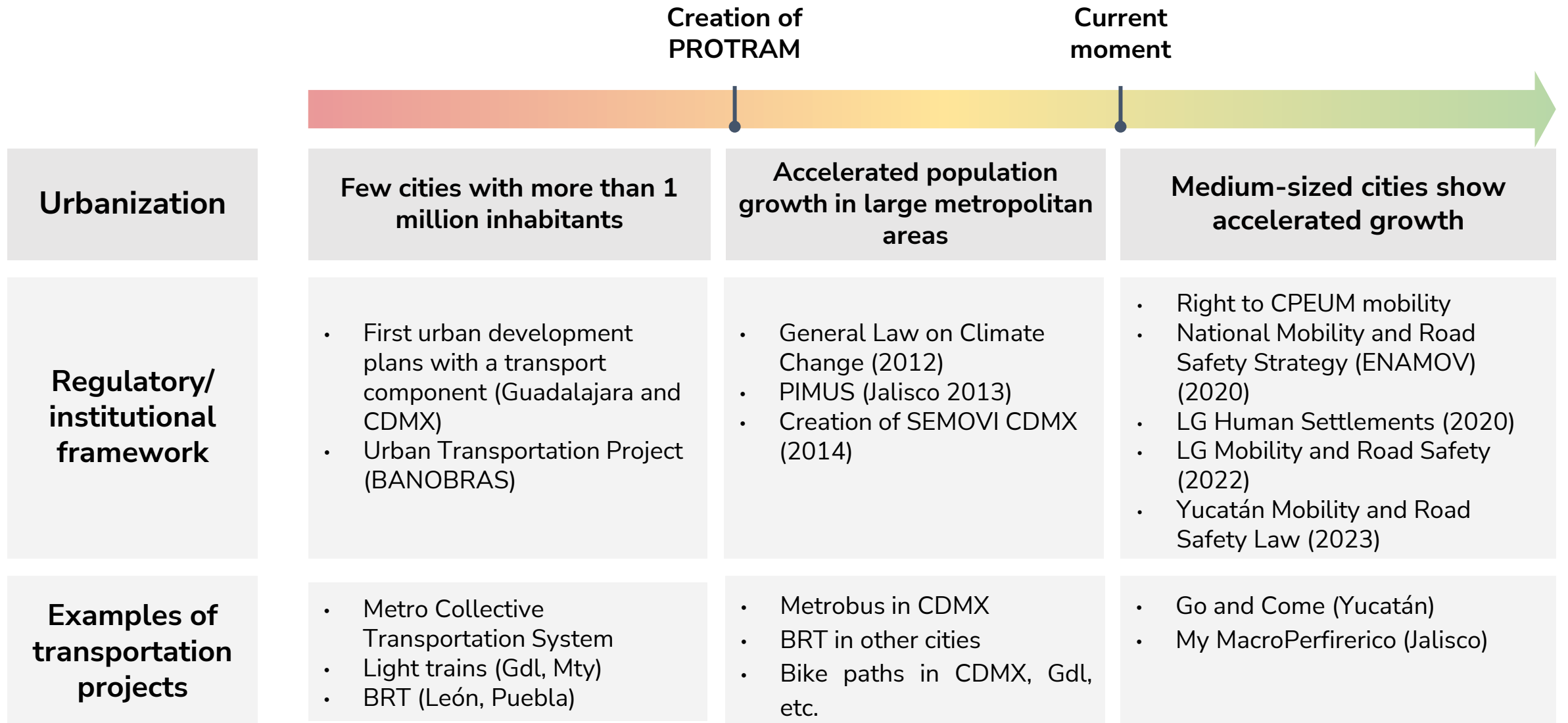
- High demand and **high motorization rates**.
- **High social costs** (deaths from accidents, pollution).
- Integration of active mobility.
- **Strategic vision for the urban development of the country and expected roles for cities**.
- **Local capacities and articulation of institutions**.

### → Mobility with accessibility

2024

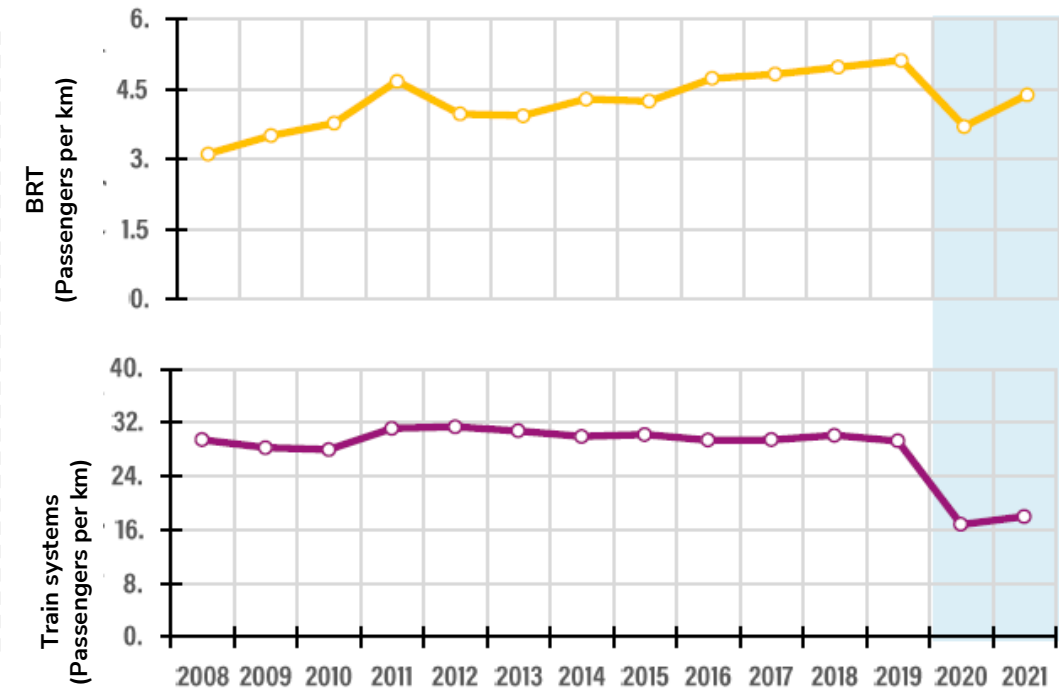
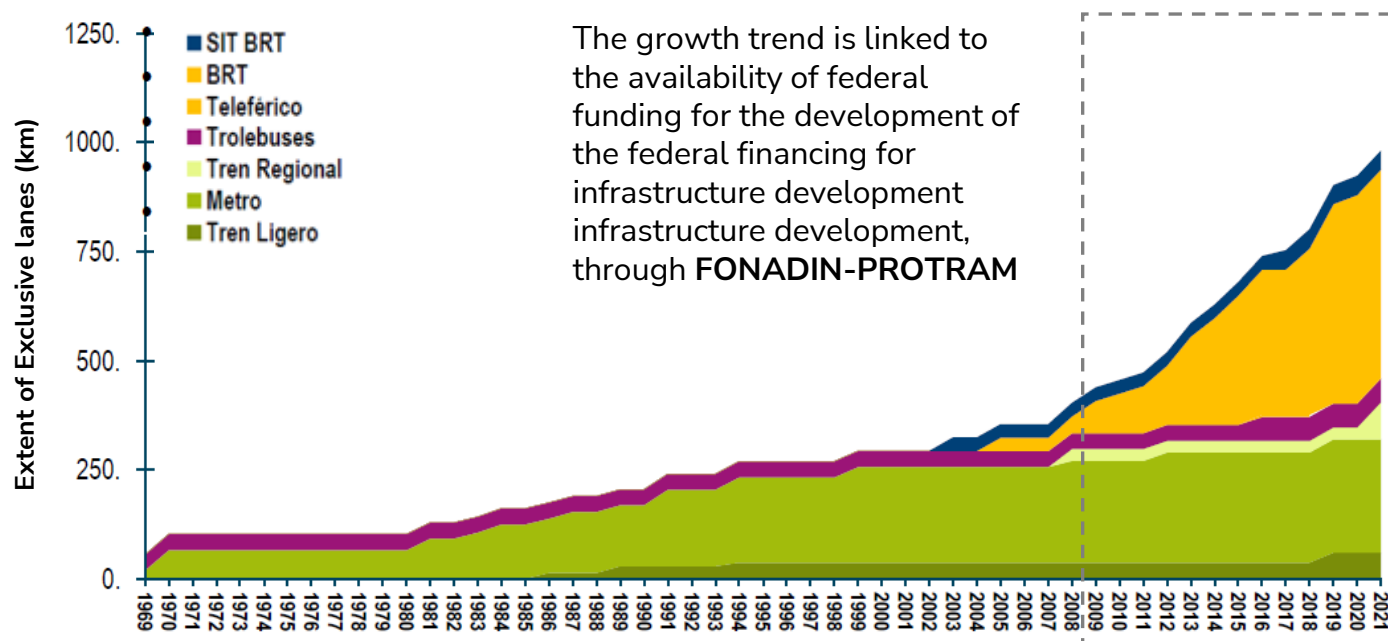
- **Right to movement, creation of the General Law of Mobility and Road Safety / ENAMO V Implementation**
- **Financing opportunities sustainable/ESG**
- **Promotion of comprehensive projects** (road safety, environmental agenda, gender, integrated mobility)
- **Electromobility**
- Business models with a **high degree of innovation**

# Evolution of urban reality around PROTRAM



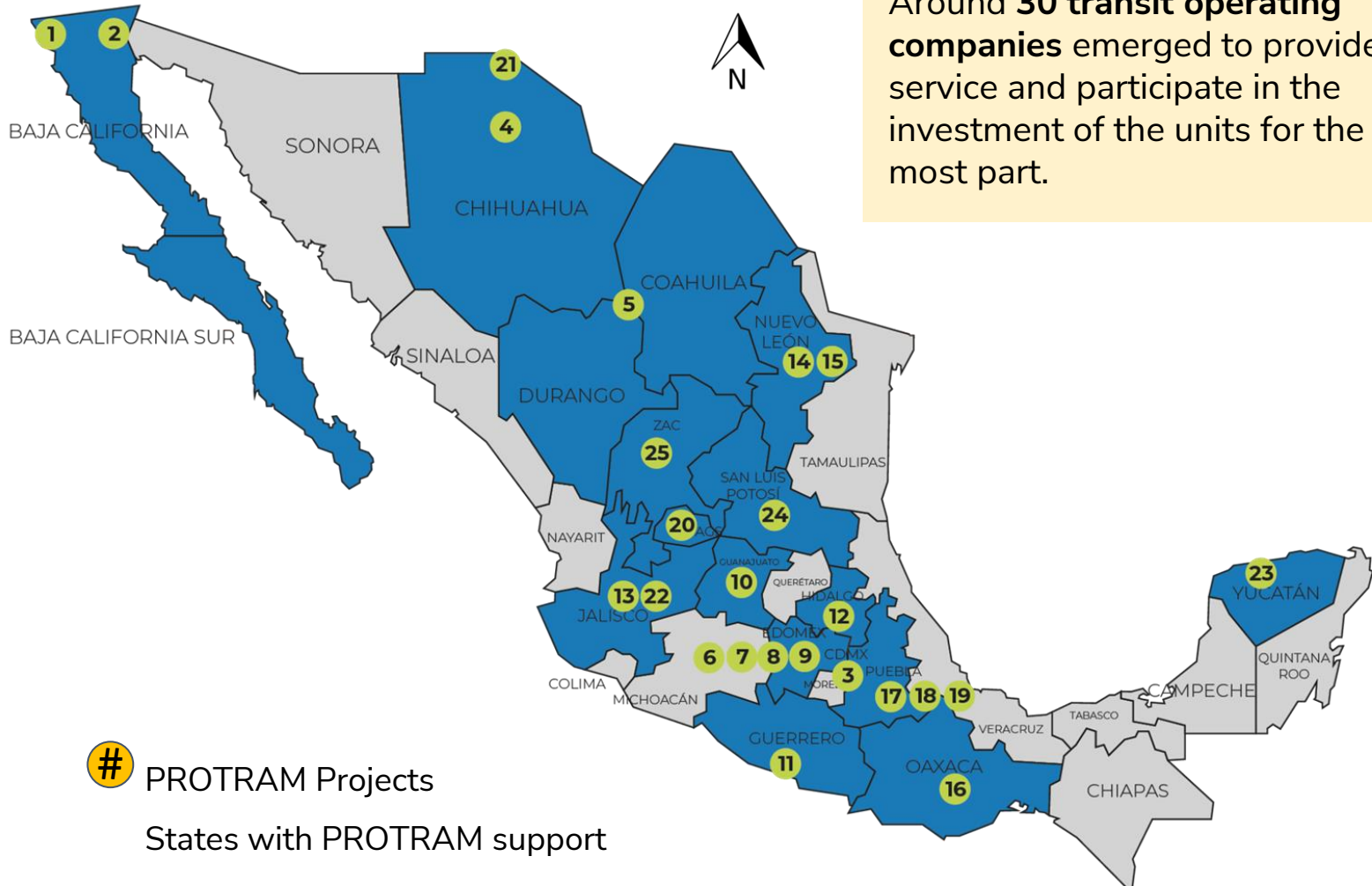
# There has been a strong increase in exclusive-lane mass transit over the past 15 years.

- **Early 2000s:** Beginning of investment of transportation systems with dedicated infrastructure. Investment concentrated on CAPEX: infrastructure for mass transit systems without observing the needs of medium or small cities.
- **In the last 10 years, Mexico has implemented:**
  - 20 BRT lines
  - 3 cable car lines
  - 3 metro/rail lines
  - 1 trolleybus line, and
  - 2 integrated transport systems (Hermosillo\*, Queretaro)
- In the case of BRT systems, there is a trend of increasing productivity (IPK)...
- ... while in the train systems there is a stabilization with a slight downward trend.



\*Hermosillo is only at the organizational level and does not have dedicated infrastructure.

