



CDMX MOBILITY

ECOBICI as the solution to mobility

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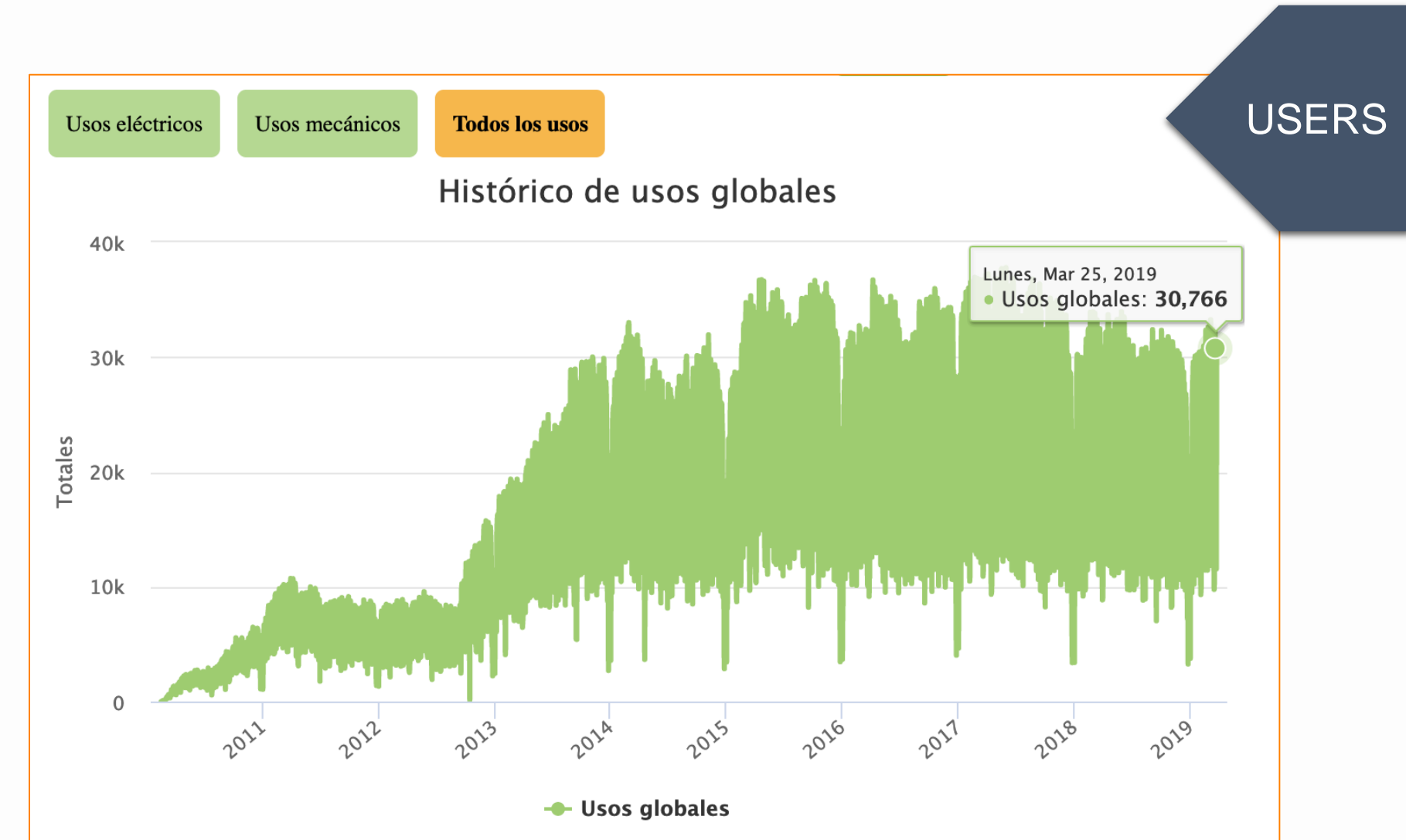
● Ricardo Moreno

ECOBICI OVERVIEW

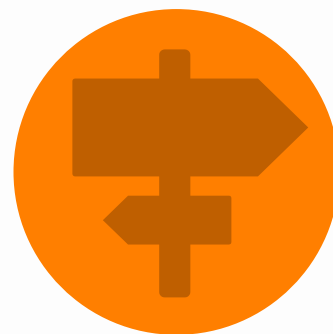
ECOBICI is a public bikeshare system that allows the user to pick up a bike in one place and return it to another, making point-to-point, human-powered transportation practical.



Source: <https://www.ecobici.cdmx.gob.mx/es/estadisticas>



Source: <https://www.ecobici.cdmx.gob.mx/es/estadisticas>



GOAL

Integrate ECOBICI with public transit,
playing a key role in the mobility for CDMX



HISTORY

The system was launched on February
2010
with 84 stations and 1,200 bicycles



GROWTH

In 8 years the system has growth 400%
to 480 stations, >6,000 bicycles and 170k
active users

HYPOTHESIS

$H_0 = \text{ECOBICI is a mobility solution for Mexico City}$

Scope: Assess whether public bikeshare system (ECOBICI) is a mobility solution for Mexico City, through the analysis of several data sources.



Efficacy

Service area coverage

Operating indicators



Complement Public Transportation

Bicycle station location



Accessible

Subscription and payment mechanisms

Accessibility by low income users



Availability

Number of bicycles and docks

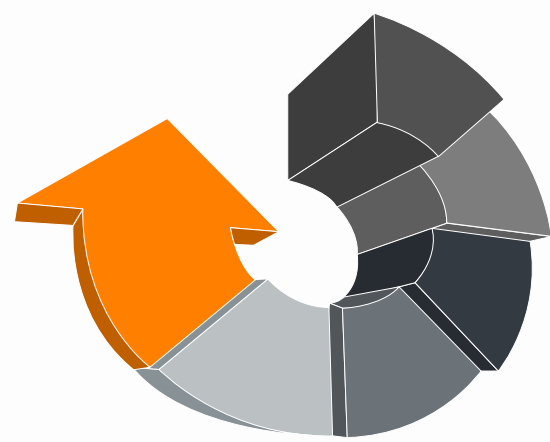
Availability in peak hours



“

Mobility is the ability to move or be moved freely and easily. However, mobility pursues a bigger goal: accessibility. Accessibility to places, services and other options to reach certain areas in big cities.

