

Stylized Urban Transportation Facts in Latin America and the Caribbean

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Stylized Urban Transportation Facts in Latin America and the Caribbean

A quick diagnosis

The urban population in Latin America and the Caribbean (LAC) has increased significantly over the last decades. Currently, almost 80 percent of the LAC population lives in cities, that is, more than 525 million people, and this trend is projected to continue. More people mean more cars. Motorization rates in the region keep rising while the share of public transportation is decreasing. Financial sustainability of the urban public transport sector in LAC is at stake. Most service providers do not cover their own operational costs and the productivity of public transportation has stagnated (or even decreased) over time. This represents a challenging scenario for improving transport services in the region, especially from a quality dimension. People in LAC travel shorter distances but their commute time is longer than in developed countries. Surveys show that users in the region are dissatisfied with public transport quality, not only with commute times but also in terms of comfort and cleanliness and the fares they pay. Women are particularly affected, as they rely more heavily on public transport than men. Moreover, the effects on CO2 emissions are notable, compromising environmental sustainability. Electromobility is still far from being a reality in the region.

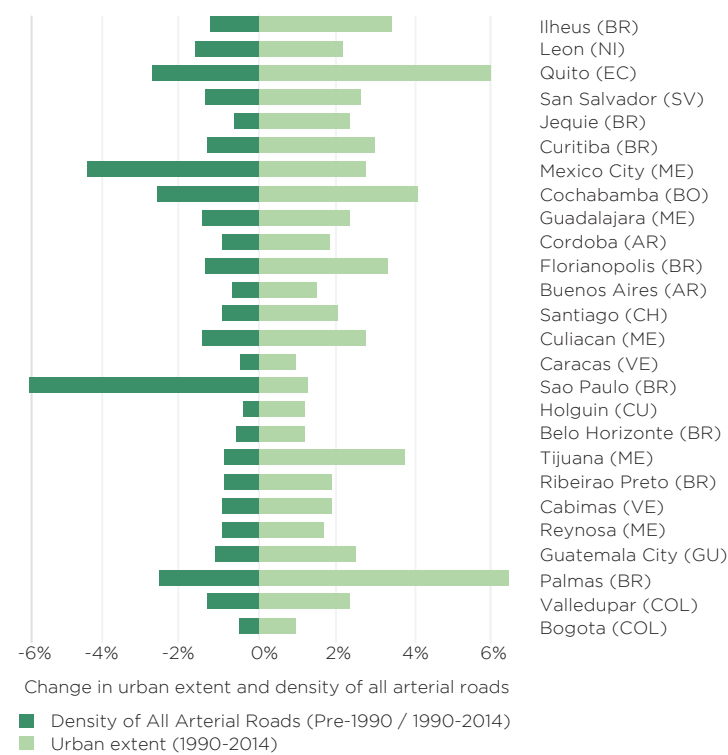
The stylized facts presented below describe a challenging scenario for urban transportation in LAC. This includes up-to-date information on the current challenges, risks, and tradeoffs the region faces if current mobility patterns remain unchanged.



Exhibit 1:

Transportation network is not accompanying urban cities growth

Urban extent growth and density of arterial roads growth



The urban population in LAC grew from 41.3 percent of the total population in 1950 to almost 80 percent in 2015. By 2050, it is projected that 87.8 percent of the region's total population will live in urban areas (United Nations, 2018). Urbanization in LAC has been continuously increasing, representing a challenge for cities in its efforts to meet the needs of its population. In fact, whereas urban extent has been growing in past decades, the density of total arterial roads has not compassed this growth, representing a limitation for the coverage of transportation systems. As a result, the connectivity of urban peripheries in metropolitan areas-together with the walkability of peripheries-is compromised.

Urban extent growth in select cities

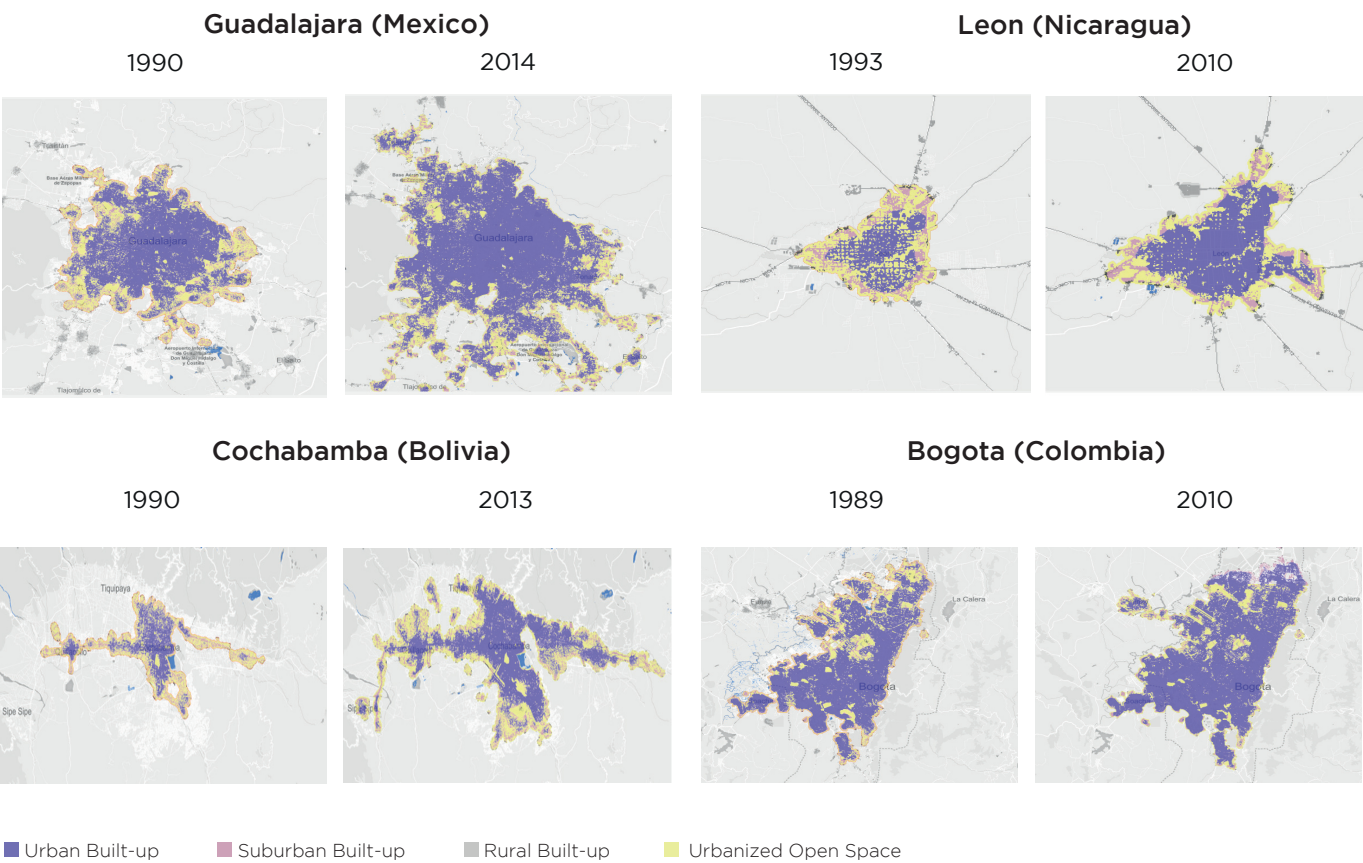
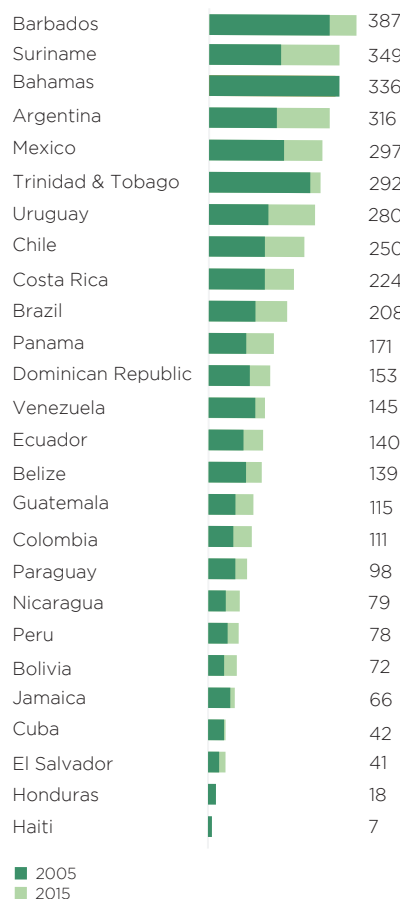