# PROTRAM's impact has included the professionalization of transit operating companies across Mexico.

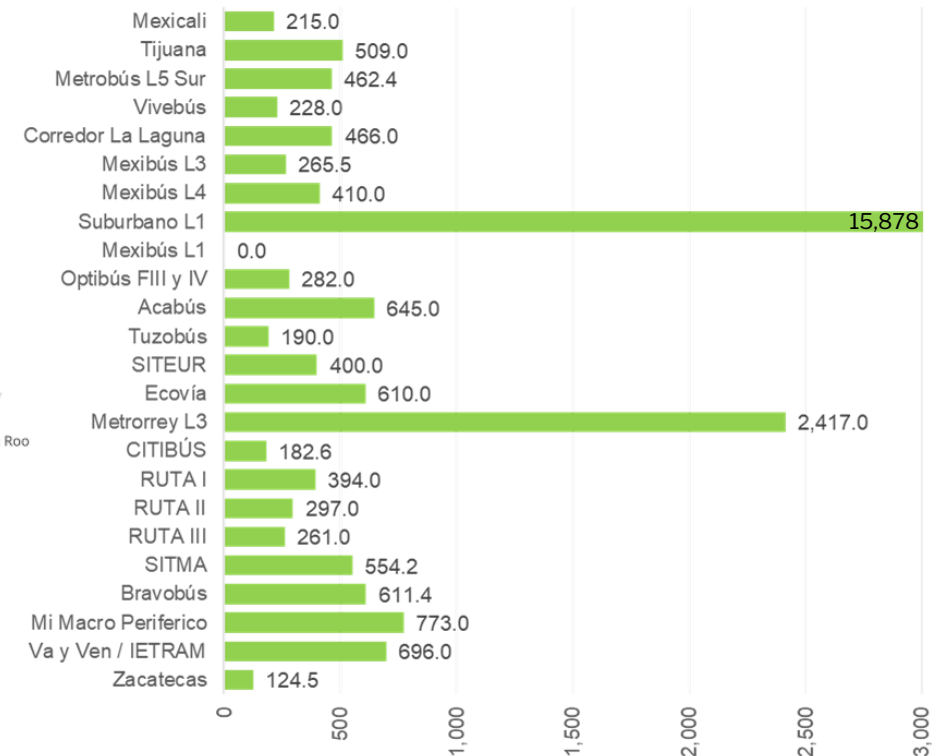
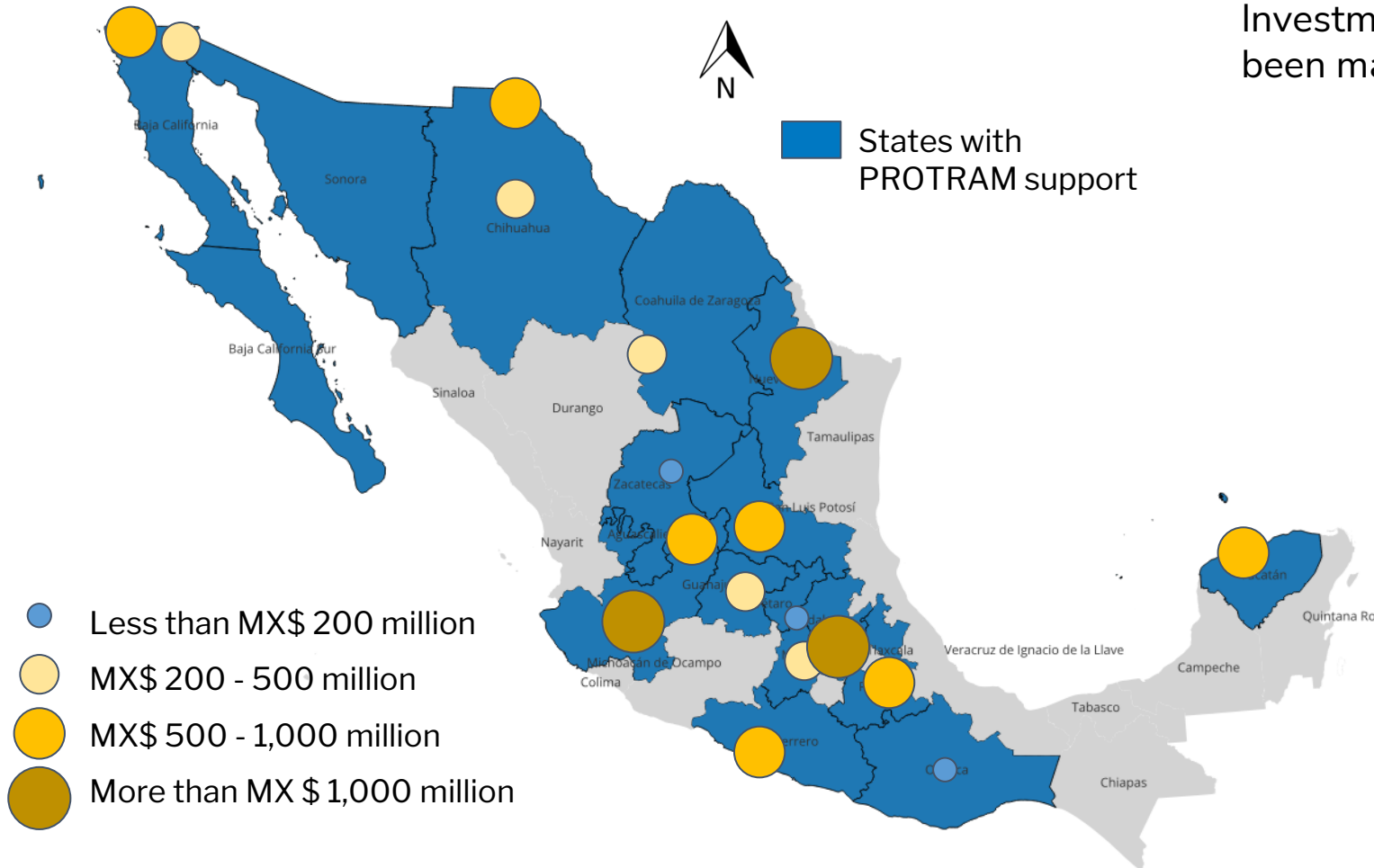


# PROTRAM Projects  
States with PROTRAM support

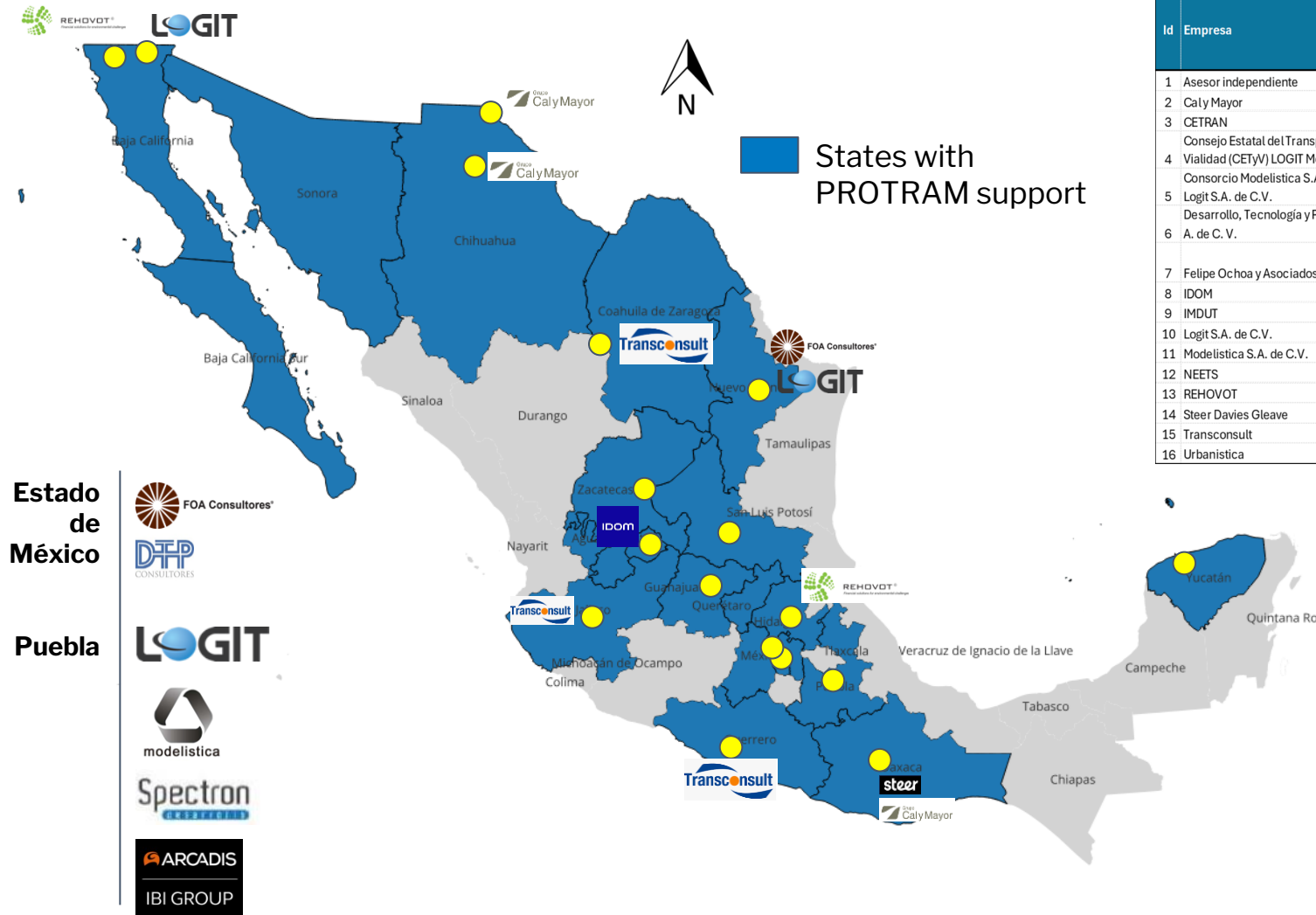
1	Mxl.	TroncoAlimentador	ATUSA SA de CV
2	Tij.	TroncoAlimentador	SITT S.A de C.V
3	CDMX	Metrobús	CORENSA - Corredor Eje 3 Eduardo Molina S.A. de C.V.
4	Chih.	Vivebús	Coordinadora de Transporte Colectivo S.A. de C.V.
5	La Laguna	Bus Laguna	En Proceso
6	ZMVM	Mexibús	Transred - Red de Transporte del Oriente S.A. de C.V.
7	ZMVM	Mexibús	LÍNEA 4 SA de CV
8	ZMVM	Suburbano	Ferrocarriles Suburbanos
9	ZMVM	Mexibús	Transmasivo SA de CV
10	León	Optibus	Red Optibus Norte, Sur, Oriente, Poniente, Red integral Optibus SA de CV
11	Aca.	Acabus	Autobuses Metropolitanos GR S.A. de C.V
12	Pach.	Tuzobús	Corredor Felipe Ángeles SAPI de CV.
13	Gdj.	SITEUR	SITEUR Sistema de Tren Eléctrico Urbano
14	Mty	Ecovía	Servicio de Transporte Tecno Ecológico SA de CV
15	Mty.	Metrorrey	Metrorrey
16	Oax.	Sistema Integrado de Transporte	Choferes del sur, tucdosa, sertexa y tusug
17	Pue.	RUTA I	Servicios Articulados de Puebla SAPI SA de CV
18	Pue.	RUTA II	TATPA Transportes SA de CV
19	Pue.	RUTA III	TATPA Transportes SA de CV
20	Ags.	SITMA	SIT de Aguascalientes SA de CV
21	Jrz.	Vivebús - BOWI	CUU
22	Gdj.	Mi Macro Periférico	Peribus Metropolitano SA de CV - Ruta 380 SA de CV
23	Mer.	Va y Ven / IETRAM	ACY - MINIS 2000
24	Slp.	Mi MetroRed	Metro Red
25	Zac.	Platabus	En Proceso

# More than 26 billion Pesos (~\$1.4 billion) from PROTRAM has been invested in mass transit projects.

Investment of > 1 billion Pesos (~\$55 million) has been made in Nuevo Leon, Jalisco, and CDMX.



# PROTRAM has also supported the growth of consulting services in the sector.

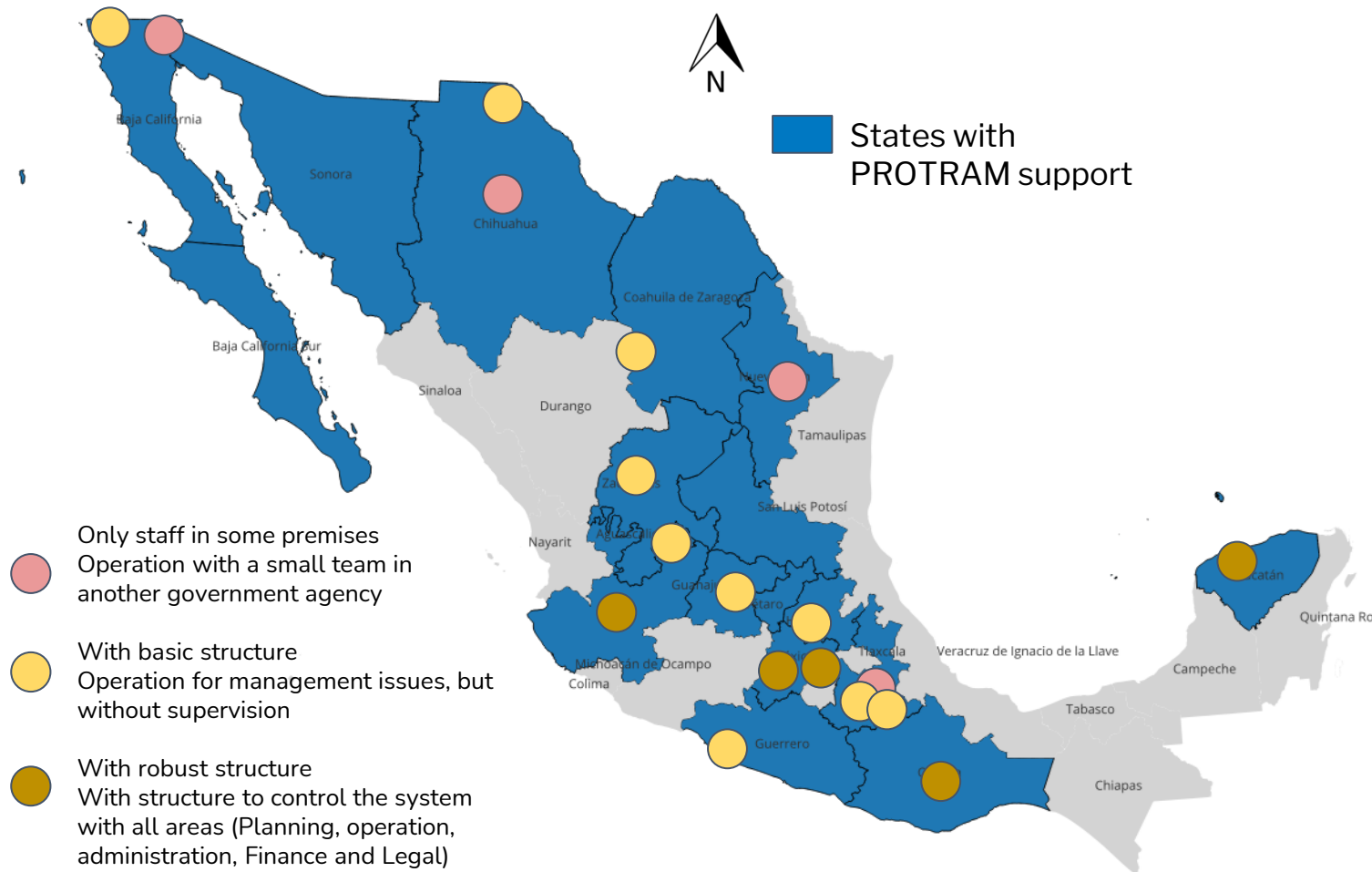


Id	Empresa	EcoVía	RUTA I	RUTA II	Metrobús Suburbano	Vivebús	Mexibús III	Acabús	Tuzobús	Mexibús I	Optibús	RUTA III	SITEUR	Metrorey	Mexicali	Tijuana	Bus Laguna	Citybus	Mexibús II	MI Macro	Periferico	MI MetroRed	Platabus	SITMA	Vay Ven / IETRAM	Vivebús - BOWI	Total general
1	Asesor independiente												X													1	
2	Caly Mayor					X																				X	2
3	CETRAM Consejo Estatal de Transporte y Vialidad (CETyV) LOGIT México	X			X																						1
4	Consortio Modelistica S.A. de C.V. / Logit S.A. de C.V.											X															1
5	Desarrollo, Tecnología y Planeación S. A. de C. V.																		X								1
7	Felipe Ochoa y Asociados S.A. de C.V.				X		X		X					X													4
8	IDOM																							X			1
9	IMDUT																								X		1
10	Logit S.A. de C.V.	X	X	X								X			X												5
11	Modelistica S.A. de C.V.		X	X								X															3
12	NEETS																			X							1
13	REHOVOT								X								X						X				3
14	Steer Davies Gleave																	X							X		2
15	Transconsult							X			X						X										3
16	Urbanistica																								X		1

Many consulting companies emerged to serve the market for more than 20 projects with different configurations (train, BRT on trunk line, BRT with feeder system).