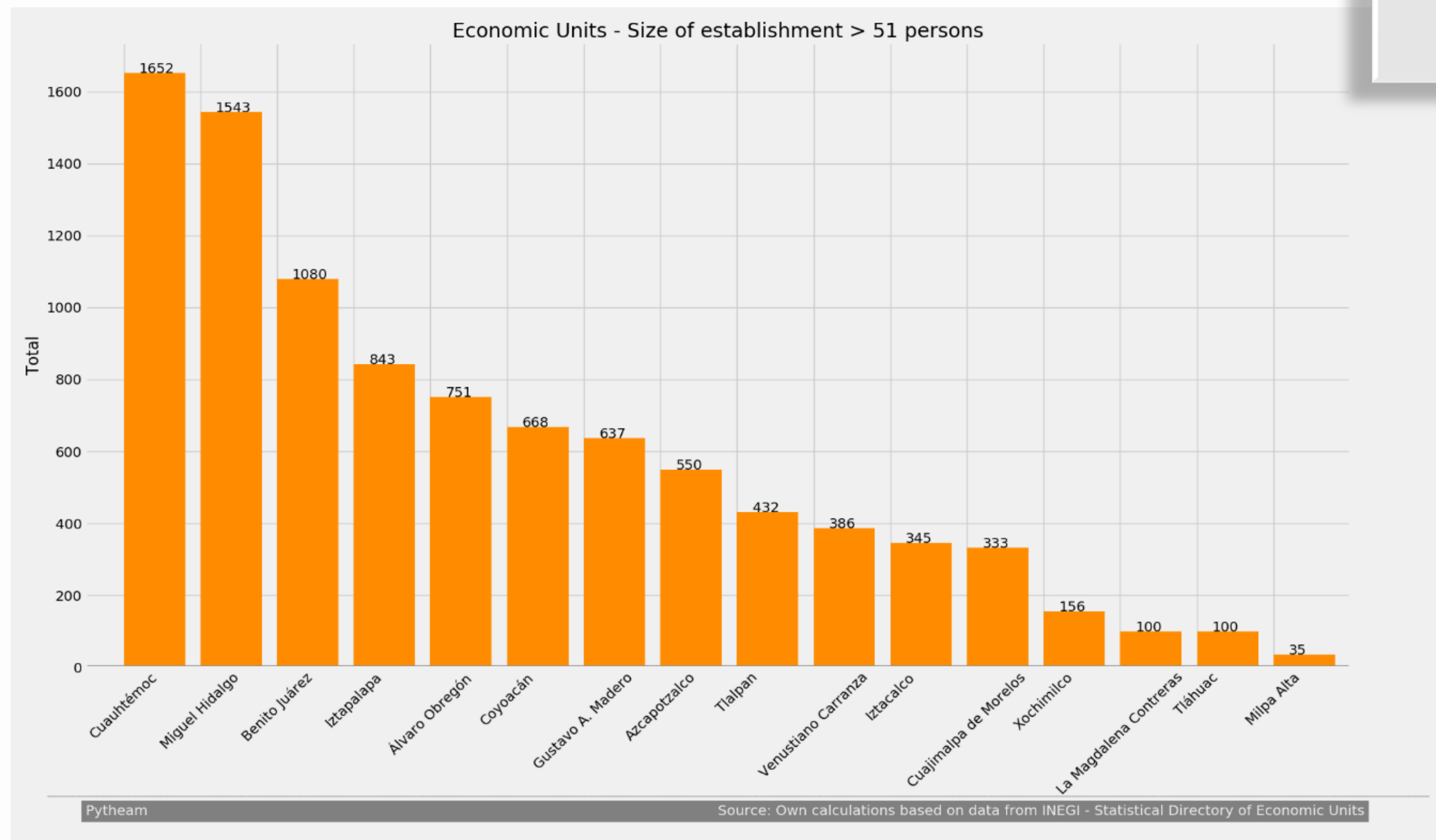
Definition by Oxford Dictionary



EFFICACY

Service Area Coverage

Municipality	Ecobici stations
Benito Juárez	168
Cuauhtémoc	199
Miguel Hidalgo	113
Total	480



01.Service Area

ECOBICI stations are located in 3 of the 16 municipalities

02.Coverage (economical dynamics)

According to the Statistical Directory of Economic Units (INEGI), these 3 municipalities hold 44% of the economic units with more than 51 employees which represents 45% of the occupied persons in the city (formal economy)

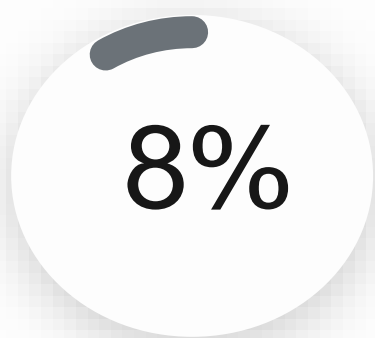
03.Coverage (demographics)

The combining area of these 3 municipalities represents 7% of territorial surface of the city and 15% of the population