Exhibit 2:

Motorization rates in the region are increasing over time

Total vehicles per 1000 inhabitants by country

Evolution 2005 and 2015 Motorization rate



Annual growth (2005-2015) Annual growth (2005-2015)



Over the past 10 years, most of countries in LAC have increased their motorization rate, with the average annual growth rate in the region equaling 4.7 percent. In 2015, the average motorization for LAC reached 201 vehicles per 1000 inhabitants. This figure remains below the rate in Europe (471 vehicles per 1000 inhabitants) and the rates in both the U.S. and Canada (805 vehicles per 1000 inhabitants). Nevertheless, the motorization growth rate in LAC is one of the highest worldwide, along with in Asia and the Middle East.

High motorization growth rates in LAC have a clear impact on congestion. Figures on total vehicles per square kilometer are higher in countries such as Mexico (19), Costa Rica (21), and Guatemala (17), when compared to the average in Europe. This problem is exacerbated in some island countries in LAC, where this number is significantly higher than in the rest of the region. For example, this is the case in Barbados (256 vehicles per square kilometer) and Trinidad and Tobago (77). As these figures represent the average for the country, it is reasonable to assume that results grow enormously when we focus on certain LAC cities.

Total vehicles per 1000 inhabitants by regions

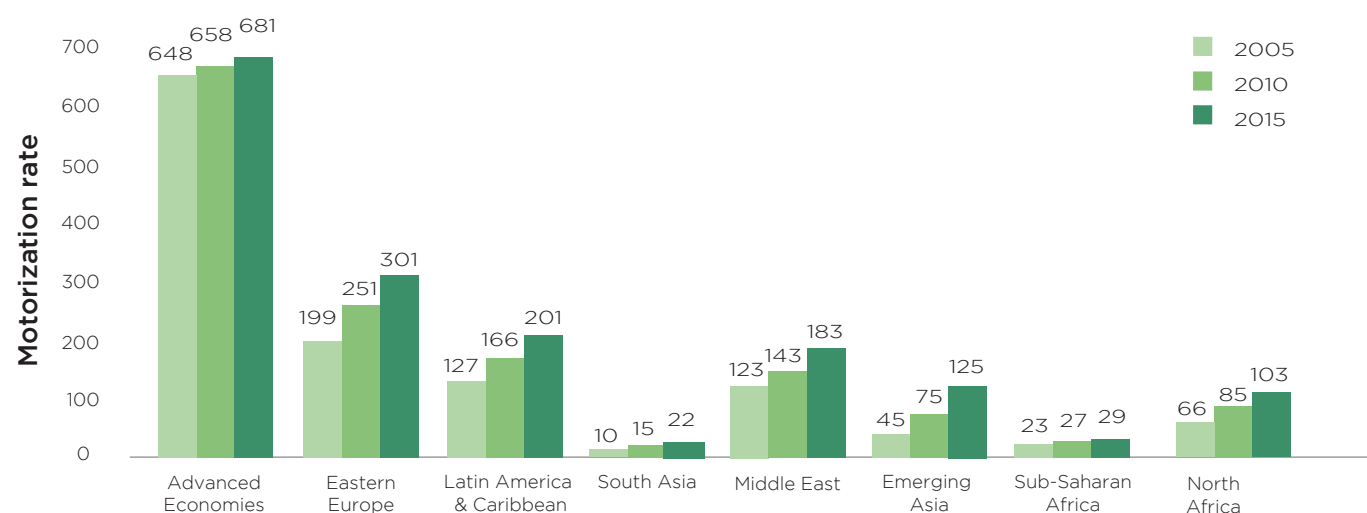
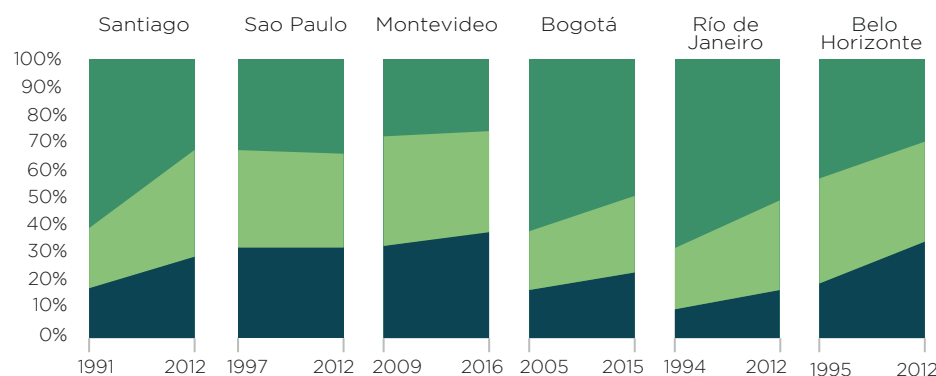