The company with the greatest participation in these projects was Logit México with 5 projects.

# PROTRAM has also supported strengthening capacities at the subnational level.



24 regulatory entities were created.







However, the emphasis on capacity building was varied. **In some cases, existing structures were substantially strengthened (11)**, while in others, only the technical equipment was reinforced (5).

The most robust structures for urban public transport planning, operation, administration, and financial / legal aspects have been put in place in Jalisco, Oaxaca, Yucatan, the State of Mexico, and CDMX.



# **BARRIERS TO FINANCING URBAN PUBLIC TRANSPORT PROJECTS**

# 92% of the public transport supply has access only to half of the conventional revenue sources.

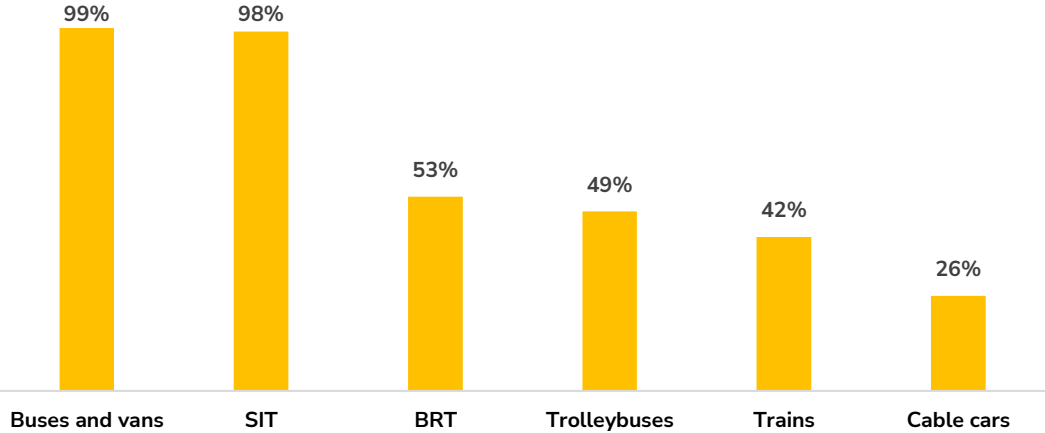
Public transport mode	Remuneration model	Income sources				Operational model
		Fares	Public resources	Advertising	Rental of commercial space	
BRT <i>(1.8% of all trips)</i>	 Payment per km traveled, Payment per Passenger-km traveled	✓	✓	✓	✓	Public firm Private firm
Trains <i>(5.6%)</i>	 Government subsidy	✓	✓	✓	✓	Public firm
Cable cars <i>(0.01%)</i>	 Government subsidy	✓	✓	✓	✗	Public firm
Trolleybuses <i>(0.15%)</i>	 Government subsidy	✓	✓	✓	✗	Public firm
Integrated Transport Systems (SIT) <i>(1.3%)</i>	 Payment per km traveled, Payment per Passenger-km traveled	✓	✗	✓	✓	Private firm
Buses and urban vans <i>(~91%)</i>	 <b>Payment per passenger</b>	✓	✗	✓	✗	Public firm Private firm Individual concession



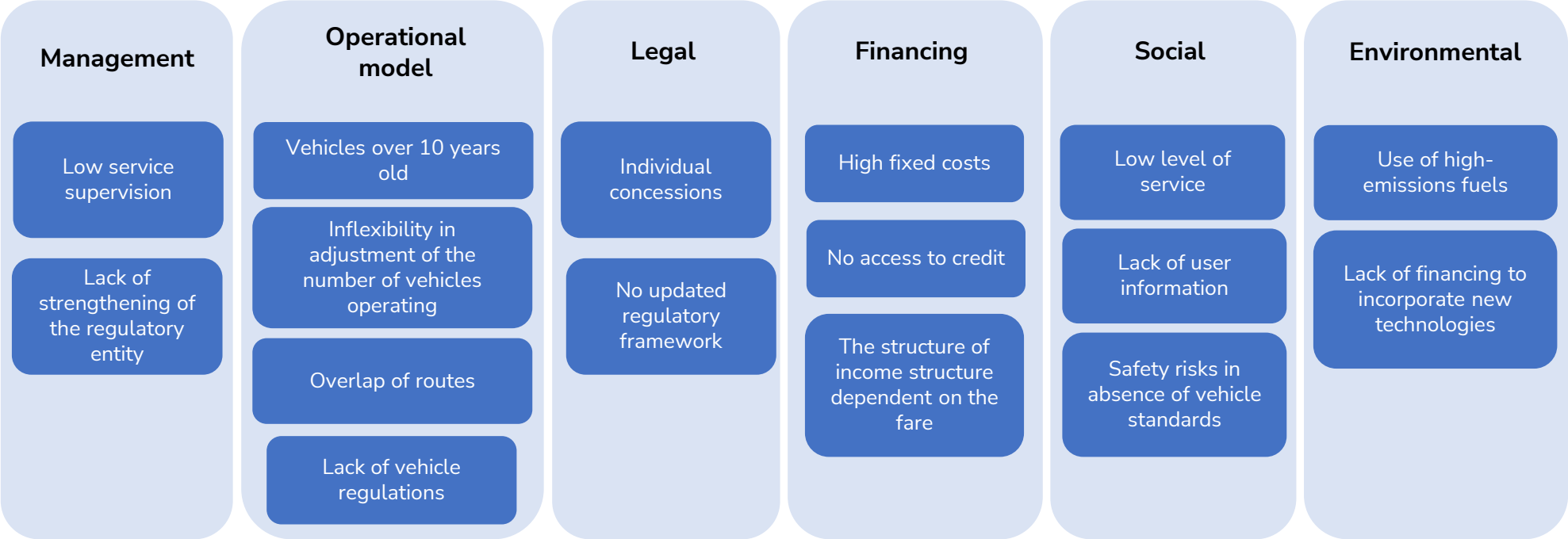
# Current financing sources constrain increase in supply.

SITs and buses and vans are almost **100% fare dependent**.

- The flexibility in their operation allows to continue improving and optimizing resources.
- Buses and vans maintain a business model based on revenue-per-passenger.



## Disadvantages of the conventional bus and van systems



# PROTRAM only addresses investments for Planning & Improvement, and these are restricted in scope.

Component	Description	Large and medium cities			Small cities		
		Public (federal)	Private (charge a fee)	Mixed (public-private)	Public (federal)	Private (charge a fee)	Mixed (public-private)
Urban planning	PIMUS	PROTRAM	✗	✗	PROTRAM	✗	✗
Transport system planning	Executive project	PROTRAM	✗	✗	PROTRAM	✗	✗
Project implementation	Training and studies complementary to the transport company	✗	✗	✗	✗	✗	✗
	Training for the entity management	✗	✗	✗	✗	✗	✗
Continuous improvement projects	Updating of information / System optimization	✗	✗	✗	✗	✗	✗

# CAPEX investments are delegated to carriers with restricted revenues, low credit rating, and informality.

Component	Description	Large and medium cities			Small cities		
		Public (federal)	Private (charge a fee)	Mixed (public-private)	Public (federal)	Private (charge a fee)	Mixed (public-private)
Infrastructure investment (heavy)	Terminals, stations, preferential lanes	PROTRAM	✗	✗	PROTRAM	✗	✗
Infrastructure investment (light)	Stops	✗	✗	Advertising companies	✗	✗	✗
Ancillary infrastructure	Enclosure Courtyards, Offices, Workshops	✗	Transport company	✗	✗	Transport company	✗
Investment in rolling stock	Acquisition of buses	PROTRAM, NAFIN, State Guarantees, State Bonds for Scrap Vehicles, SEMARNAT Technological Change Bonds	Transport company	✗	PROTRAM, NAFIN, State (Credit Guarantees, scrappage)	Transport company	✗
Control center	Bus monitoring	✗	Transport company	✗	✗	Transport company	✗
Centralized collection system	Compensation chamber, external recharge network	✗	Transport company	✗	✗	Transport company	✗
Equipment in Vehicles	GPS, Cameras, Validators, etc.	State (Credit Guarantees, Support)	Transport company	✗	✗	Transport company	✗
Communication, customer service	Call Centerer, Application Development	✗	✗	✗	✗	✗	✗

# OPEX financing is left to the private entity, without public or mixed support.

Component	Description	Large and medium cities			Small cities		
		Public (federal)	Private (charge a fee)	Mixed (public-private)	Public (federal)	Private (charge a fee)	Mixed (public-private)
<b>Collection system</b>	Data transmission and salaries of monitoring staff	✗	Transport company	✗	✗	Transport company	✗
	Salaries of drivers, maintenance and administrative personnel	✗	Transport company	✗	✗	Transport company	✗
<b>Bus operation</b>	Fuel	Federal - IEPS Tax Benefits	Transport company	✗	✗	Transport company	✗
	Vehicle maintenance, spare parts	✗	Transport company	✗	✗	Transport company	✗
<b>Road infrastructure maintenance</b>	Road resurfacing	✗	✗	✗	✗	✗	✗
<b>Operational infrastructure maintenance</b>	Preferential traffic lights and horizontal signaling	✗	✗	✗	✗	✗	✗
<b>User information</b>	Data transmission and salaries of monitoring staff	✗	✗	✗	✗	✗	✗

# Mapping of alternative funding - financing

## Examples of implementation

### Sources linked to transportation systems

Adjustment of tariffs in the federal entities

### Revenues related to the use of assets or application of sanctions

Parking meters and traffic fines in states (Jalisco)

### Contributions, taxes and similar

Charges for placement of advertising, Fuel tax

### Public finance

Budget resources, Loans

### Private and mixed financing

Loans, PPPs, Stock financing

### International cooperation

Financing, Technical support

## Barriers that have hindered the introduction of such sources

- Possible impacts on the demand for public transportation given the generalized reluctance to increase fares for transportation services.
- A corresponding increase in the quality and conditions of service provision for users would be required.
- Subsidies require budget sufficiency and prioritization, together with efficient and effective management of resources.
- Limited collection capacity in relation to vehicle parking, and possible opposition from users.
- Adopting the measures would require offering quality transportation alternatives.
- Transparent enforcement and distribution schemes would be needed.
- Difficulty in the administration of interinstitutional coordination between different levels of government.
- Difficulty in the characterization of taxes in which the behavior of individuals and companies, and their use of public and/or private goods, vary.
- An enabling legislative framework is required, and public justification and transparency in the use of resources.
- Possible negative repercussions on inequitable access to urban infrastructure and services based on income levels.
- Public transport is not legally considered a priority issue for the allocation of budgetary resources (SHCP 2020).
- Political will is required for authorization and support in the acquisition of credits.
- In the event that the private sector participates in the purchase of securities, it is more complex to comply with financial regulations to develop transport projects (SHCP 2020).
- In PPP contracts it is important that there is clarity in the rights and obligations of the parties, and it will probably be necessary to renegotiate the contracts within the framework of the actual budgets. In the event that the contractor goes bankrupt, the entire risk would be assumed by the public sector.
- It is common for grants to be competitive or tendered, so they tend to be allocated based on specific need. They are also limited in absolute amount and may only be available on a one-time basis.
- Both providers and resources are limited, in which case access management can be lengthy and complicated.
- Credit conditions are not always "preferential".
- Conditions may be established that may affect the objective or scope of the project.
- Local governments may face institutional, legal and financial barriers to access.



# TRANSITION TO LOW-CARBON TECHNOLOGIES

# Transition to low-carbon technologies in public transport will provide significant environmental and public health benefits.

Expansion of public transport, including through incorporation of new, low-carbon technologies, will be **essential for meeting Mexico's Nationally Determined Contributions (NDCs) to the UNFCCC**. The NDCs specify an unconditional reduction target of 22% of GHG emissions and by 51% of black carbon emission by 2030, and a conditional target of a reduction of 36% and 70%, respectively.