How ECOBICI complements Public Transportation System

Statistics



Density

ECOBICI stations connect with 8% of the public transportation stops



People with long trips

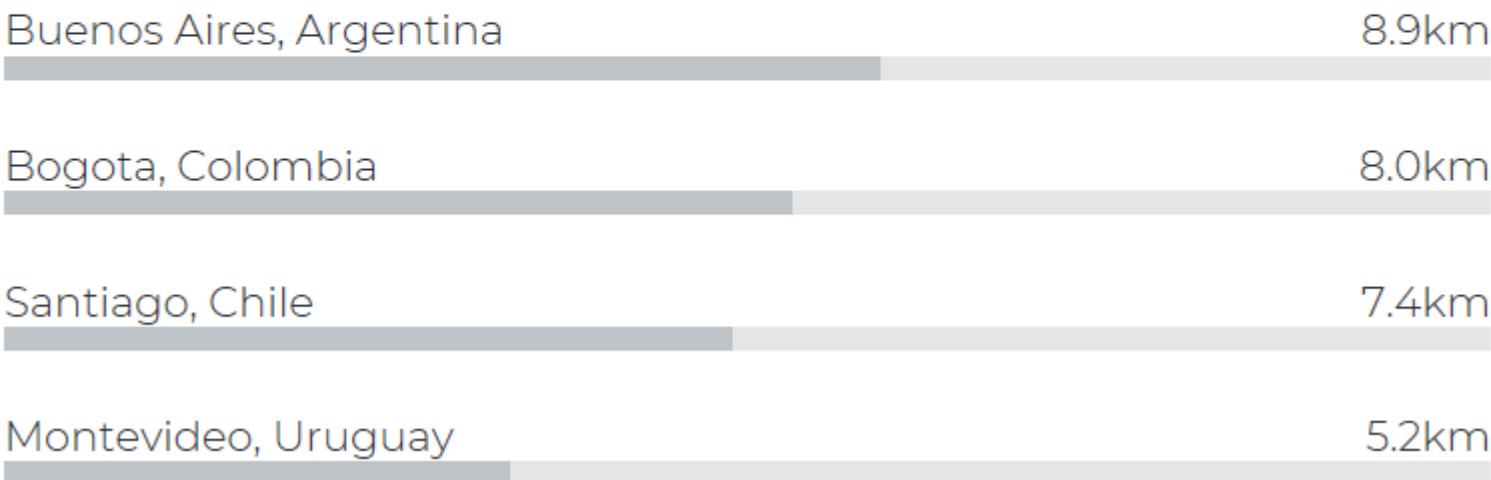
Long trip = more than 2 hrs daily in public Transportation

Daily average distance travelled in public transportation

One direction (i.e. from home to work)

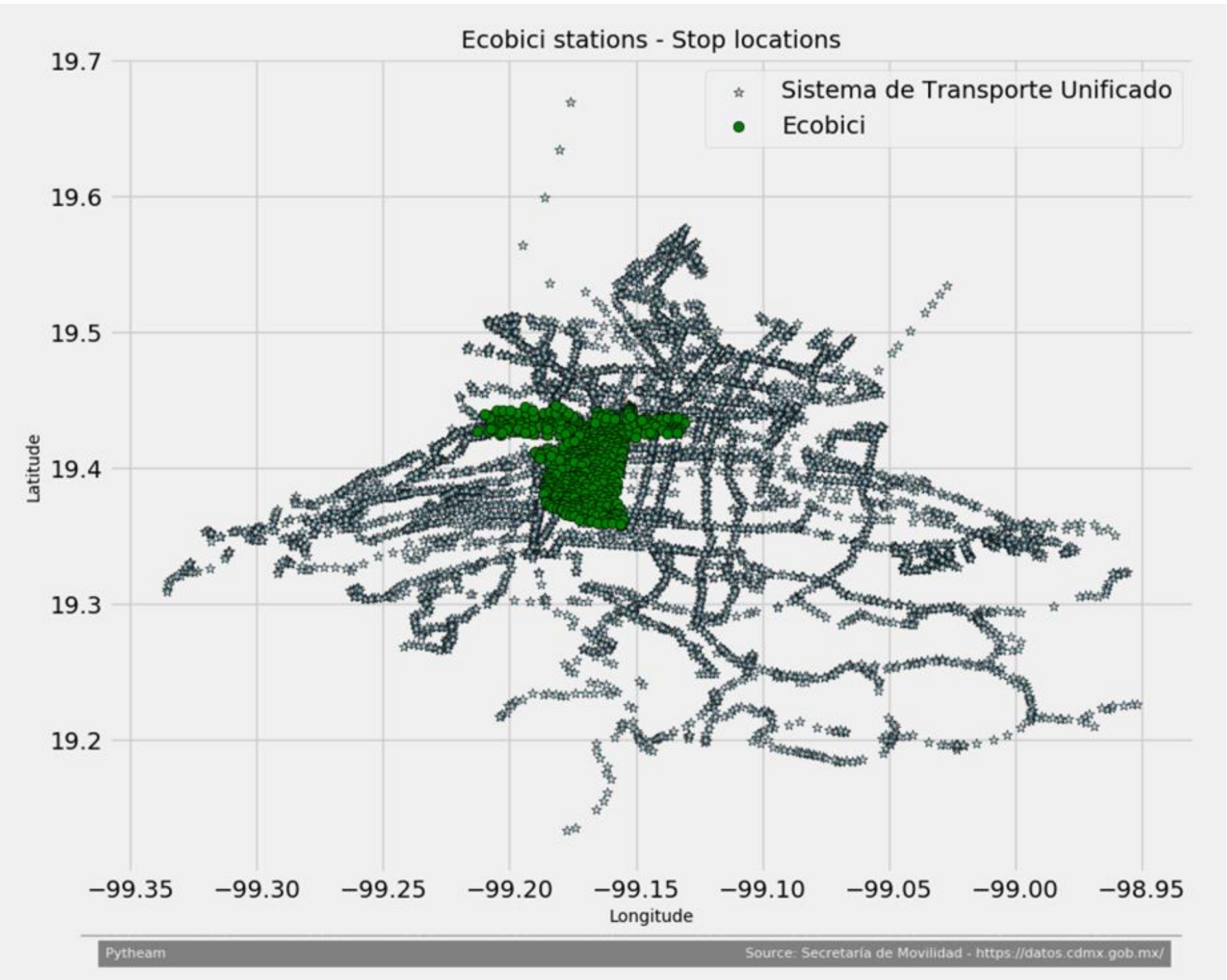
Source: <https://moovitapp.com/insights>

9.9km



Municipality	Ecobici stations
Benito Juárez	168
Cuauhtémoc	199
Miguel Hidalgo	113
Total	480