Exhibit 3:

The share of public transportation is decreasing over time in the region whereas private motorized share is increasing

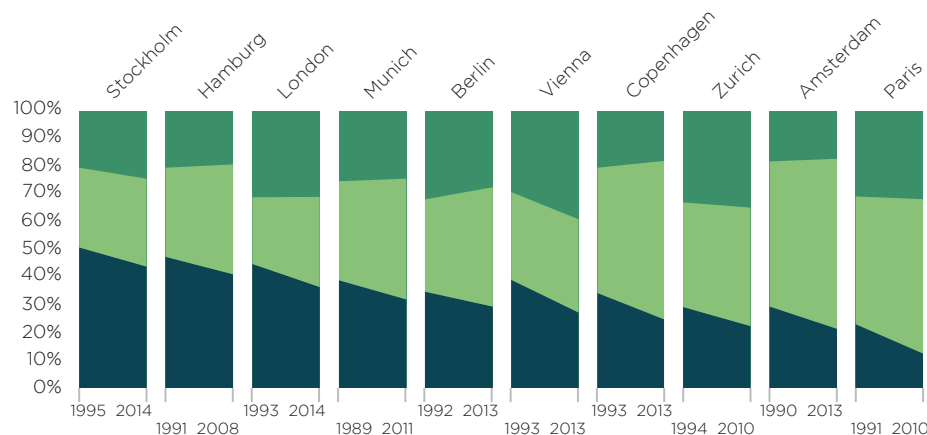
The constant growth of motorization rates in LAC is reflected in the regional transport modal split. Contrary to the trend in Europe—where there is a notable decrease in the use of private transportation—the share of private transportation is increasing in LAC. Some cities have witnessed a reduction in their public transportation shares by one-half. This passenger leakage to private transportation modes has an impact on public transportation performance, which in turn increases the leakage, generating a vicious circle between private and public transportation.

The evolution of modal split In selected Latin America and the Caribbean cities

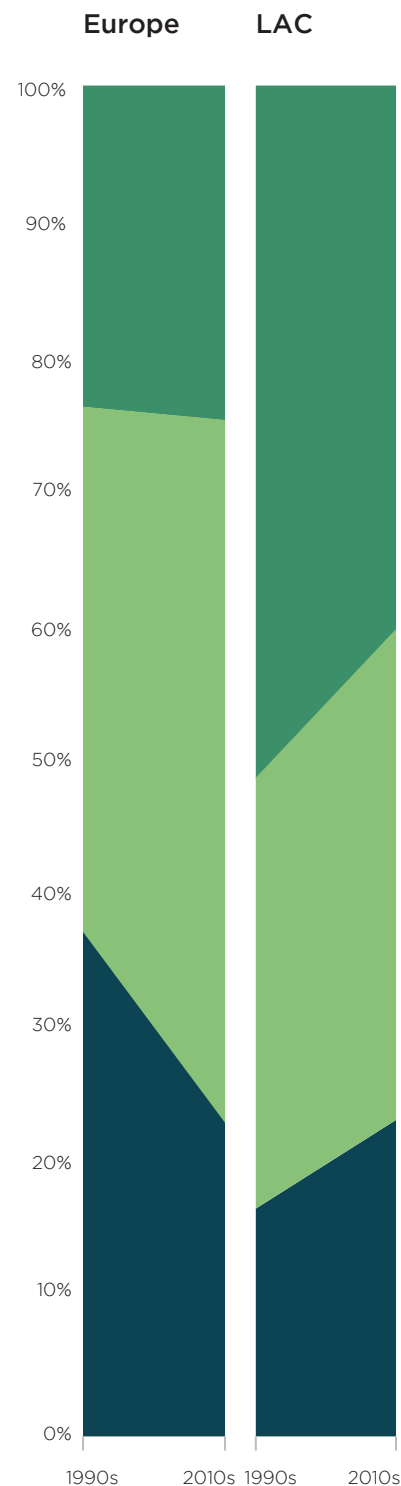


Note: Comparisons among cities are limited by differences in methodologies and timing of surveys. Main differences arise from walking trips and motorcycle trips. Private transport: includes car and motorcycle trips.

In selected European cities



Note: Comparisons among cities are limited by differences in methodologies and timing of surveys. Main differences arise from car and walking trips because of the definition of geographic limits and the main mode of transport for a trip reported in the surveys. For more details see Buehler, Pucher and Altshuler (2017). Private transport: includes car trips.



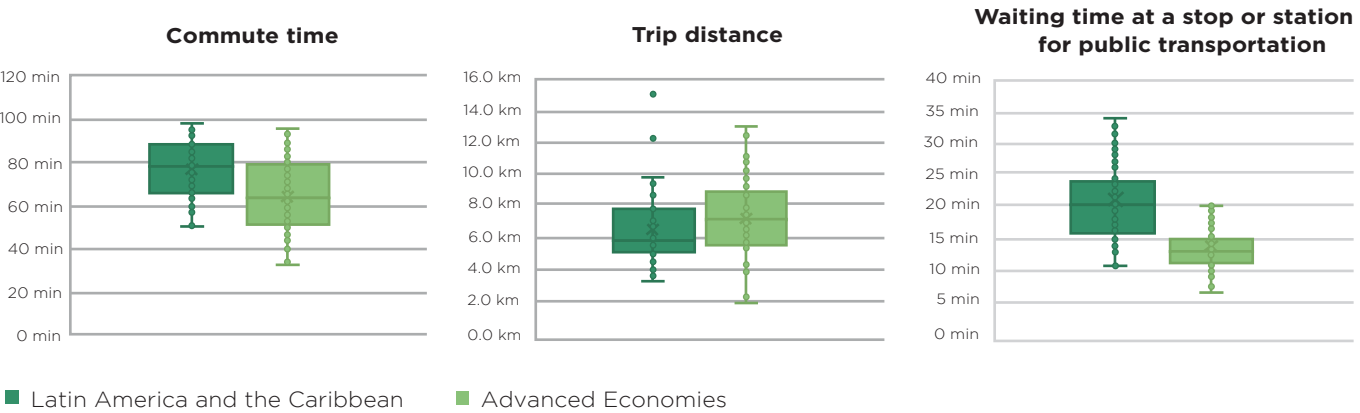
Cities included in Europe average: Stockholm, Hamburg, London, Munich, Berlin, Vienna, Copenhagen, Zurich, Amsterdam and Paris. Cities included in LAC average: Santiago, Sao Paulo, Rio de Janeiro and Belo Horizonte.