Electric-powered vehicles have environmental and social benefits, associated with improved public health:

Environmental	Social
<ul style="list-style-type: none"><li>• Mitigation of GHG emissions of at least 50% and up to 100%, depending on the source.</li><li>• Direct mitigation of air pollutants and improvement of the service experience</li><li>• Improved air quality</li><li>• Increased service levels</li><li>• Noise abatement</li></ul>	<ul style="list-style-type: none"><li>• In LAC, women are the main users of public transport; in Mexico City alone they make 3.5 million more trips than men on a working day.</li><li>• Their main mode of transport is walking, which increases their exposure to contaminants associated with internal combustion vehicles, such as respiratory and noise pollutants.</li><li>• Carbonization decreases work productivity, affects maternal health and causes dementia.</li></ul>



180,000

deaths

818.8

million tons of CO2

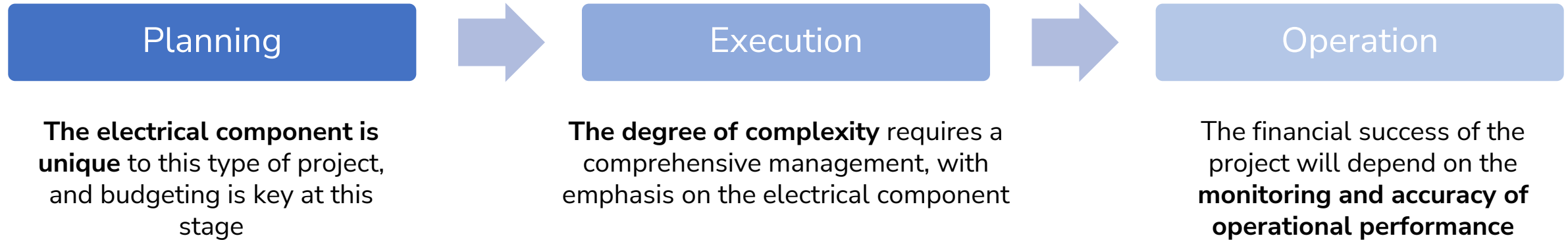
Would be avoided if Mexico city electrified all of its public transport in 2019-2050

## In the transition to low-carbon technologies in public transport, there has been an emphasis on e-buses.

- Currently the Mexican government does not have a national plan for the energy transition; however, there have been some significant efforts to advance in this direction.
- **The National Electromobility Strategy** proposes as a goal that 5% of the sales of light and heavy passenger vehicles should be hybrid and/or electric by 2030, 50% by 2040 and 100% by 2050.
- Local and state governments are leading the way since 2019 through the Mexican Governors Climate Alliance and capacity building with respect to climate action planning and implementation through experience and knowledge sharing
- Monterrey, Guadalajara and Mexico City worked on the pre-identification of corridors that could operate e-bus systems. The incorporation of 10 and 38 electric buses, respectively, in **Mexico City's** METROBUS Line 3 and **Guadalajara's** Mi Transporte Eléctrico system started the electromobility transition.



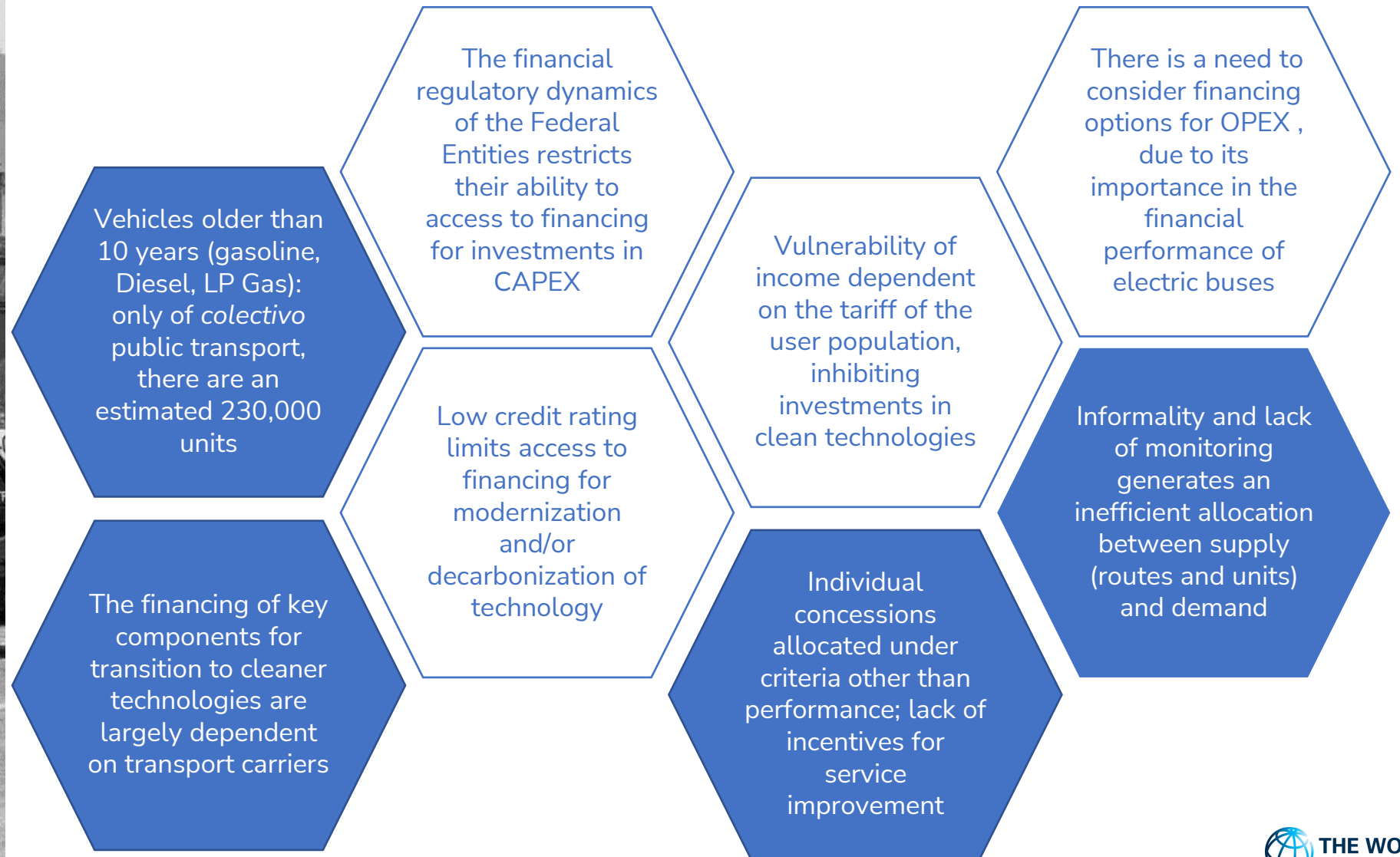
# The lifecycle of an electromobility project includes new elements compared to a conventional public transport system.



## Key differences compared to conventional public transport systems

- Up to 2.5 times **higher cost** of buses
- Operation conditioned to unit autonomy
- Additional planning of **recharging strategy**
- Consideration of the electric component
- **Professionalization** of driving and maintenance personnel
- Highly recommended **piloting** (budgeted)
- Complexity in permit processing
- Consideration of **new players** (technology providers, load strategies, CFE)
- Accurate **demand estimates** condition investment in electric infrastructure
- Comprehensive project management, both in civil and electromechanical works
- Exhaustive **monitoring** of operation and maintenance costs
- Technical complexity for the application of **guarantees** (buses)
- Financial performance depends on the professionalization of the operation
- Key to perform ex-post evaluations (environmental and social)

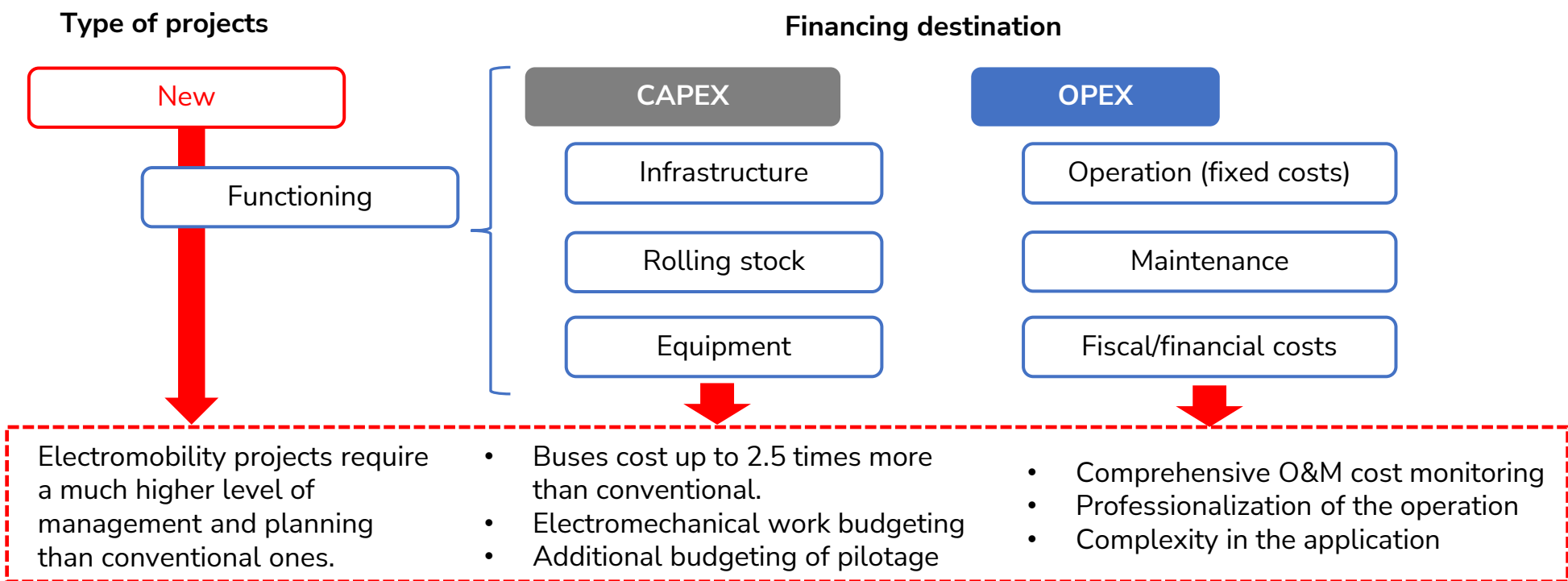
# The transformation of the public transport sector – and the way it is financed – are key for reaching climate objectives.





# The current financing sources for public transport will need to be adapted for the needs of the electromobility transition, considering not only CAPEX but also OPEX.

- **Planning & Improvement:** The financial performance of an electromobility project will depend on the professionalization of the operation and maintenance of the units.
- **CAPEX:** In an electromobility project, the main CAPEX investments are in the adaptation of yards, purchase or leasing of buses. Currently, the transport company is the only entity that could pay for the investments.
- **OPEX:** The operating requirements and technology is key to ensure a lower OPEX than a conventional project (financing options for OPEX are key for the financial performance of e-buses). At present, the transportation company appears to be the only entity that could meet these needs.





**RESOURCE MOBILIZATION  
STRATEGY FOR URBAN  
PUBLIC TRANSPORT  
INTERVENTIONS AT THE  
SUBNATIONAL LEVEL**

## KEY STAKEHOLDERS

### FEDERAL GOVERNMENT: SEMARNAT | SHCP | SCT

In charge of developing the public policies

### NATIONAL DEVELOPMENT BANKS: BANOBRAS-FONADIN

Provide funding/financing instruments to support investments

### SUBNATIONAL GOVERNMENTS

Transport and urban planning agencies, responsible for designing and implementing services and infrastructure development

### PRIVATE SECTOR

That develop or operate transport infrastructure investments, including private investors.

### COMMERCIAL FINANCING INSTITUTIONS

That participate in and finance investments urban mobility/transport services.

### PUBLIC TRANSPORT SYSTEMS

Public transport organisms with public and private participation. Organized transport firms (*concesionarios*).

The LGMSV, together with the ENME, present an opportunity to coordinate federal and local resources



## POLICY INSTRUMENTS

National Electromobility Strategy (ENME)

General Law of Mobility and Road Safety (LGMSV) + National Strategy, Governance System and Information

# POLICY INSTRUMENTS: General Law of Mobility and Road Safety - LGMSV (2022)

The new Law envisages closing the institutional gap and instructs the coordination of resources among the three levels of government

Article 57. Economic and financial instruments(mobility)	Article 59. Financing instruments	Article 60. Prioritization of actions and resources in the field of mobility	Article 61. Federal investment programs
<p>3 levels of government can implement economic and financial, national or international, public and private economic and financial instruments necessary to improve the <b>efficiency and equity of access to mobility systems</b>, vehicle renewal, road safety management, and the sustainability of mobility systems.</p>	<p>These are programs, actions and investment projects related to mobility and road safety that are developed by the competent authorities of the <b>three levels of government</b></p>	<p>Improve <b>infrastructure for mobility</b>, ancillary services and transport;</p> <p>Promote mobility and road safety planning aimed at strengthening and <b>improving the conditions of public transportation</b>, its integration with the territory, as well as the efficient distribution of goods</p>	<p>The Federation will incorporate in the execution of its investment programs and <b>infrastructure works for mobility</b> the principles and policies established in this Law.</p>

Recognizes the need to:

1. Create new instruments
2. Earmark resources for mobility infrastructure
3. Integrate and complement existing programs

# Various public transport financing instruments can be leveraged by local governments to finance public transport although not all have reference cases in Mexico.

## With examples of application in Mexico

Public transport fare adjustment	all States have a normative/regulatory framework that allows them to adjust fares
Public transport subsidies	Many examples
Parking meters	CDMX, Guadalajara, Zapopan, Tlaquepaque, Tonalá
Traffic fines (on roads under local government jurisdiction)	Guadalajara
Charges for placement of advertising	CDMX
Vehicle taxes	Tenure, New Automobile Tax (ISAN)
Carbon taxes	Special excise tax on production and services (IEPS) on gasoline
Debt instruments (government issuance)	Green Bond GCDMXCB 16V



Real estate capital gains, Property tax revenues (municipal governments), Public budget, Public debt, PPPs as a financing mechanism

## No examples of application in Mexico identified

Parking fees (membership type usage fee), Urban tolls and congestion charges, Employer contributions, Investment of "idle" public funds

Many of the instruments generate **significant resources** flows (e.g., vehicle and carbon taxes, property taxes, and real estate capital gains) ...