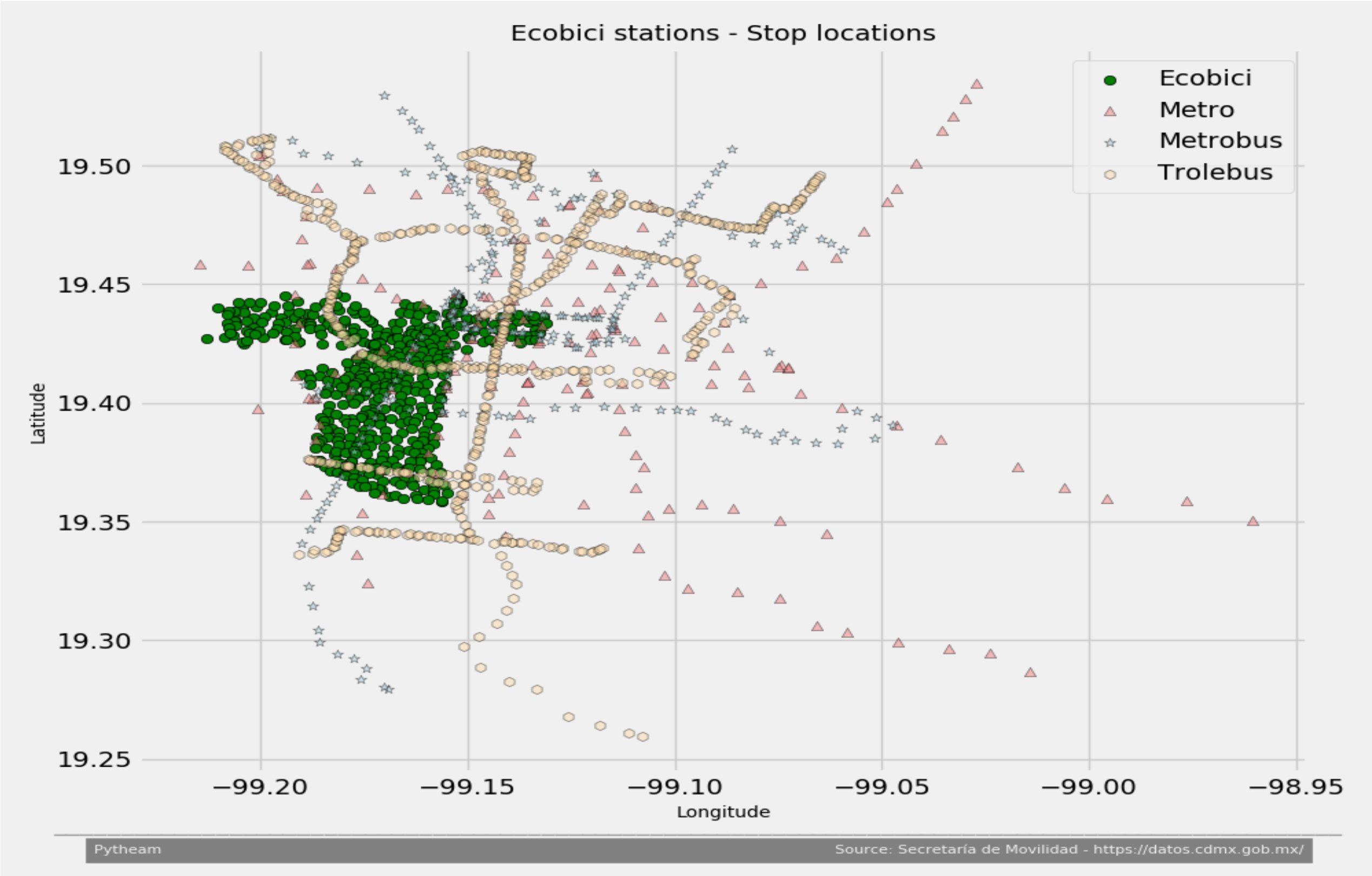
System	Stops
Transporte Colectivo - Metro	195
Metrobus	234
Transporte Eléctrico – Trolebus	596
Other	4,996
Transporte Unificado de la Ciudad de México	6,021





How ECOBICI complements Public Transportation System

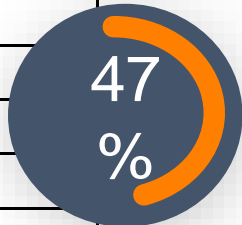
Walking distance from bike stations to public transportation stops



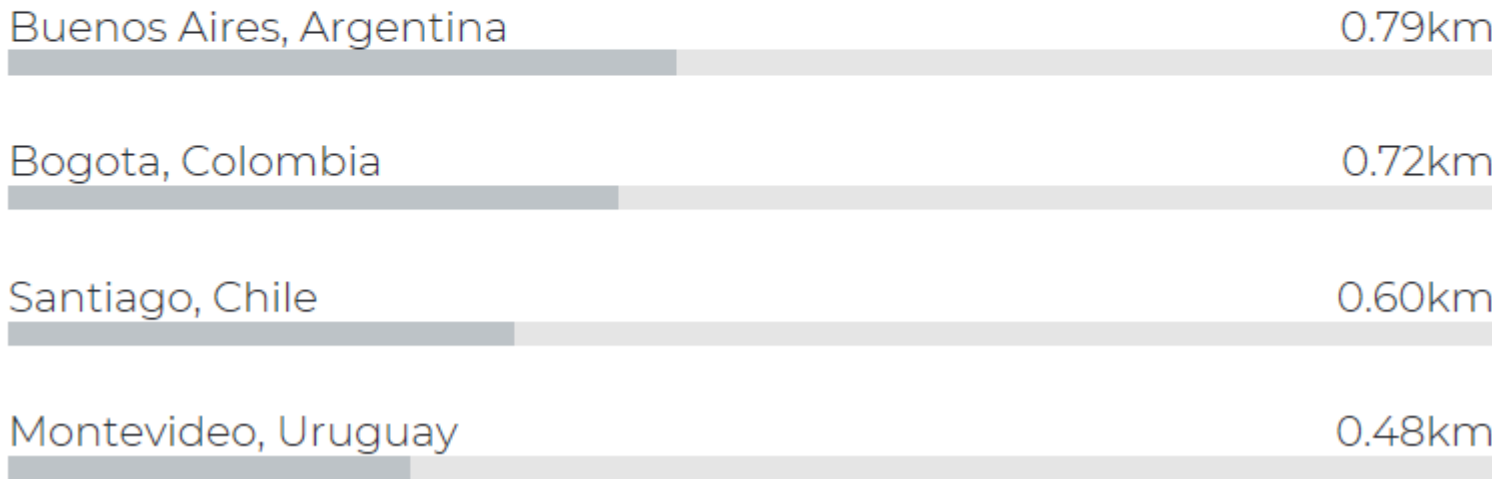
Municipality	Approx. walking distance 100 meters from	Ecobici stations
Benito Juárez	Metro stop	6
	Metrobus stop	3
	Trolebus stop	18
	Subtotal	27
Cuauhtémoc	Metro stop	7
	Metrobus stop	26
	Trolebus stop	4
	Subtotal	37
Miguel Hidalgo	Metro stop	1
	Metrobus stop	1
	Trolebus stop	3
	Subtotal	5
Total		69