Public transport
Walking and cycling
Private transport

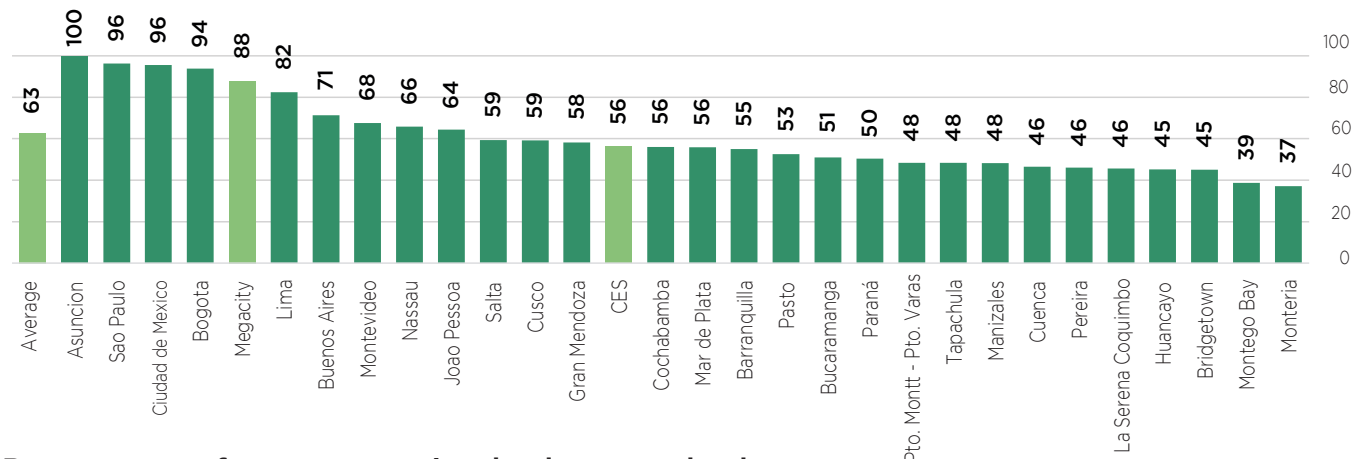
Exhibit 4:

Quality of public transportation is worse than in advanced economies

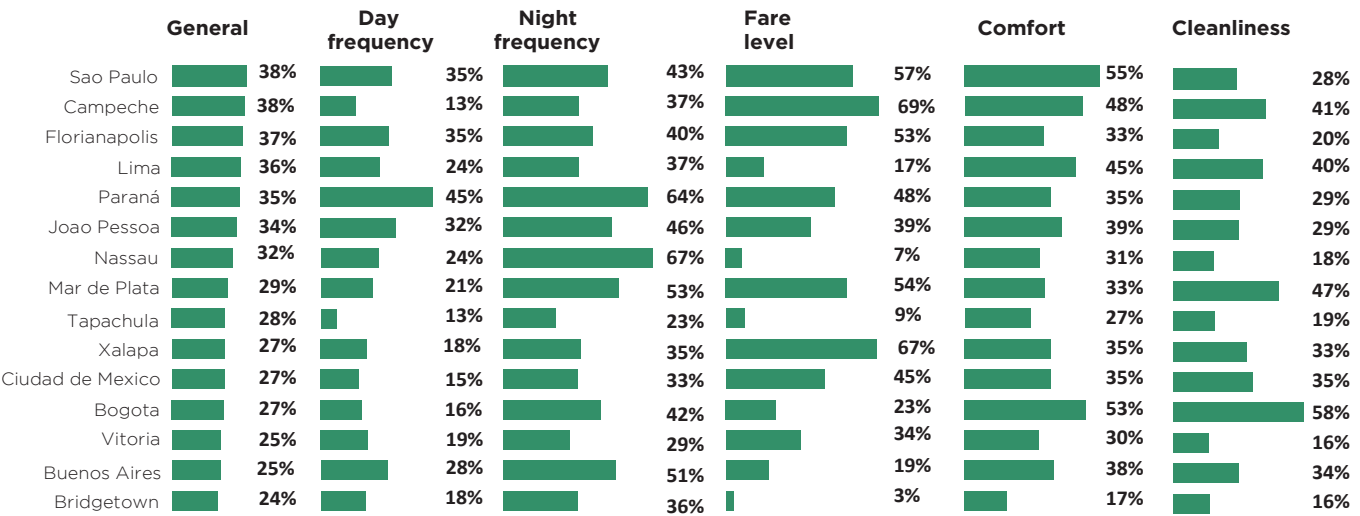
People in LAC wait longer for public transportation and spend more time traveling a given distance compared with those in advanced economies. Plus, there is a clear concern about general transport quality, proxied not only by the amount of time spent traveling, but also by fares, comfort, and cleanliness. In LAC, the average amount of time that people spend on public transportation during a weekday commute is 77 minutes. This is above the average of 64 minutes for advanced economies, even though the average trip distance in LAC is lower. Waiting time at a stop or station is also higher in the region (21 minutes) compared with advanced economies (14 minutes). On average, 40 percent of people in LAC wait over 20 minutes, compared to 20 percent in advanced economies.



Commute time by city



Percentage of users reporting bad or very bad aspects of service quality of public transportation

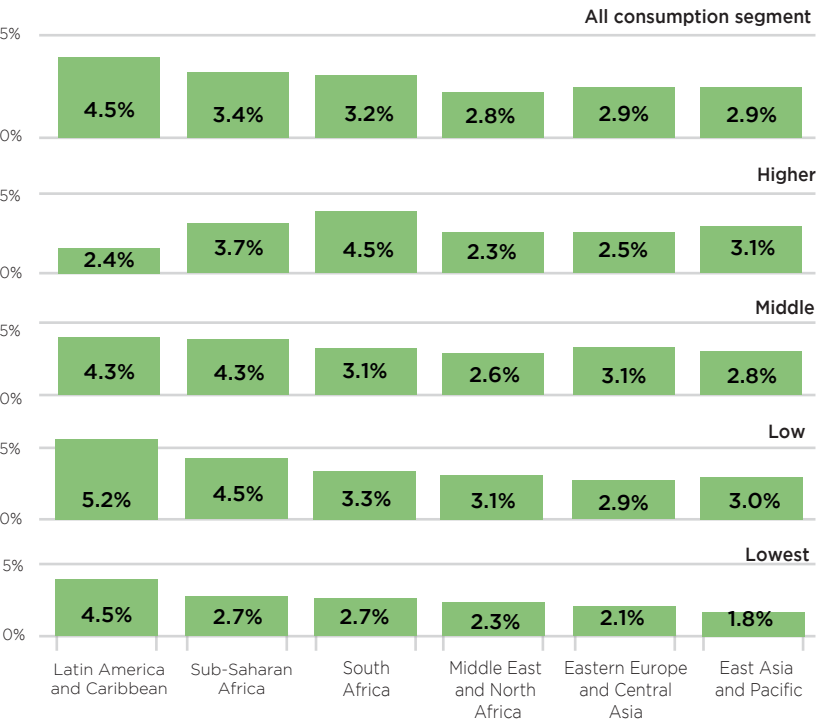


A) IDB, Inter-American Development Bank, 2014, Database Opinion Survey: IDB's Emerging and Sustainable Cities Initiative.
B) Moovit, 2019, Moovit Public Transit Index. https://moovitapp.com/insights/en/moovit_insights_Public_Transit_Index-countries