... but several of them also tend to be **politically unpopular** (e.g., any taxes) and/or **require robust management strategies** (e.g., parking fees and meters) or have a **tenuous link to the public transport system** (e.g., property tax revenues, real estate capital gains, urban tolls and congestion charges)

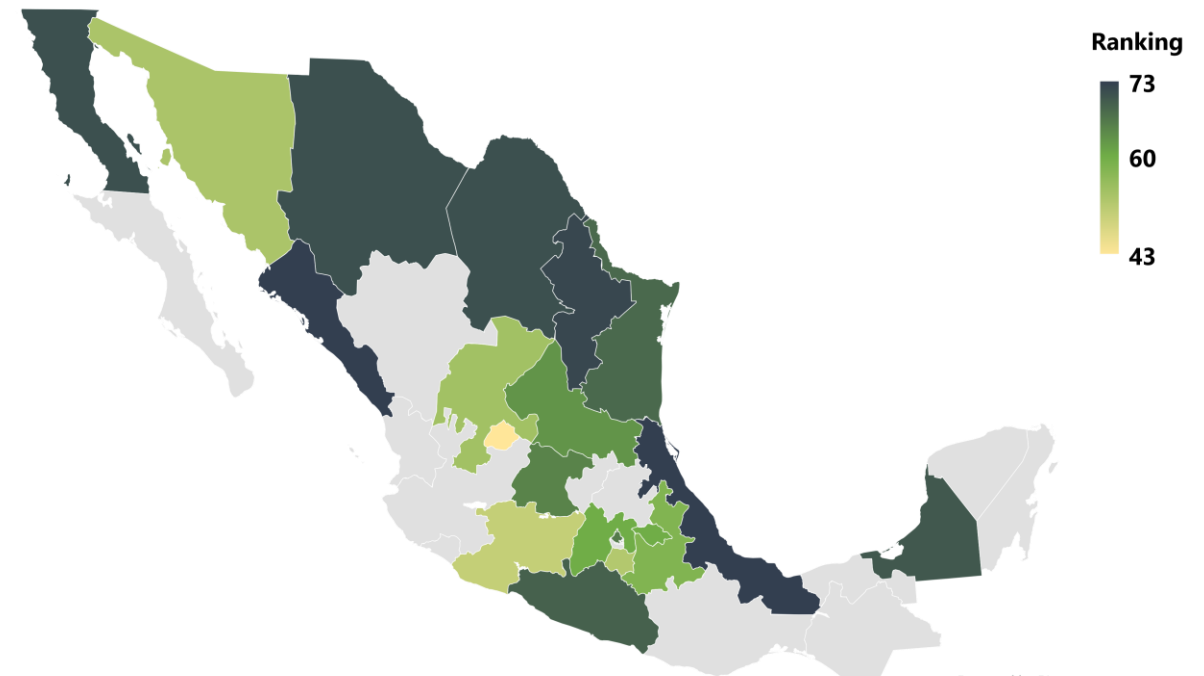
# Local governments could also leverage their road assets to generate revenues for investment in urban mobility projects.

A review of the inventory of the **State road infrastructure** – evaluating 89 highways/bridges & tunnels across Mexico – suggests that:

- Highways represent 79% of the volumes carried by the assets, while bridges & tunnels account for the remaining 21%. Revenues from cars account for 56.9% of the total revenues.
- These assets generate 24.824 billion Pesos (US\$1.241 billion, or US\$0.5 million per km) annually.
- **Sinaloa, Veracruz, Nuevo Leon, Baja California, Chihuahua, Coahuila, and Campeche** are the States with the highest quantitative and qualitative ranking of the road assets.
- **The legal situation, conditions, and models of operation of the concession titles** will determine the feasibility of the monetization of specific road assets.
- It will be key to consider the **implications of climate change in terms of financial risk.**

Qualitative and quantitative valuation ranking of road assets

Low	Medium	High
Aguascalientes Michoacan Morelos Sonora Zacatecas Puebla	Mexico State Tlaxcala San Luis Potosi Guanajuato Mexico City Tamaulipas Guerrero	Campeche Coahuila Chihuahua Baja California Nuevo Leon Veracruz Sinaloa



# In addition, local pension funds could be leveraged in some cases.

There are more than 1,000 **subnational pension systems** across Mexico

- There are pension systems at all three levels of government
- Most States (18) have defined benefit systems
- The Financial Discipline Law for Federal Entities and Municipalities **does not restrict** local governments from making investments with these resources. Promoting their productive use could rehabilitate the funds from their deficit situation.



- The challenge for pension systems is to provide long-term sustainability through optimal reserve management.
- Despite the fragmentation and deficits of most systems, there is precedent of federal entities with more than 50% of the actuarial reserve in the investment portfolio
- **However, the applicability of the pension funds as a financing alternative will depend on the financial regulatory context of each subnational entity.**

### Types of State Systems:

- Without a pension institute
- Affiliated to ISSSTE
- Mixed system
- Own pension systems
- Dual pension

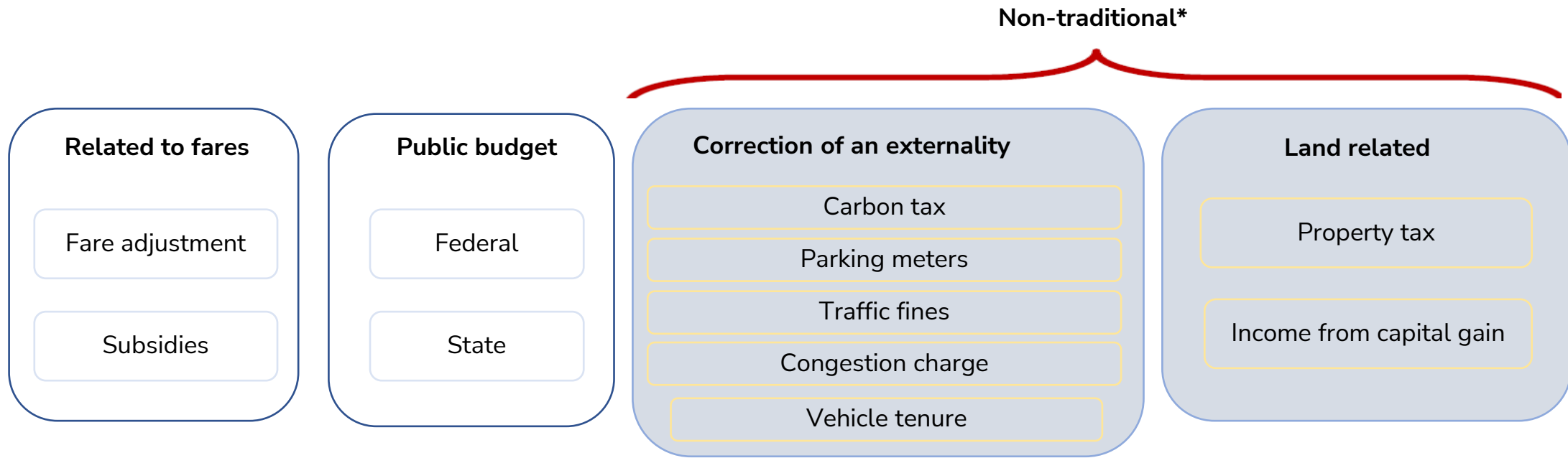
### Municipal Systems:

- No funding mechanisms
- Lack central public pension systems

Defined contribution		Others		
State	ISSSTE	Defined benefit	Mixed systems	Lack a formal system
4 FEs*	5 FEs	18 FEs	2 FEs	3 FEs
Aguascalientes, Chihuahua, Nuevo León, Sinaloa	Baja California Sur, CDMX, Hidalgo, Quintana Roo, Tlaxcala	Baja California, Campeche, Chiapas, Coahuila, Durango, Guanajuato, Guerrero, Jalisco, Michoacán, Nayarit, Oaxaca, Puebla, San Luis Potosí, Sonora, Tamaulipas, Veracruz, Yucatán, Zacatecas	State of Mexico, Tabasco	Colima, Morelos, Querétaro

\* Federal Entities

# ... and several other non-traditional sources of funding and financing.



## Specific to Electromobility

Public	Private	Green bonds	International
Local resources PROTRAM	Commercial banking	Investment funds	Climate and green funds
Climate Change Fund FOTEASE		Sector companies	Multilateral development banking
Development banking			



\* The advantages and disadvantages of these sources is described in detail in the Annex

# At least two FONADIN-PROTRAM intervention strategies have been identified in the financing of electric public transportation systems\*:

## As a shareholder of a Joint Venture Company:

FONADIN can make contributions to the figure of Beneficiary Companies, among others such as trusts, investment funds, corporations and associations. FONADIN may participate in the ECM with up to 49% of the capital or equity of trusts, and up to 20% in the case of investment funds.

## As guarantor:

Likewise, the ROP (2021) offer two guarantee modalities, the first one for Performance, which would allow guaranteeing "the fulfillment of one or more specific obligations of a Beneficiary Company", for example, for fleet leasing obligations. While the second modality, To the Project, would be destined "to the fulfillment of obligations assumed for the promotion of said Project".

\* FONADIN's ROP (2021) does not restrict the simultaneous use of several recoverable support instruments..





**FINANCING MECHANISM  
FOR GREEN AND  
RESILIENT URBAN  
TRANSPORT PROJECTS**

# There are several alternative models for public transport provision in Mexico that can be utilized for improving service and mobilizing private capital.

## Model 1: Single public entity

### Governments own, operate and maintain buses

- The government can directly purchase and operates the transportation system through a public company
- E.g., Mexico City Metro

## Model 2: Private operators with formal concessions and subsidies

### Systems with formal concessions and subsidies

- Public sector covers upfront cost or subsidy for CAPEX and/or subsidies for OPEX
- Private sector operation through a concession and maintenance of fleet
- E.g., Metrobús

## Model 3: Private ownership and operations

### Cities with privately-owned fleets operators

- Private investment and operations responsible for acquisition, maintenance, operation and renewal.
- There are both concession companies that buy their own buses, and also affiliate companies that buys and owns the vehicle.

## Model 4: Complete unbundling of asset ownership and service provision through separate concession contracts

### Cities with divided responsibilities within BRT/integrated system

- Separated concessions for different aspects of the service provision (infrastructure, IT system, Stations management, yards/depots, fleet provision, operations )
- Some aspects can be bundled or unbundled

# Moving to financing transit systems offers an opportunity to improve bus concessions through new business models.

**Model 1:**  
Acquisition and operation  
by a public company

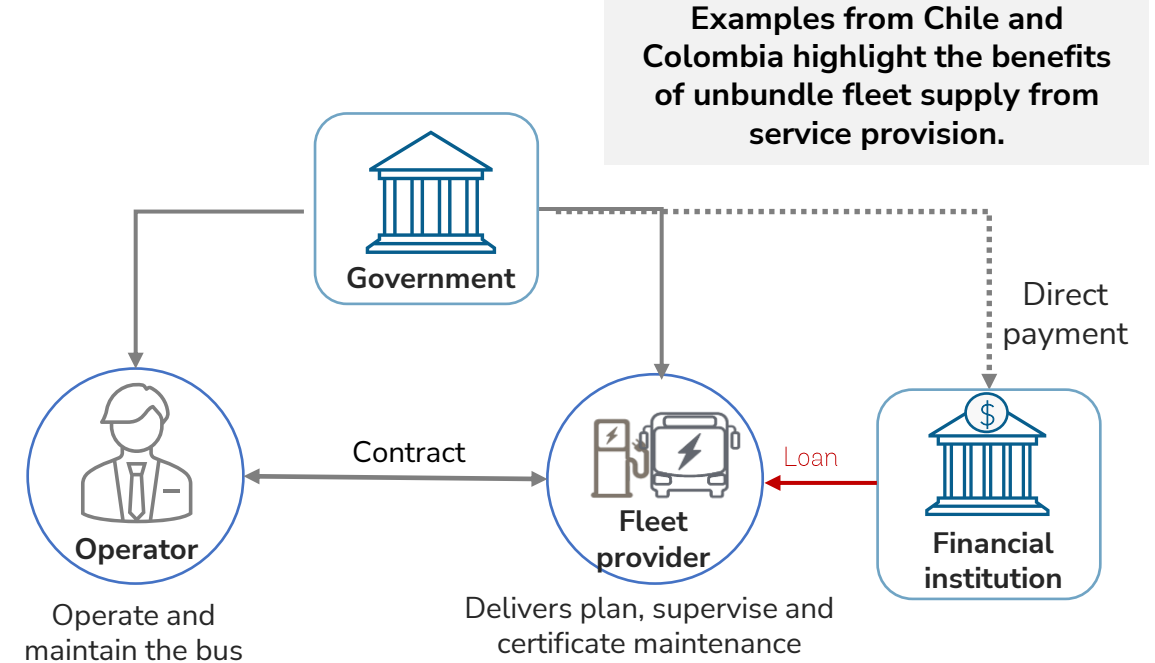
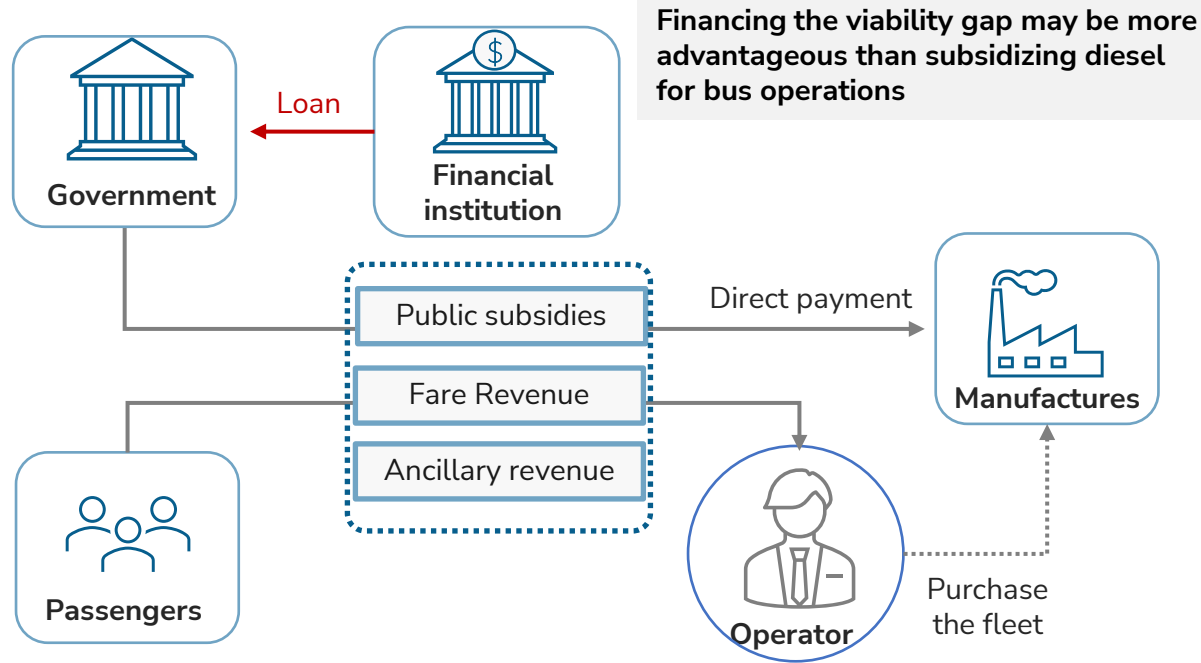
**Model 2:**  
Viability gap financing by  
the public sector and  
private operation

**Model 3:**  
Acquisition through lease by  
the private sector and private  
operation

**Model 4:**  
Complete unbundling of  
asset ownership and service  
provision through separate  
concession contracts

## CONCESSIONAL FINANCE FOR ASSET OWNERS

## SEPARATION OF ASSET OWNERSHIP



Risk mitigation and low-cost financing options required for both commercial arrangements

# There has been a revolution in financing for urban public transport, opening up new alternatives.

**New regulatory and financial reforms** have created favorable conditions to expand investments in urban public transport, particularly in green investments and expand private capital mobilization (PCM) in the sector. This has opened up new potential sources of financing such as **regional trust funds, pension funds and private equity**.