Municipality	Approx. walking distance between 100 and 200 meters from	Ecobici stations
Benito Juárez	Metro stop	13
	Metrobus stop	22
	Trolebus stop	39
	Subtotal	74
Cuauhtémoc	Metro stop	26
	Metrobus stop	69
	Trolebus stop	30
	Subtotal	125
Miguel Hidalgo	Metro stop	5
	Metrobus stop	3
	Trolebus stop	19
	Subtotal	27
Total		226



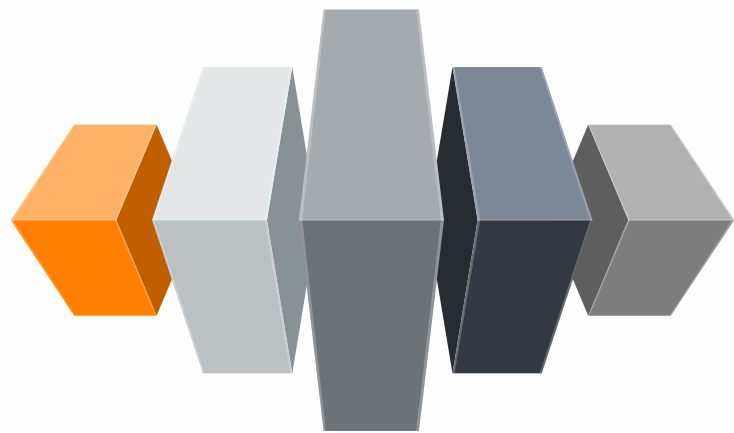
1.01km



Daily average distance people walk by trip

Source: <https://moovitapp.com/insights>

AVAILABILITY



February 2019 data

User age	
mean	35.12
min	16
Max	92

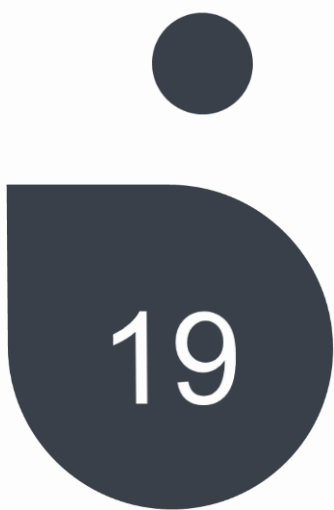
Gender	Trips	%
Male	510,546	75
Female	173,469	25
Total	684,015	

Trips	684,015
Bicycles used	6,073
Departure from	477 stations
Return to	477 stations
The departure station with more trips was	271 Av. Jesús García - J. Meneses, Located in Buenavista, Cuauhtémoc with 7,232 trips. 25% of those trips to stations located in Juárez suburb, 16% to stations located in Cuauhtémoc suburb, and 9% to stations located in Tabacalera suburb

Departure from	Trips	%
Cuauhtémoc	404,216	59
Peak Hours: 6-10	119,991	
Peak hours: 12-16	119,118	
Peak hours: 18-22	112,604	
Non Peak hours	52,503	
Benito Juárez	140,397	21
Peak Hours: 6-10	43,285	
Peak hours: 12-16	38,373	
Peak hours: 18-22	40,999	
Non Peak hours	17,740	
Miguel Hidalgo	139,402	20
Peak Hours: 6-10	37,870	
Peak hours: 12-16	39,824	
Peak hours: 18-22	41,104	
Non Peak hours	20,604	
Total	684,015	