Exhibit 5:

Household spending on transportation services of low-income household are the highest among regions

Share of transportation services in total consumption by region and consumption segment, 2010

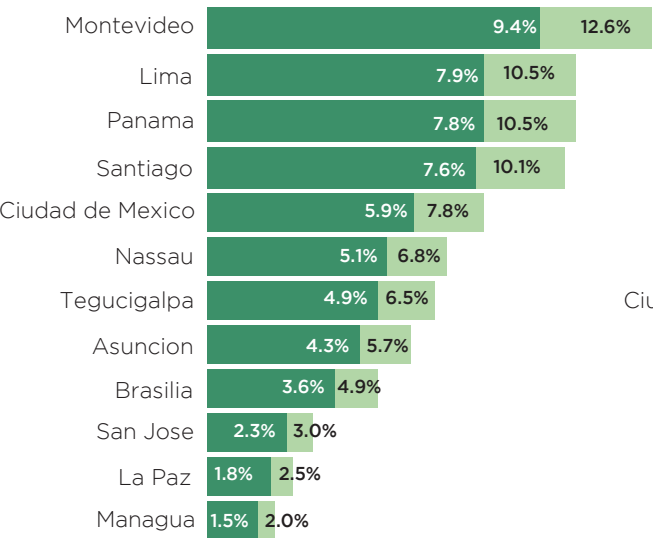


Compared to outside the region, public transport services in LAC are of lower quality and the prices are higher. Low-income households are particularly affected by higher public transport prices. Transportation services expenditures relative to total consumption expenditures are 4.5 percent and 5.2 percent for the “lowest” and “low” consumption segments, respectively.

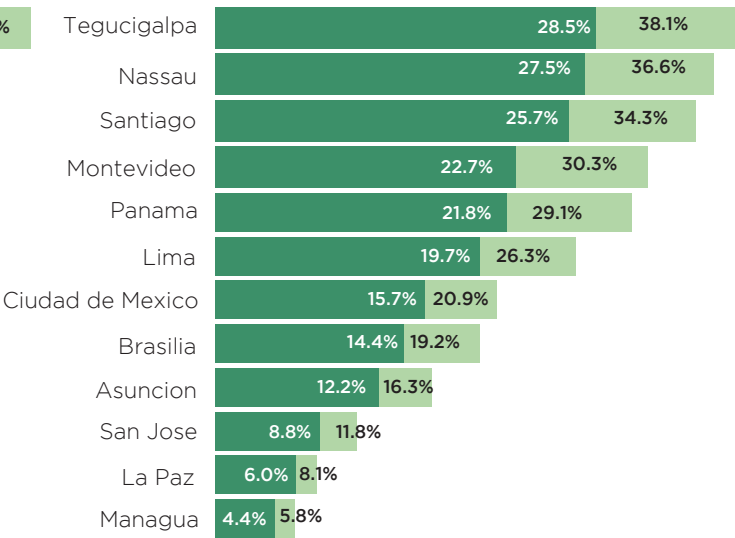
Measurement of transport spending may not fully capture the affordability problem for low-income groups for various reasons, particularly because fare evasion is higher in deprived areas and poor people may avoid some public transportation trips because they are too expensive. A transportation affordability indicator has been created to address this problem, which considers a fixed basket of trips. The results show that for the bottom income quintile, the financial burden of a 60-trip basket is over 25 percent in one-half of the cities analyzed.

Transportation Affordability Indicator of Selected Cities in Latin America and the Caribbean, 2018

Average per capita income



Average per capita income of bottom income quintile



■ Basket of 45 trips ■ Basket of 60 trips

Exhibit 6:

Productivity of public transportation has stagnated or decreased over time in the region

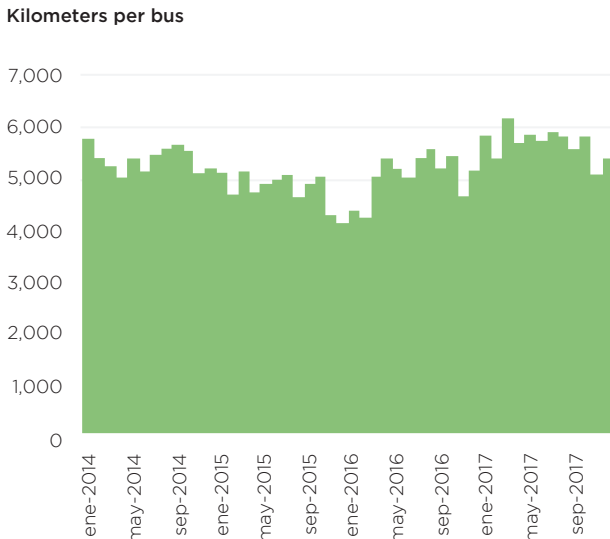
The productivity of urban transport has decrease in the region, which is exacerbated by a low cost recovery. The evidence shows that productivity of the public transport sector in LAC, expressed by different partial indicators, has stagnated or even decreased. This has resulted in rising costs in the public transport sector, as is also observed in other labor-intensive sectors. These rising costs can be attributed in part to difficulties associated with replacing labor with capital as well as a slowdown in technological advances. Public transportation faces two additional aggravating factors: vehicular congestion and the negative impact of a positive income elasticity with respect to the demand for private transportation. This evidence has been confirmed statistically in Colombia and Argentina. Panama City and Santiago de Chile have also experienced a decrease in vehicle-kilometers in public transport.