These reforms include:

- The introduction of green, social, or sustainable labeling for investments
- The presence of markets, bond labels, and disclosure of guidance and market data in stock exchanges
- The enabling of environmental, social and governance (ESG) considerations for corporate and securitized bonds through new regulations for institutional investors (e.g. reforms to pension fund regulations)

However, a range of measures are needed to attract investment, including, **streamlining administrative procedures, developing sound business models and working closely with development institutions.**

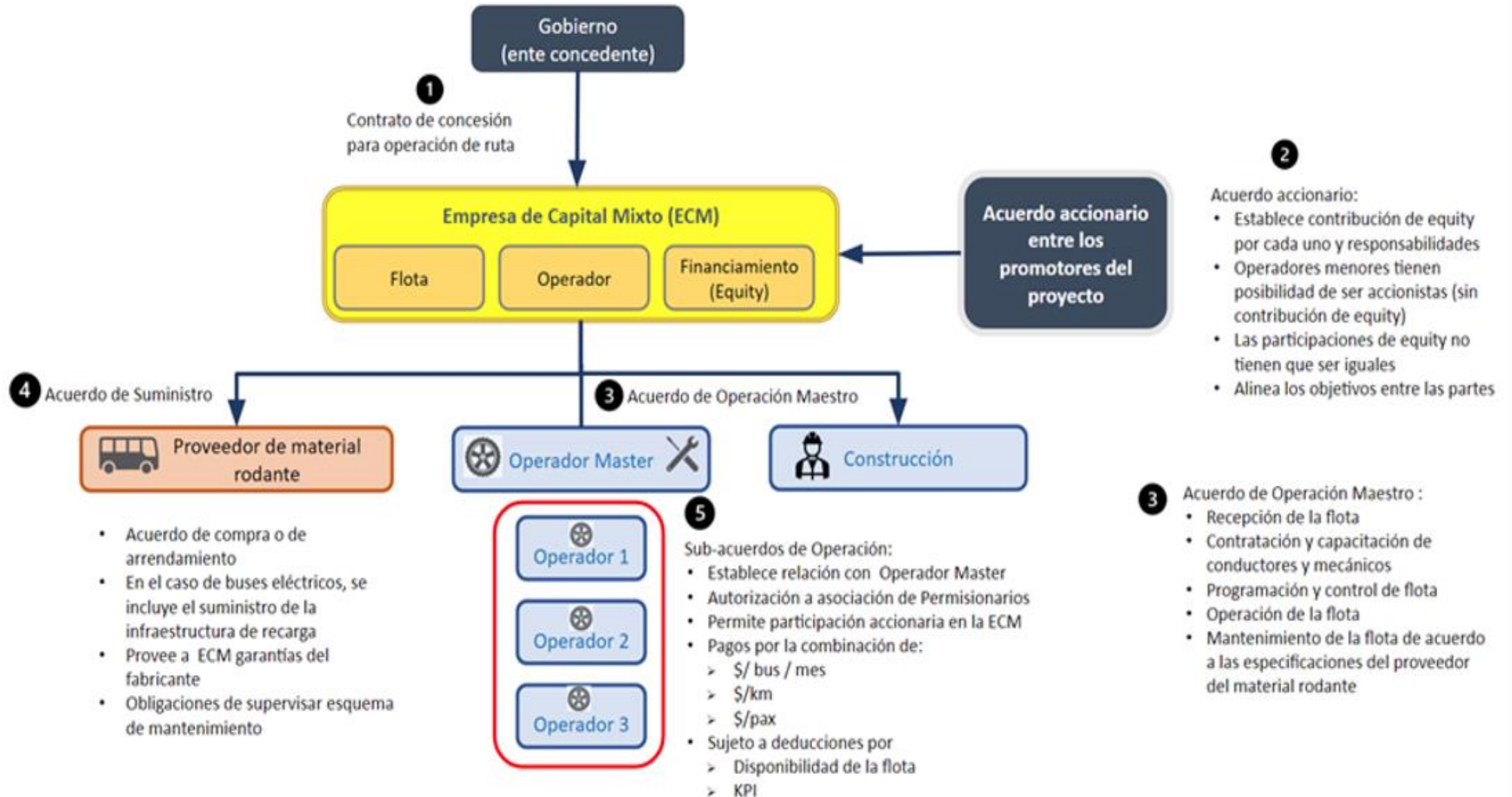




**OTHER STRUCTURES TO  
MOBILIZE PRIVATE  
FINANCING**

It is proposed to consider the participation of FONADIN as a shareholder of a Joint Venture Company,

Conceptual Framework



- 2** Acuerdo accionario:
- Establece contribución de equity por cada uno y responsabilidades
  - Operadores menores tienen posibilidad de ser accionistas (sin contribución de equity)
  - Las participaciones de equity no tienen que ser iguales
  - Alinea los objetivos entre las partes

- 3** Acuerdo de Operación Maestro :
- Recepción de la flota
  - Contratación y capacitación de conductores y mecánicos
  - Programación y control de flota
  - Operación de la flota
  - Mantenimiento de la flota de acuerdo a las especificaciones del proveedor del material rodante

- 5** Sub-acuerdos de Operación:
- Establece relación con Operador Master
  - Autorización a asociación de Permissionarios
  - Permite participación accionaria en la ECM
  - Pagos por la combinación de:
    - > \$/ bus / mes
    - > \$/km
    - > \$/pax
  - Sujeto a deducciones por
    - > Disponibilidad de la flota
    - > KPI

- 4** Acuerdo de Suministro
- Acuerdo de compra o de arrendamiento
  - En el caso de buses eléctricos, se incluye el suministro de la infraestructura de recarga
  - Provee a ECM garantías del fabricante
  - Obligaciones de supervisar esquema de mantenimiento

# Empresa de Capital Mixto (ECM) would receive the rights to operate the public transport service.

Concession or exploitation rights to an ECM for the operation of a public transportation service, similar to a railroad concession, in which the rights are granted to the same legal entity to build, operate, exploit and provide the service.

The ECM integrates the project promoters or partners as :

- ✓ Fleet
- ✓ Operator
- ✓ Equity

The ECM would be responsible for establishing:

- ✓ Shareholder agreements
- ✓ Master Operating Agreements
- ✓ Fleet acquisition or lease agreements

49%

Could be the integration of FONADIN as a shareholder of ECM

20%

Participation in investment funds

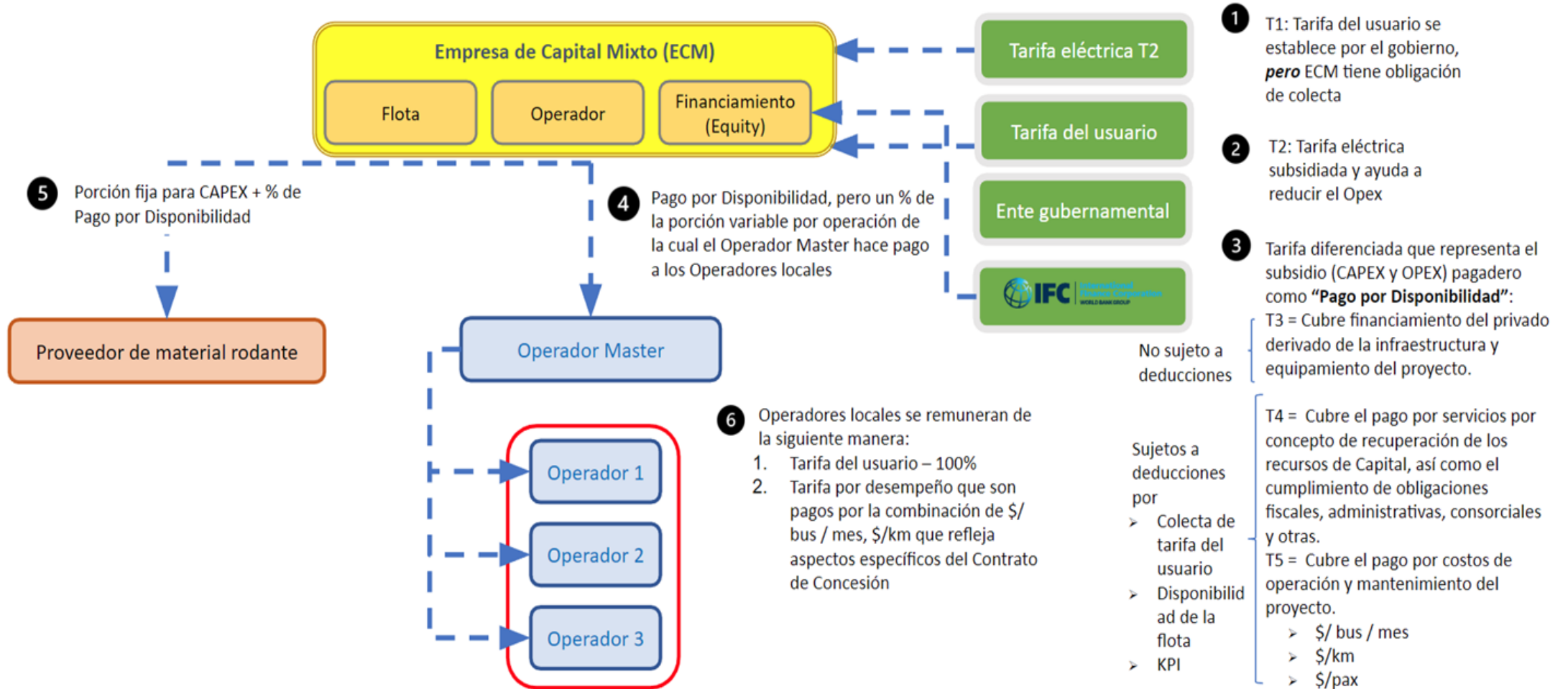
FONADIN has the capacity to grant subordinated and/or convertible loans to Beneficiary Companies:

- Up to 24% of the **total investment** of the project, or
- Up to 30% of the **total debt value**, for a maximum of 5 years



# FONADIN could grant a guarantee to the ECM that would be used to cover some proportion of the Availability Payment (PPD).

## Modeling of Flows



The flow of income and expenses would be categorized into tariffs, according to the source or destination of the resources.

Social tariff



**T1**

Fee paid by users; established by the corresponding authority



Revenues 100% for operators

Electric tariff



**T2**

Tariff that could receive a proportion of subsidy from the energy distribution company

Differentiated rate of payment per unit of product or service



**T3 + T4 + T5**

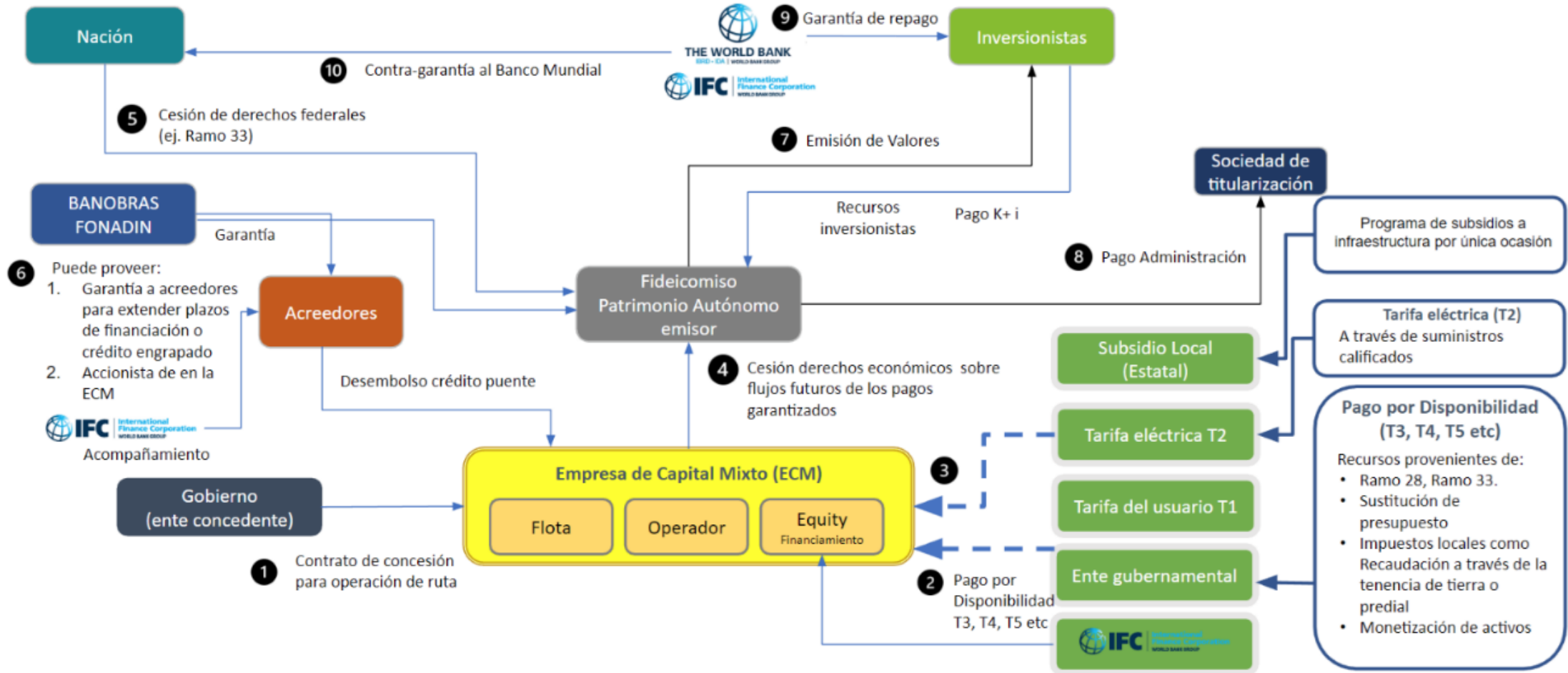
T3 amortizes the expired period's costs and covers the cost of private financing derived from the CAPEX investment.