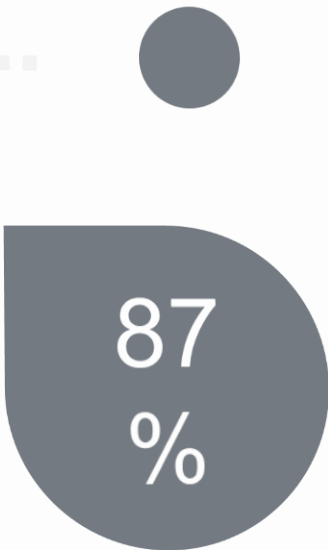


trips per bike daily



Bikes per 1000 residents

In service area

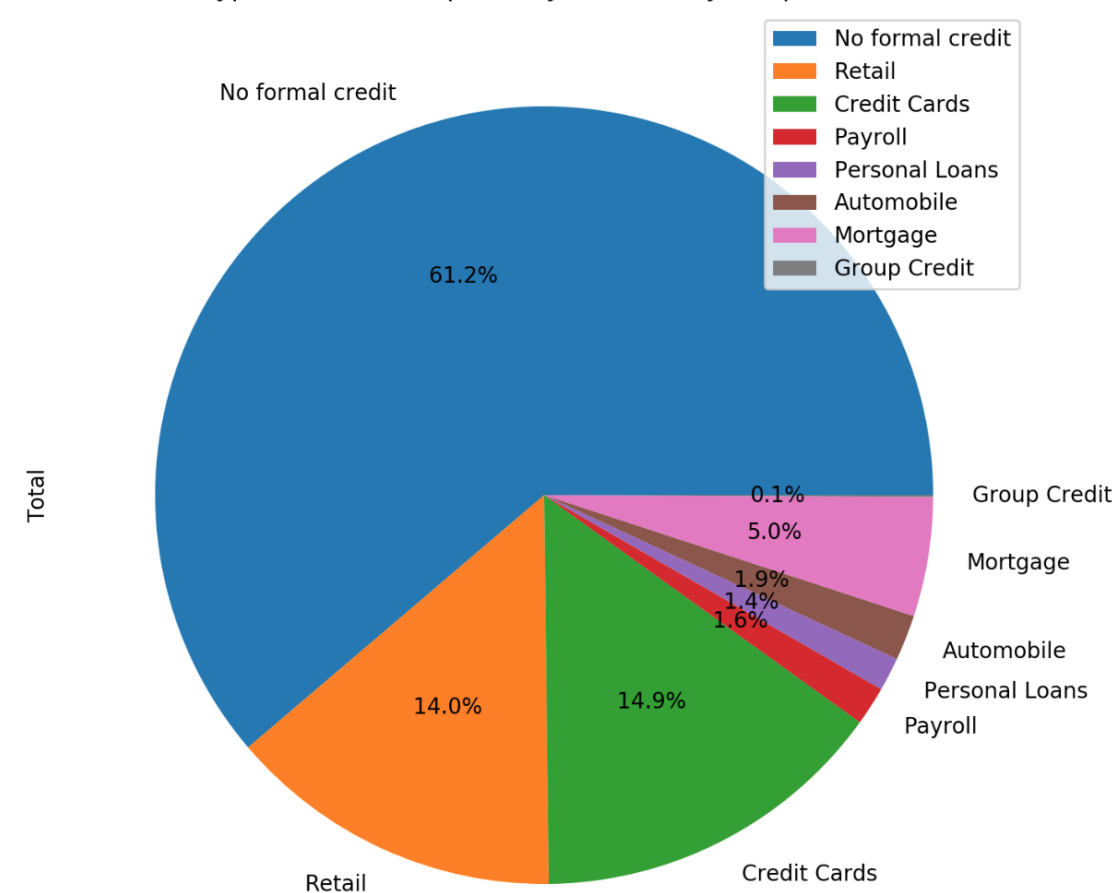


Trips in peak hours

Is ECOBICI an accessible system?

- Easy enrollment
- Method of payment – accessible for low income
- Population
- Inclusion

Type of Credits acquired by Mexico City's Population



Source Encuesta Nacional de Inclusión Financiera (ENIF)
2018/INEGI



Sources
United Nations Development Program/ INEGI / Lamudi catalog



Subscription Requirements

Valid ID (national and international)