Evolution of kilometers

in selected Latin America and the Caribbean cities

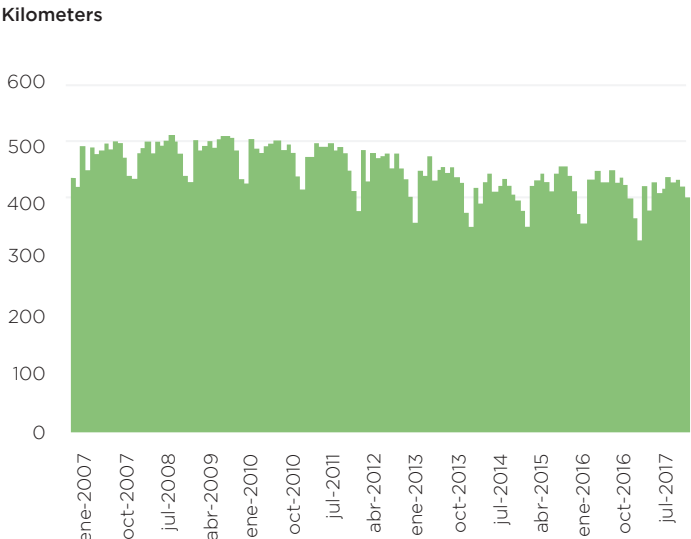
Panama City

(total per bus, January 2014 - December)



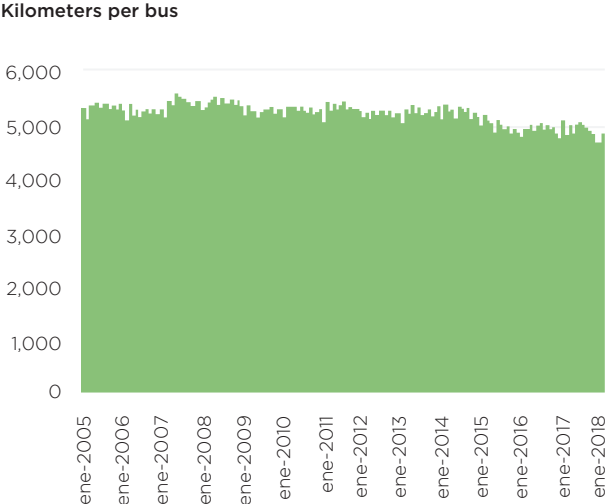
Argentina

(average per operator, January 2017 - December 2017)



Colombia without Bucaramanga

(total per bus, January 2005 - March 2018)



Santiago de Chile

(average per bus by operator, 2013 - 2015)

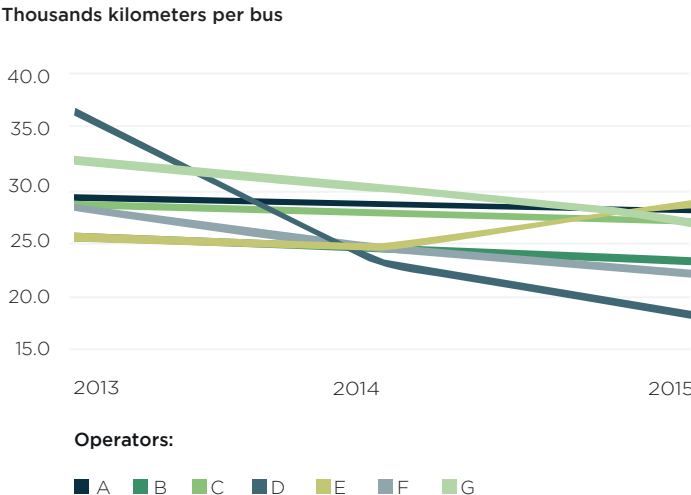


Exhibit 7:

Several cities in the region do not cover operating costs through fare revenues

The LAC region faces a problem of cost recovery in the public transport sector. Most big cities in the region do not cover operating costs with fare revenues. In 2014, Buenos Aires had the lowest coverage of operating costs (29 percent) based on a select group of cities. The lack of financial sustainability of public transportation systems in the region makes it difficult to implement quality improvements because of the pressure on government budgets.