T4 and T5 cover the capital recovery payment, administrative expenses, and costs associated with the service units.

FONADIN can grant a credit to the Federal Entity responsible for the project to make this subsidy, for a defined period of time, or through a back-up guarantee with commercial banks. **This type of support would necessarily have to be recoverable**, since the figure of non-recoverable support in PROTRAM guidelines is limited to 50% of the CAPEX investment.

FONADIN and the World Bank (IFC) would enable the MCA to leverage access to financing on competitive terms.

# Sources and Guarantees of Payment





The Federal Entities would contribute through the allocation of their own resources and federal transfers.



### Government subsidies

Infrastructure subsidy budget program that disburses resources on a one-time basis, e.g. electricity tariff subsidy.



### Revenues derived from the project

Fee paid by users (T1) 5% of total project cost



### Pay per availability

Payments by the government entity that contracted the project through the ECM

#### Ramo 28 y 33

Federal participations or Federal contributions for federal entities

#### Monetization of project assets

Attractive instruments for investors

#### Budget substitution

Substitution of a project with similar characteristics

#### Local revenue sources

Local taxes

**FONADIN\*****4.9%**of **equity interest** in the ECM.**As guarantor**, backing the commercial banks that granted credit to the ECM.**World Bank\*\*****Letter of credit:** to endorse a letter of credit that a commercial bank would provide to creditors.**Direct guarantee:** guarantees the repayment of the interest corresponding to the bond issue in the event that the Government does not comply with the availability payments that correspond to the ECM for the repayment of the interest.

\* By having a dual role, the interest rates at which obligations are contracted would decrease.

\*\* In both possibilities, the World Bank guarantee can only be granted if there is a counter-guarantee from the Federal Government. The World Bank may act as guarantor without prejudice to the guarantees that would be covered by FONADIN-PROTRAM.



**INCREASING  
INVESTMENT IN URBAN  
PUBLIC TRANSPORT:  
A ROADMAP**

# Despite the evolution and progress since 2010, several institutional challenges remain to be addressed.

## The creation of metropolitan transport authorities:

Mexico has officially recognized more than 70 Metropolitan Areas with many of them expanding over more than one State. However, urban transport is still being managed at the State/city level. Improving public transport service will require legal and institutional reforms to allow the establishment of Metropolitan Transport Authorities.

## Institutional strengthening in the following areas:

- **Adoption of improved business models for service provision:** Mexico is in need of adopting innovative business models. Mexico continues to contract public transportation services under two types of contract net cost or gross cost. Improved business models include bundling, partially-and fully unbundled contracts.
- **Adoption of international best-practices in areas of road safety and gender:** Most cities and municipalities need to adopt policies that would ensure road safety, accessibility and gender, especially since the majority of transit riders are women.



# The participation of development banks is key for increasing financing for sustainable urban mobility.

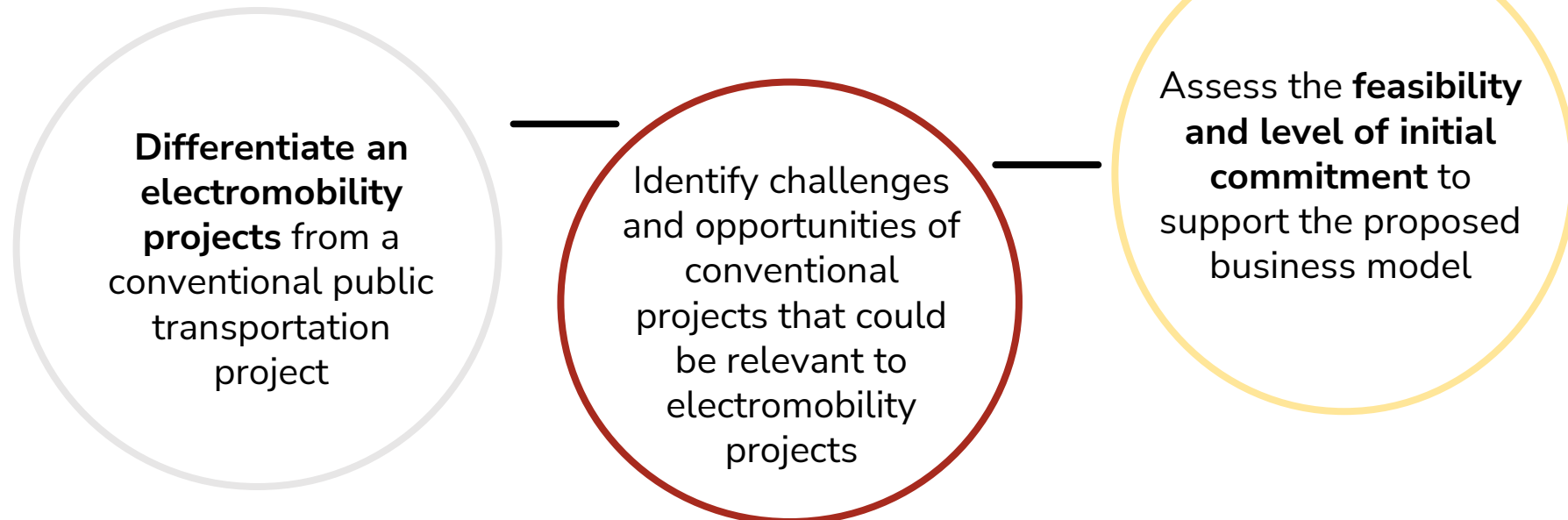
1

FONADIN, as a public trust, whose **experience** has been proven in the structuring and implementation of projects, **is ideal for supporting electromobility projects**, allowing the integration of best practices and lessons learned in both key sectors for sustainable development.

2

FONADIN-PROTRAM has a **privileged portfolio** due to its variety of recoverable support instruments, allowing for **different scenarios of participation** in the financing of electromobility projects.

## Next steps:



# In addition to its participation as a financing agent, FONADIN can lead and represent Mexico in the electrification of the sector.

Incorporation of electromobility projects as public transportation infrastructure projects susceptible to support....

Supporting the consolidation of technological know-how in the public transportation sector

Explore, together with the Program's Advisory Working Group, support for electromobility projects as a cross-cutting contribution to the sustainability, economic development and welfare agendas of federal policy.

Participate and represent Mexico in international discussion tables on the decarbonization of public transportation.

PROTRAM guidelines and its role in structuring and formalizing development bank support to local authorities:

- Consideration of different business models
- Supervise or instruct outsourced audits
- Participation in the monitoring and follow-up phase of the operation.

Advise and assist in the structuring of electromobility projects.



## Current financial dynamic at the subnational level will need to be revamped.

The context makes it necessary to design and build options for financing investment spending at the subnational level

### *Catalogue of instruments:*

Certificados bursátiles (CEBURES)  
Private equity funds

New projects (*greenfield*)  
Certificates of development capital (CKDs)  
Certificates of investment projects (CERPI)

Operating assets (*brownfield*)  
Real estate and investment trusts (FIBRAS)  
Energy and Infrastructure Investment  
Trusts (FIBRA E)

- **Capital markets provide solutions** such as CKDs-Cerpis and Fibras that could be used for financing, and the co-financing of physical investment at the subnational level, provided that the regulatory conditions of the law are met.
- Both instruments, being representative of capital securities, **do not count as liabilities/obligations for subnational governments** in accordance with the applicable laws. Thus, raising funding for a portfolio of investment projects in which the authority would be a co-investor and sponsor.



**WORLD BANK  
OPPORTUNITIES  
FOR ENGAGEMENT  
AND VALUE ADDED**



## There are several opportunities for World Bank to bring value.

### ***TA support for reforming FONADIN's Mass Transit Program***

- Technical assistance, both reimbursable or non-reimbursable, can be utilized to ensure that recommendations to PROTRAM are adopted, with the aim of leveraging more private investment to mass transit interventions.
- Technical assistance can be utilized to incentivize the adoption of business models that use payment sources other than fares or tariffs, that are utilized in traditional concession agreements in Mexico, including, e.g., availability payments using public resources. This could help to reduce the premiums cost that a current bore by the private sector. These savings should be redirected to secure more financing for new/renewal fleets.

### ***WB Guarantee Program***


- A World Bank Guarantee Program can be structured under the umbrella of BANOBRAS or NAFIN (another large national development bank) to backstop availability payments from State or federal entities for large mass transit investments, such as metros and interurban rail projects.

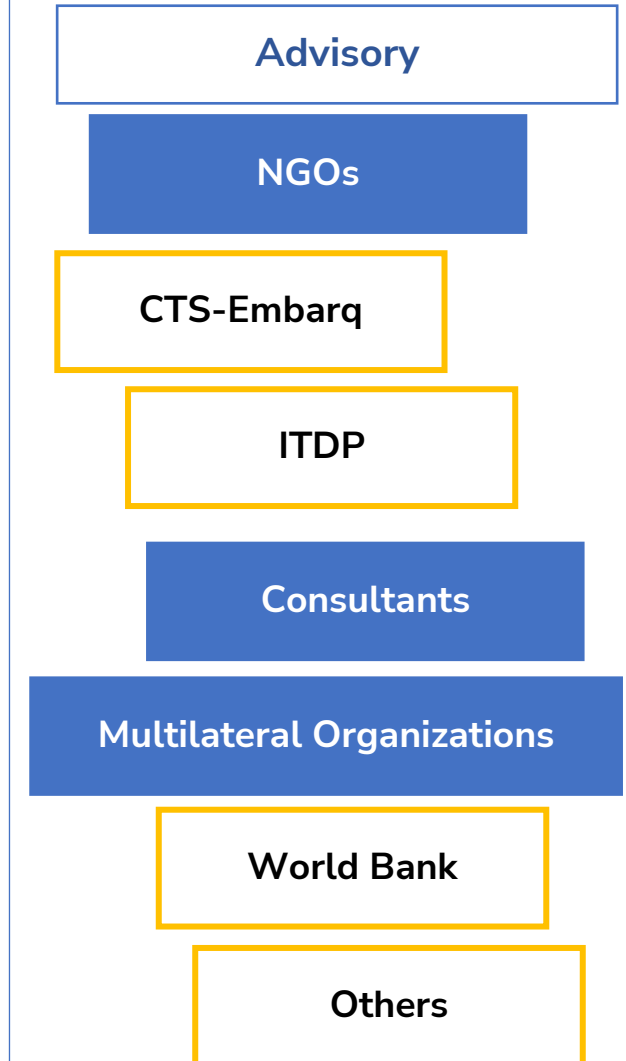
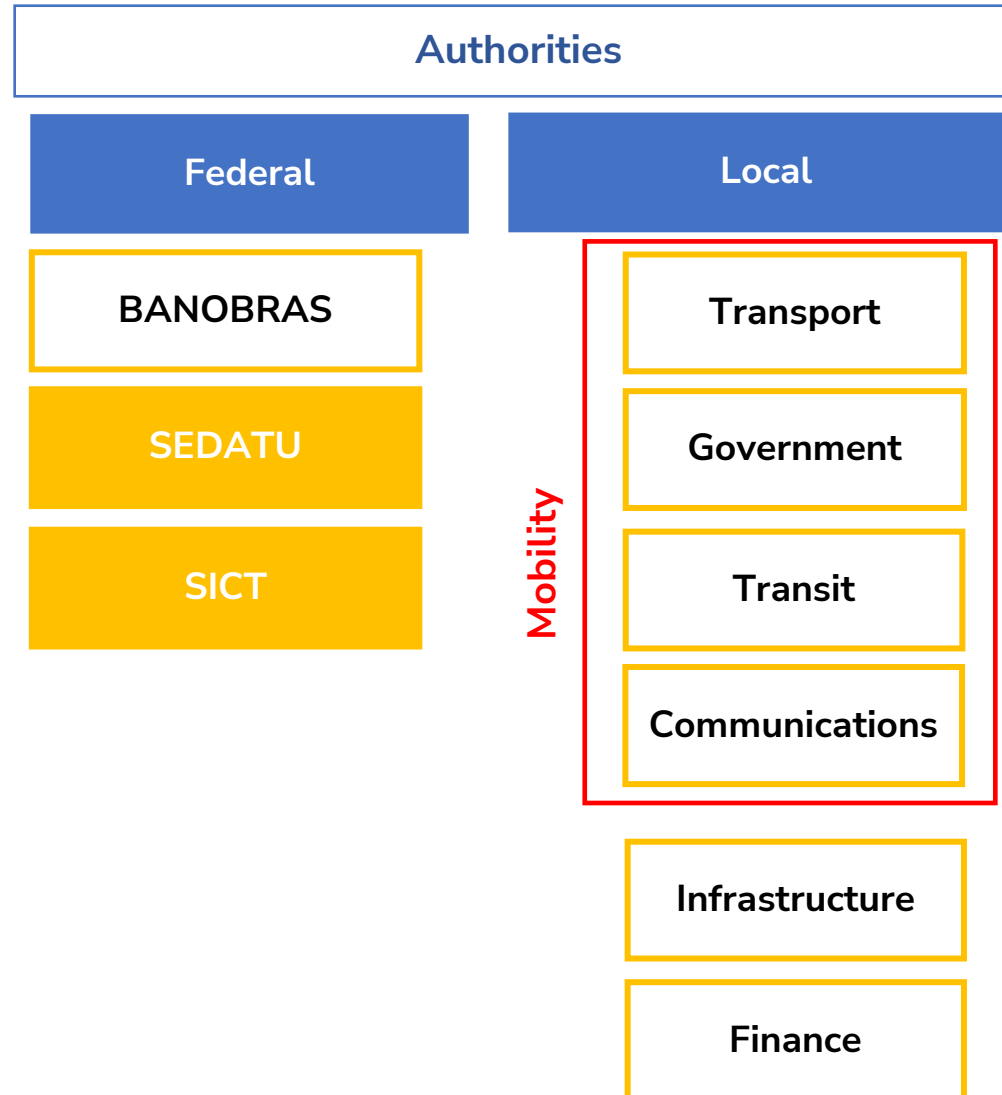
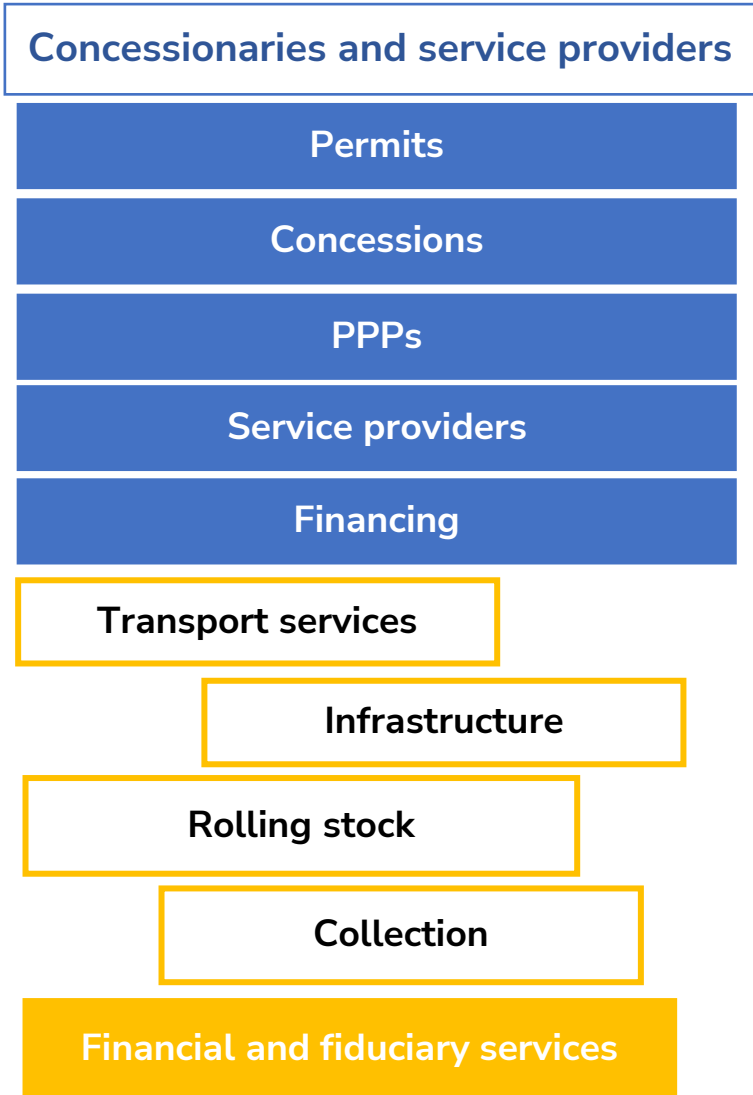
### ***Asset Recycling***

- Asset recycling can financially support public entities such as FONADIN to access international ESG investors through securitization of leveraging future revenue from assets by maximizing revenue.