Credit/debit Card

WEB or In-Person enrollment



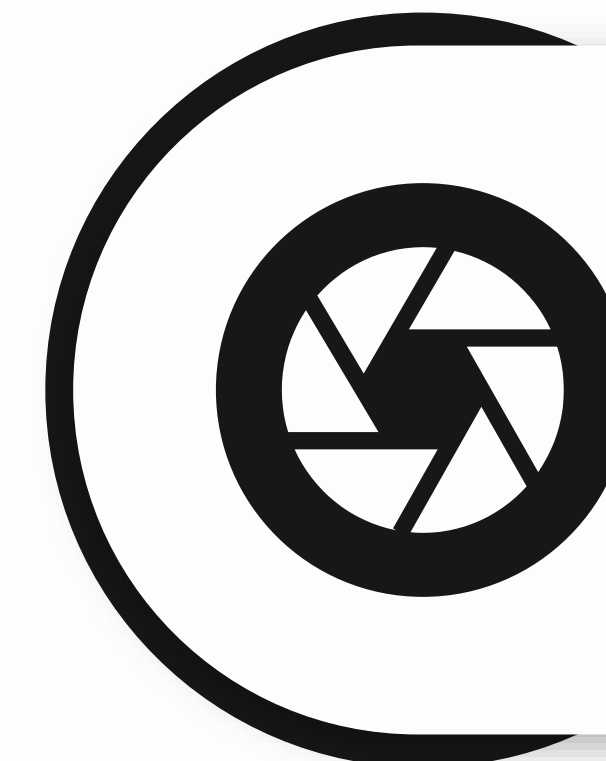
Price

Annual = \$24 usd

7 days = \$18 usd

3 days = \$11 usd

1 day = \$5.5 usd

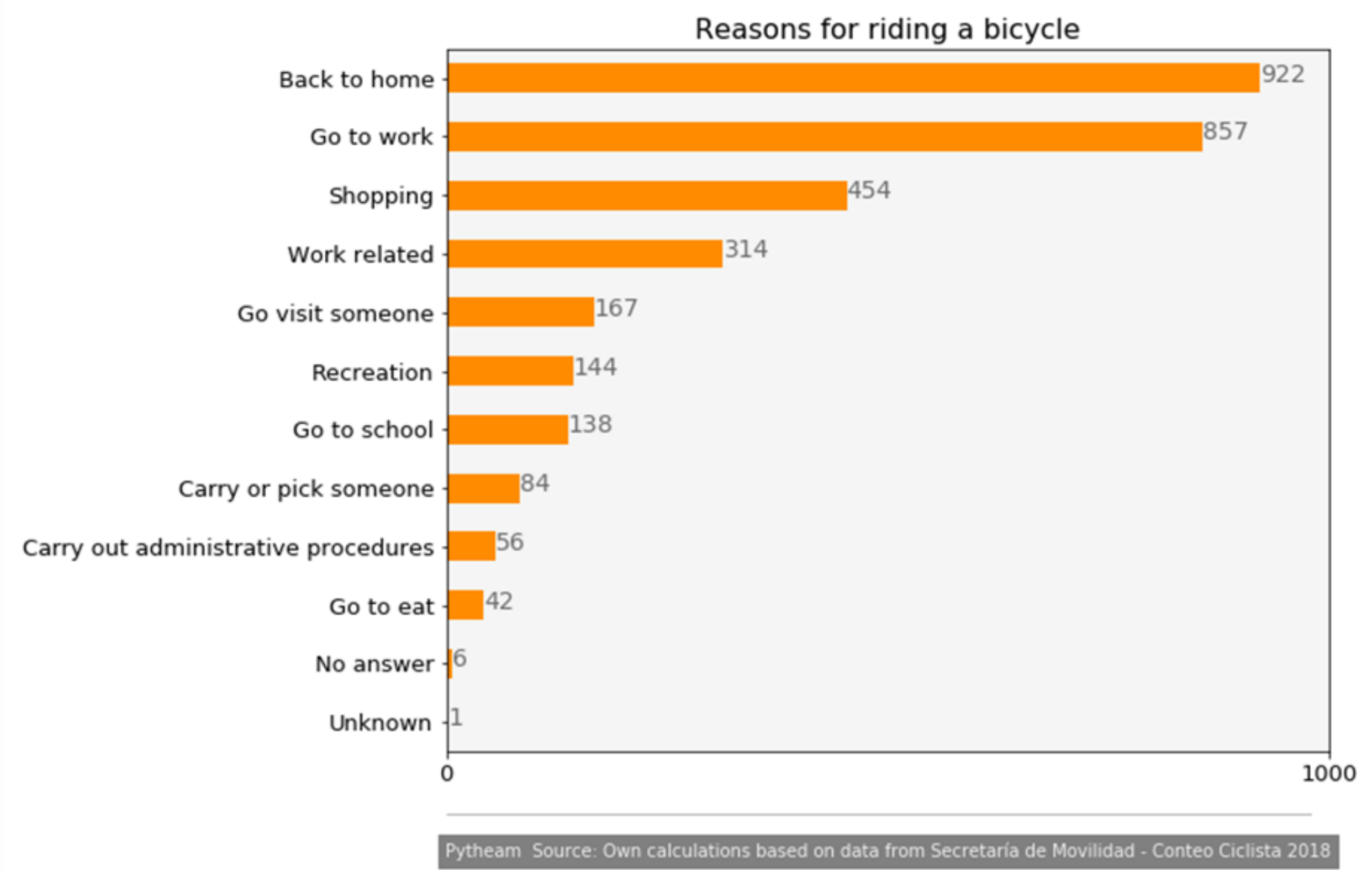


Inclusion

No gender restriction

No maximum age restriction

Available in zones in the list of the top 5 municipalities with the highest income in Mexico



From	To	Count
Home	Work	761
Work	Home	573
Work	Work	181
Work	Mall, store, market	84
Work	Other	82
Work	Another house	29
Other	Work	27
Work	School	19
Mall, store, market	Work	18
Work	Restaurant, bar, coffee shop	14
Another house	Work	11
Restaurant, bar, coffee shop	Work	9
School	Work	9
Work	Unknown	2
	Total	1,819

The 57.11% of 3,185 persons used the bicycle for work related activities

Cyclist Count Research

Source: Bicycle Mobility Study 2018

Riding own bike 9 / 10

Work/business related trips 6 / 10

Gender mix 83%Male/17% Female

Bicycle type	n
Own	2,968
Other	91
Ecobici	65
Mobike	39
V-Bike	20
Dezba	1
Unknown	1
Total	3,185



● Public Transportation

The installed bicycle infrastructure complements the existing public transportation network, but the coverage is very limited and centralized in only 7% of the total CDMX area

● Support to Economy

Efficacy was proved for the users in the service area. Although it benefits to the people employed by the 45% of the formal companies, it is necessary to extend the benefit to the whole population

● For the city residents Peak hours demand

The information shows that the main part of the trips are done in peak hours, however there is not information about the unsatisfied demand

● For the whole population

Requirements allow to access only to a minimum portion of the population.
2 of the 3 municipalities where ECOBICI is located are in the list of the high income of the country

Conclusions



DATA ANALYZED

Our Data Sets and Databases

IN CDMX

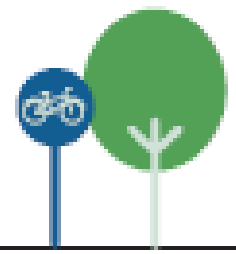
SOURCE	DATABASES	LINK
ECOBICI	Datos Abiertos, Estadísticas	https://www.ecobici.cdmx.gob.mx/es
DATOS ABIERTOS (CDMX)	Cicloestaciones	https://datos.cdmx.gob.mx/explore/dataset/estaciones-de-ecobici/export/
INEGI	Directorio Estadístico de Unidades Económicas	https://www.inegi.org.mx/app/mapa/denue/
DATOS ABIERTOS (CDMX)	Conteo ciclista	https://datos.cdmx.gob.mx/explore/dataset/estudio-de-conteo-ciclista-2018/information/

AS A COMPARISON-OTHER COUNTRIES

SOURCE	DATABASES	LINK
CITI BIKE NYC	Citi Bike System Data Citi Bike NYC	https://www.citibikenyc.com/system-data
ECOBICI-BUENOS AIRES	Recorridos realizados	https://datos.cdmx.gob.mx/explore/dataset/estaciones-de-ecobici/export/

TOD Standards

Transit Oriented Development



CYCLE NETWORK

Maximum walking distance to the safe cycling network is:

Less than 100 m



2
POINTS

Less than 200 m



1
POINT

200 m or more



0
POINTS



CYCLE NETWORK

100% of street and path segments are open and safe for cycling



2
POINTS

No building entrance is more than a 200 m walking distance from a safe cycling network segment



1
POINT

One or more building entrance are more than a 200 m walking distance from a safe cycling network segment



0
POINTS



Key features of cycle sharing systems

- A dense network of stations across the coverage area, with a spacing of approximately 300 m between stations
- Cycles with specially designed parts and sizes to discourage theft
- A fully automated locking system at stations that allows users to check cycles in or out without the need for staffing at the station
- Electronic tags to track where a cycle is picked up, the identity of the user, and the station where it is returned. The identity of the user is associated with that of the cycle to ensure security
- Redistribution of cycles to ensure availability of cycles and empty docking points
- Real-time monitoring of station occupancy rates through information technology (IT) systems, used to guide the redistribution and provide user information through the web, mobile phones, on-site terminals, and other platforms
- Pricing structures that incentivise short trips, helping to maximize the number of trips per cycle per day