Percentage of operating costs covered by fare revenues, 2014

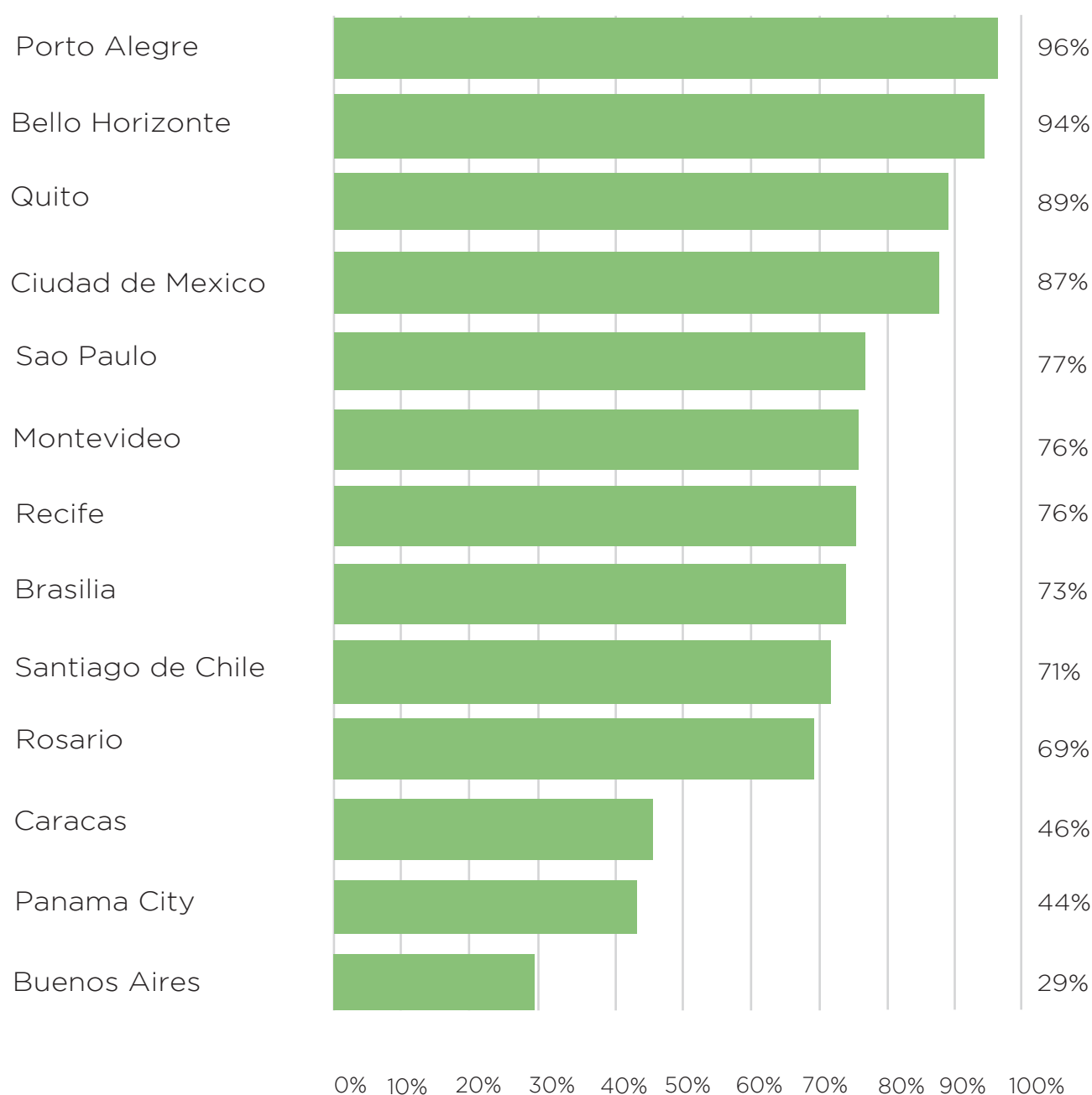
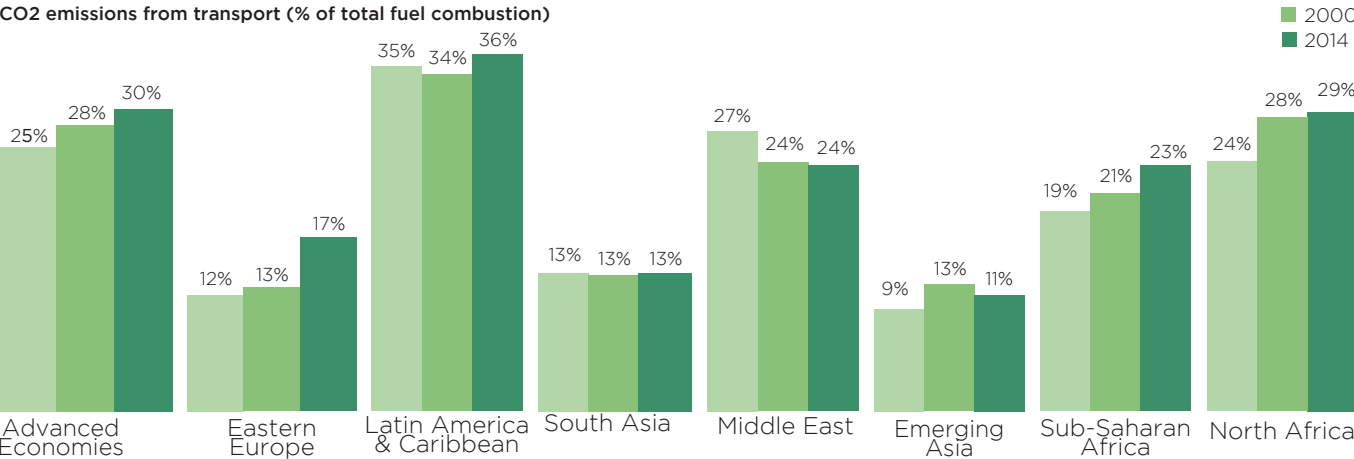


Exhibit 8:

The share of CO2 per capita transportation emissions in Latin America and the Caribbean is one the highest among regions

Historically, LAC has been the region with the highest share of CO2 emissions per capita from transportation. In 2016, transportation emissions in the region were lower than in Advanced Economies, Middle East, and Eastern Europe, yet higher than in South and Emerging Asia ,and North and Sub-Saharan Africa. Nevertheless, transportation's share of global energy-related CO2 emissions in LAC was 37 percent in 2016, which was the highest among all regions. In contrast, worldwide, transportation was responsible for 24.3 percent of emissions in 2016. The average emissions from transportation in LAC was 962 kg CO2 per capita in 2016, ranging from a minimum of 131 kg in both Cuba and Haiti to a maximum of 2,724 kg in Trinidad and Tobago. Further, the share of CO2 emissions from transportation differs significantly among countries depending on their patterns of production, ranging from a share of 6 percent and 18 percent for Cuba and Trinidad and Tobago, respectively, to 94 percent for Paraguay.