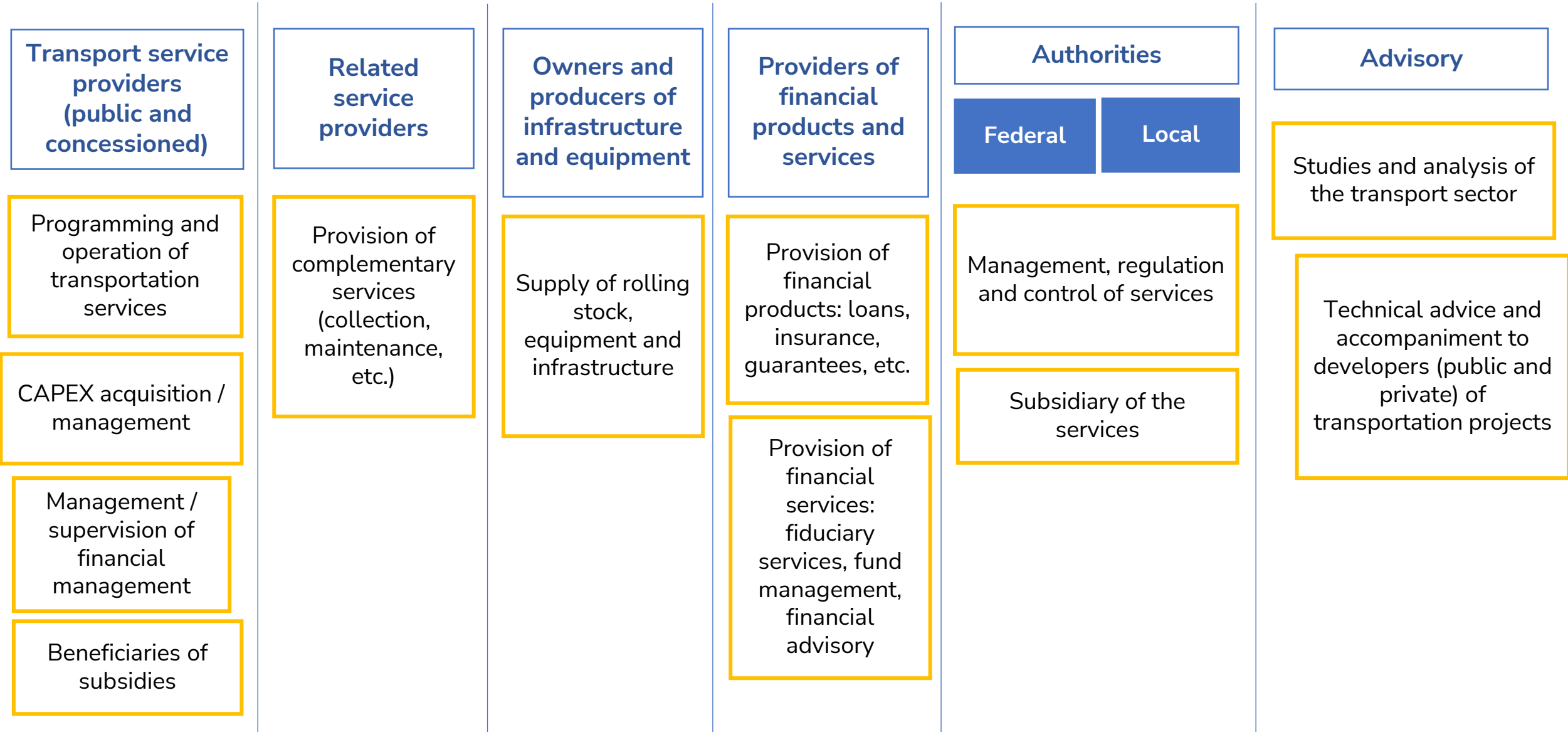
# Annex

# Provision of public transport services: Relevant stakeholders

 New compared to 2010



# Provision of public transport services: Stakeholder roles



# Available financing instruments under federal and subnational competency

Instrument	Competency	Advantages	Disadvantages	Reference cases	Implementation mechanisms
Public transport fare adjustment	Local governments	Immediately increases the volume of revenues	Political / social costs, risk of demand adjustment (demand elasticity)	All States have a normative/regulatory framework that allows them to adjust fares	Issuance of executive decree, agreement or notice.
Public transport subsidies	Local governments	Easy implementation (simple tariff policy), popular measure	Budget cost, post estimation for differences	Transportation systems with tariffs that are not updated in the long term	Allocation, extension or reclassification of budgets; legal appropriation or labeling
Parking fees (membership type usage fee)	Local governments	Continuous flow of resources due to recurring user payments	Requires a robust management mechanism; can be seen as a tax burden (unpopular)	Not identified in Mexico; some European cities apply it	Zonal control (intervention); requires incorporation into tax law of the concept and amount of collection
Parking meters	Local governments	Recurrent but variable resource flow	Requires a robust management mechanism; sometimes proposed as an instrument for zonal improvement, which would leave a marginal resource for transport projects or systems.	CDMX, Guadalajara, Zapopan, Tlaquepaque, Tonalá	Zonal control (intervention); requires incorporation in tax law of the concept and amount of collection; when it is a zonal improvement mechanism, a financial management instrument is required
Traffic fines	Federal Government (on federal roads and bridges), local gov's on roads under their jurisdiction	"Additional" resource flow	The penalties are not for collection purposes; the amount collected is marginal, so it is conceived as supplementary income	Guadalajara	Budget reclassification when there is pre-existing earmarking for another activity; budget allocation (administrative); earmarking by law or earmarking
Urban tolls and congestion charges	Local governments	Recurrent flow of resources	Collections can be "diluted" in the general revenue pool; lack of linkage to the transport service and therefore its allocation to this subject can be questioned	Not identified in Mexico	Delimitation of the polygon; robust management scheme; incorporation of the concept and amount into tax legislation

# Available financing instruments under federal and subnational competency

Instrument	Competency	Advantages	Disadvantages	Reference cases	Implementation mechanisms
<b>Employer contributions</b>	Local governments	"Extraordinary" resource flows	Marginal collection	Not identified in Mexico	Identification of spaces or real estate owned or in the public domain; real estate management; subscription of agreements with the company; incorporation of the concept and amount into tax legislation
<b>Charges for placement of advertising</b>	Local governments	Additional or complementary flow of resources	Recurrently disputed collections (ownership of the collection right, basis for calculating the collection)	CDMX	Incorporation of the concept and amount of collection in the tax legislation
<b>Fuel taxes</b>	Federal Government (NOT to be confused when used as a mechanism to collect local taxes)	Significant and recurring flow of resources	Unpopular due to over-taxation, highly contestable (disproportionate and inequitable), controversy in the distribution mechanism (beneficiaries and proportion)	Special excise tax on production and services (IEPS)	Incorporation in the tax legislation of both the concept and the amount or percentage
<b>Vehicle taxes</b>	Federal Government, local governments	Significant and recurring flow of resources	Unpopular due to additional tax burden, highly contestable (double taxation), Federal: Controversy in the distribution mechanism (beneficiaries and proportion).	Tenure, New Automobile Tax (ISAN)	Incorporation in the tax legislation of both the concept and the amount or percentage
<b>Carbon taxes</b>	Federal Government, local governments	Significant and recurring flow of resources	Unpopular due to the additional tax burden; controversial due to pre-existing IEPS collection (double taxation); Federal: Controversy in the distribution mechanism (beneficiaries and proportion).	Special excise tax on production and services (IEPS) on gasoline	Distinguish from the current IEPS charge on gasoline, which already contemplates a charge for CO2 emissions; incorporation in the tax legislation (federal or local)
<b>Real estate capital gains</b>	Local governments	Significant and recurring flow of resources	Unpopular because of the additional tax burden, controversial because of the capital gain determination, no linkage to public transport	Entities that collect similar contributions, such as improvement contributions	Cadastral updating, incorporation of the concept and amount in the tax legislation

# Available financing instruments under federal and subnational competency

Instrument	Competency	Advantages	Disadvantages	Reference cases	Implementation mechanisms
Property tax revenues	Local (municipal) governments	Significant and recurring flow of resources	Unpopular because of the additional tax burden, when there is an increase; controversial if there is disproportionality; no linkage with public transport	All entities (municipalities) collect property tax directly or indirectly	Revision of taxable base (cadastral), affectation by law or labeling
Public budget	Federal Government, local governments	Significant and recurrent flow of resources	Transitory of the LGMSV (compensated costs); wording of financing issues in the law ("may").	Other matters (health, education, etc.)	Budget cycle; results-based budgeting
Public debt	Federal government and legislature, local governments and legislatures	Source of earmarked funds	Required rigorousness of management, administration, and accountability	Federal and local governments	Procedure for budgetary and fiscal discipline provisions
Debt instruments (government issuance)	Federal government (only issues 7 instruments), local governments	Source of earmarked funds	Rigorous and time-consuming certification process	Green Bond GCDMXCB 16V	Certification before a specialized company; issuance on the stock exchange
Investment of "idle" public funds	Federal Government, local governments	Higher financial profitability	Higher risk	Not identified in Mexico	Verify that the regulatory framework allows it
Private credit	Concessionaries	Line of credit for the acquisition of goods	Stringent credit conditions (conditions and high rates), concessionaries not subject to credit, double collateral requirement	Traditional credit	Compliance with requirements; credit agreement
Debt instruments / equity instruments	Issuing company	Fundraising for specific purposes	Strictness in the requirements for listing and bidding on the stock exchange	Companies listed on the Mexican Stock Exchange (BMV) and Institutional Stock Exchange (BIVA)	Listing procedure, issuance of securities through the financial intermediary

# Available financing instruments under federal and subnational competency

Instrument	Competency	Advantages	Disadvantages	Reference cases	Implementation mechanisms
<b>Donations and private donations (non-repayable)</b>	Receiving individuals or legal entities	Extraordinary non-reimbursable resources	Donation procedures (SAT); specific incorporation, tax accounting of donations, insignificant amounts	List of national and international donors registered with the Tax Administration Service (SAT)	Authorization to be a donee; specific fiscal accounting
<b>PPPs as a financing mechanism</b>	Federal Government, <b>local governments</b>	Integrates complementary resources and/or technical knowledge	Rigorous, inflexible and sometimes lengthy legal proceedings	Any PPP	Procedure foreseen by law (competition or unilateral proposal)
<b>Multilateral financing</b>	Federal government	Line of credit for the development of a specific project	Intermediation; not always coincidence in the project approach (agency/entity); lack of financial structuring of projects	Entities with previous credits	Process defined by the agency; comply with the regulatory framework for cooperation
<b>Multilateral non-repayable grants</b>	Federal government	Extraordinary non-reimbursable resources	Intermediation; not always a match in project focus (agency/entity); limited supply or fashionable topics	Entities that have received this type of support	Process defined by the agency; comply with the regulatory framework for cooperation
<b>Multilateral technical support</b>	Federal government	High-level technical support	Support associated with a specific vision	Entities that have received this type of support	Process defined by the agency, comply with the regulatory framework for cooperation
<b>PROTRAM FONADIN</b>	Federal government	Credit lines for specific projects, technical assistance	Product offering needs to be adjusted to new market needs, lack of technical/financial structuring of project ideas	Supported projects	FONADIN rules; compliance with the financial product data sheet
<b>Development bank credit</b>	Development Banks	Credit lines for specific projects, technical support	Conditions equal to or more stringent than those of private banks	Authorized lines of credit	Compliance with the financial product data sheet

# Available financing instruments under federal and subnational competency

Instrument	Competency	Advantages	Disadvantages	Reference cases	Implementation mechanisms
<b>Pure leasing (development and commercial banking)</b>	Leasing company (SOFOM)	Tax, equity and accounting benefits	Limited supply; conditions of access to the product	Contracts with leasing companies and fleet managers	Fulfillment of requirements and signing of the contract
<b>Pure leasing (development and commercial banking)</b>	Financial institution	Fiscal benefits	Conditions of access to the product, risk due to the high enforceability of the debt security	Contracts with financial institutions	Fulfillment of requirements and signing of the contract
<b>Guarantees (development and commercial banking)</b>	Financial institution	Improved credit conditions	Requirements and limited access	Contracts subscribed for the product	Fulfillment of requirements and signing of the contract
<b>Fleet supply as financing</b>	Specialized company (fleet manager)	Separation between the fleet supplier and the concessionaire (service provider)	Little known figure; requires modification of the "integral" concession	Transmilenio (2021)	Separation of the concession between service operators and fleet providers; signing of the contract



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