Evaluating Performance

System Information and Performance Metrics

Institute for Transportation and Development Policy

Bikeshare System Information & Performance Metrics

City	Region	System Type	Operator(s)	Bike Type	Service Area (km²)	Service Area Population	City	Service Area Population as % of City Population	City Area (km²)	Population Density (persons/km)	Total Bikes	Total Stations (docked)	Station Density (per SA km²)	Total Dock (docked)	Docks per Bike	Bike Density (bikes per SA km2)	Bikes per 1,000 Residents (in SA)	Average Daily Trips (peak month)	Dil Trips per Bike	Trips per 1,000 Residents (in SA)
Guangzhou	AS	Dockless	Mobike, ofo, Unibicycle	Smart Bike	3,843	14,043,500	14,043,500	100%	3,843	3,654	800,000	--	--	--	--	208	57	4,000,000	5	285
		Docked	Guangzhou Public Bicycle Operation Management Co	Traditional																
Shanghai	AS	Dockless	Dockless Mobike, oBike, ofo	Smart Bike	6,341	24,152,700	24,152,700	100%	6,341	3,809	1,500,000	--	--	--	--	237	62	1,000,000	0.7	41
		Docked	Shanghai Forever Bicycle Co.	Traditionalz																
Tianjin	AS	Dockless	Mobike, ofo	Smart Bike	2,771	13,245,000	13,245,000	100%	2,771	4,780	300,000	--	--	--	--	108	23	N/A	N/A	N/A
Singapore	AS	Dockless	Mobike, oBike, ofo	Smart Bike	720	5,612,300	5,612,300	100%	720	7,796	30,000	--	--	--	--	42	5	N/A	N/A	N/A
London	EU	Docked	Serco	Traditional	111	1,287,842	8,787,892	15%	1,572	5,590	13,850	839	7.6	20,439	1.5	125	11	36,511	2.6	28
		Dockless	Mobike, oBike, ofo	Smart Bike																
Barcelona	EU	Docked	Clear Channel	Traditional & E-b	53	1,421,573	1,604,555	89%	101	15,824	6,000	465	8.8	10,240	1.7	113	4	38,230	6.4	27
Paris*	EU	Docked	Smoovengo	Traditional	155	3,117,628	4,146,722	75%	268	15,473	23,600	1,197	7.7	N/A	N/A	N/A	N/A	108,117	4.6	35
		Dockless	Mobike, Bike, ofo	Smart Bike																
Manchester	EU	Dockless	Mobike	Smart Bike	116	541,300	541,300	100%	116	4,678	2,500	--	--	--	--	22	5	N/A	N/A	N/A
Cologne	EU	Hybrid	nextbike	SmartBike	405	1,060,582	1,060,582	100%	405	2,618	1,450	23	0.1	36	0	4	1	3,700	2.6	3
Milan	EU	Docked	Clear Channel	Traditional & E-bike	53	1,368,590	1,368,590	100%	182	7,530	4,650	268	5	N/A	N/A	87	3	6,000	1.3	4
		Dockless	Mobike	Smart Bike																
Dublin	EU	Docked	JC Decaux	Traditional	15	120,598	553,165	22%	115	4,811	1,600	100	6.8	3,131	2	109	13	9,000	5.6	75
		Dockless	Bleeperbike	Smart Bike																
Minneapolis	NA	Docked	CycleHop	Traditional	82	239,744	716,049	33%	140	5,123	1,833	197	2.4	3,541	1.9	22	8	2,927	1.6	12
Washington, DC	NA	Docked	Motivate	Traditional	175	687,928	1,401,661	49%	444	3,157	3,700	440	2.5	8,169	2.2	21	5	13,291	3.6	19
		Dockless	JUMP, Limebike, Mobike eBike, ofo, Spin	SmartBike & E-bike																
Chicago	NA	Docked	Motivate	Traditional	238	1,433,915	2,821,962	51%	606	4,653	5,800	582	2.4	10,000	1.7	24	4	18,287	3.2	13
Boston	NA	Docked	Motivate	Traditional	77	535,586	912,832	59%	125	7,300	1,600	180	2.3	2,999	1.9	21	3	6,150	11	3.8
Boulder	NA	Docked	Bcycle	Traditional	18	37,810	108,090	35%	67	1,614	305	43	2.4	576	1.9	17	8	450	1.5	12
Madison	NA	Docked	Bcycle	Traditional	19	57,886	252,551	23%	244	1,037	350	44	2.3	493	1.4	18	6	600	1.7	10
Mexico City	NA	Docked	Clear Channel	Traditional & E-bike	54	334,806	8,918,653	4%	1,485	6,006	6,500	480	8.9	11,304	1.7	120	19	35,000	4.6	105
		Dockless	Mobike	Smart Bike																
Montreal	NA	Docked	BIXI Montreal	Traditional	213	801,877	1,944,394	41%	432	4,506	6,250	540	2.5	N/A	N/A	29	8	22,595	3.6	28
New York City	NA	Docked	Motivate	Traditional	129	1,771,173	8,537,673	21%	1,213	7,036	9,789	751	5.8	23,339	2.4	76	6	62,516	6.4	35
Atlanta	NA	Hybrid	CycleHop	Smart Bike	32	84,423	472,522	18%	347	1,361	500	75	2.4	709	1.4	16	6	464	0.9	5
Portland	NA	Hybrid	Motivate	Smart Bike	34	137,671	639,863	22%	376	1,702	1,000	119	3.5	2,050	2.1	29	7	1510	1.5	11
Seattle	NA	Dockless	LimeBike, ofo, Spin	Smart Bike	217	704,352	704,352	100%	369	1,908	8,000	--	--	612	0	37	11	2,711	0.3	4
Vancouver	NA	Docked	CycleHop	Traditional	22	175,154	631,486	28%	115	5,493	1,200	123	5.6	2,464	2.1	54	7	3,900	3.3	22
Dallas	NA	Dockless	LimeBike, ofo, Spin, VBikes	Smart Bike	999	1,317,929	1,317,929	100%	999	1,319	20,000	--	--	--	--	20	15	N/A	N/A	N/A
Rio de Janeiro	SA	Docked	tembici	Traditional	80	440,394	6,453,682	7%	1,221	5,286	1,100	239	3	3,300	3	14	2	4,065	3.7	9
Buenos Aires	SA	Docked	City of Buenos Aires	Traditional	50	945,636	2,890,151	33%	203	14,237	3,000	198	4	N/A	N/A	60	3	6,300	2.1	7