Evolution of CO2 per capita emissions from transportation



Per capita CO2 emissions from transportation and total by country, 2016

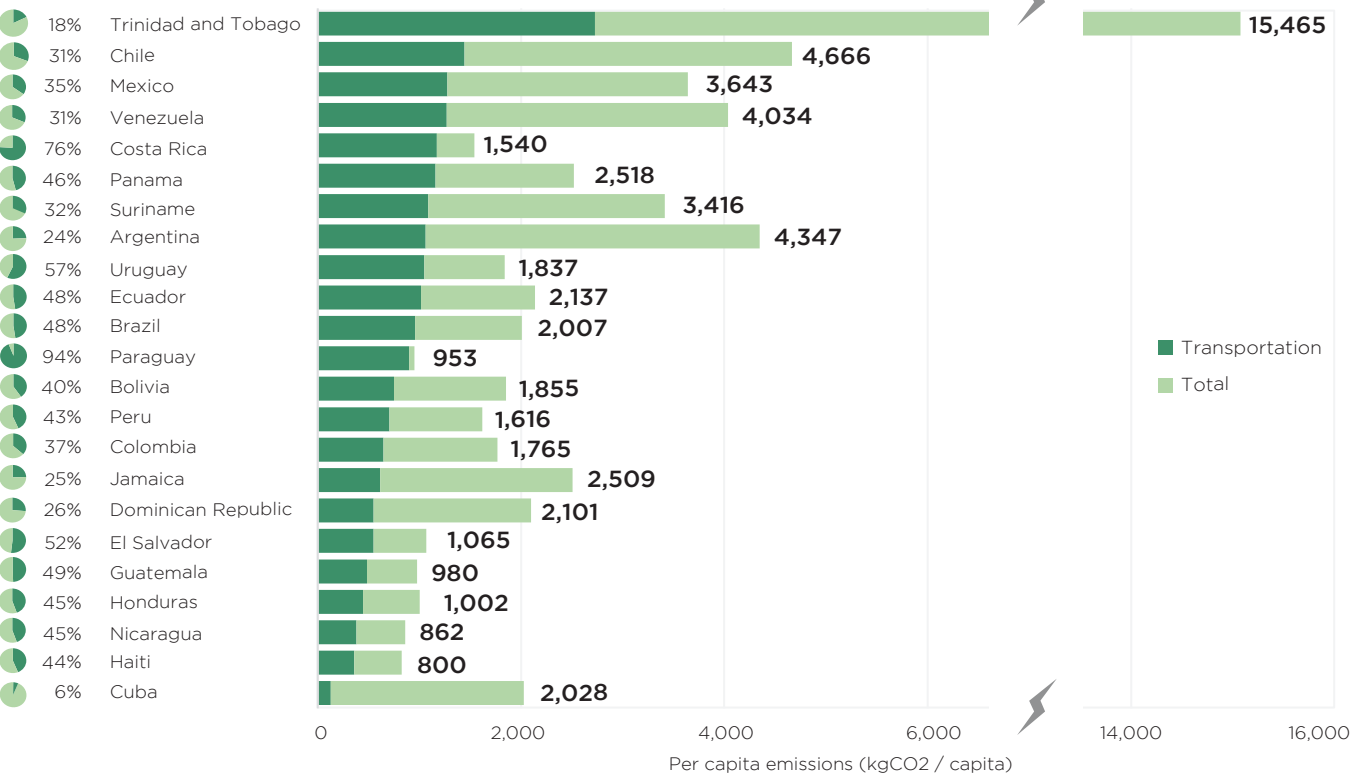


Exhibit 9:

Electromobility is still incipient in the region

Electromobility constitutes an important path to achieve environmental sustainability in transportation. Countries in the region are making progress in different areas, including standardization and interoperability, circulation and reliability, incentives for promoting purchases, among other incentives. However, the development of electric vehicles in the region is still incipient.

Electromobility regulation in the region

(from Perez-Jaramillo et al, 2019)

	Energy efficiency	Operation of electric vehicles	Charging infrastructure	Vehicle-network connectivity	Emissions of light vehicles
Chile	● Labeling. Proposals of minimum levels.	● Proposed in National Strategy of Electromobility.	● Proposed in National Strategy of Electromobility.	● No progress	● EURO 5
Mexico	● Measured. Without labeling. Proposals for improvement.	● No progress	● Mentioned in NOM-001-SEDE-2012	● No progress	● EURO 4
Panama	● Not measured. Proposals for improvement.	● No progress	● No progress	● No progress	● Own standard
Dominican Republic	● Not measured. Proposals for improvement.	● No progress	● No progress	● No progress	● EURO 4
Costa Rica	● Incentives, but without labeling. Proposals for improvement.	● INTE/IEC 61851 part 21	● INTE/IEC 61851 part 1, 22, 23	● No progress	● EURO 4
Colombia	● Proposal for efficiency and labeled before 2022.	● No progress	● No progress	● No progress	● EURO 4
Uruguay	● Labeling. Proposals for efficiency improvement.	● UNIT 1234: 2016	● UNIT-IEC 61851 part 1	● No progress	● EURO 3
Brazil	● Labeling. Proposals for efficiency improvement.	● NBR IEC 61851 part 21	● NBR IEC 61851 part 1 and 22	● ABNTISO 15118 (Under elaboration)	● EURO 5
Argentina	● Measured. Labeling under development.	● No progress	● No progress	● No progress	● EURO 5
Ecuador	● Energy Plan considers labeling and efficiency improved	● PRTE INEN 162	● PRTE INEN 162	● No progress	● EURO 3

Mayor progress ● ● ● Minor progress ●

Market share of electric cars (BEV and PHEV) by country, 2017 (%)

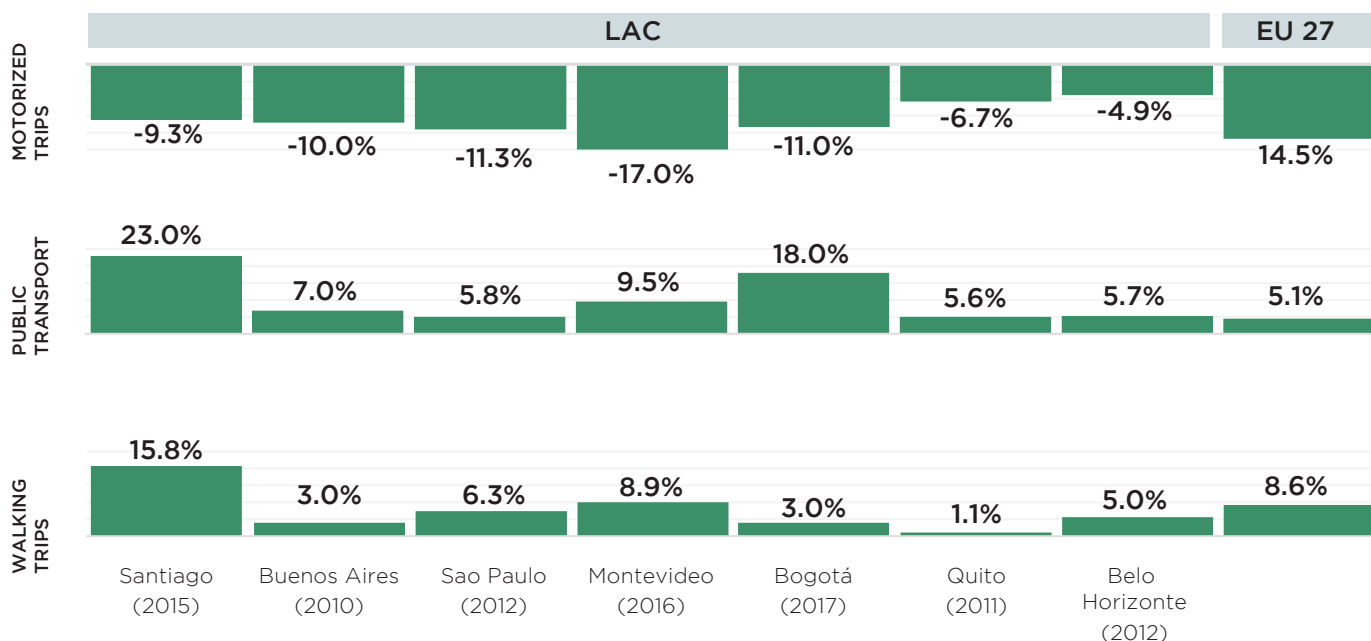


Exhibit 10:

Women have less access to private modes of transport and make more public transport and walking trips than men

The growth of motorization rates in the region and its negative consequences on public transportation have a direct impact on women's mobility. Women use significantly more public transportation and walk more, whereas men drive more cars. Thus, the urban transport quality problem in the region is particularly affecting women. This is observed in the distribution of drivers' licenses by gender, where female drivers' licenses represent merely 30 percent of the total licenses in the region. In contrast, some developed countries are in the process of closing or have closed the gender gap among drivers.

Gender differences in mobility patterns* in selected LAC cities and EU27



Note: *Differences in percentages (female - male)

Distribution of driver's licenses by gender in Latin America and the Caribbean and selected countries

