

# Barcelona Urban Mobility Masterplan

## 2006 - 2012

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Ajuntament de Barcelona

Mobility Services Department

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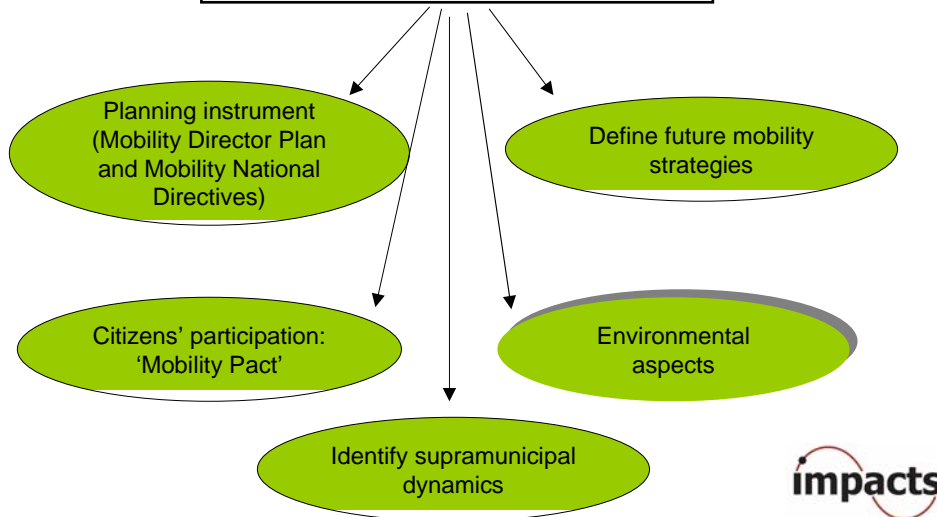


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## Barcelona Urban Mobility Masterplan: main features

### Urban Mobility Masterplan 2006-2012-2018



## Barcelona Urban Mobility Masterplan: background

Different frameworks:

International (Kyoto Protocol)

European (transport, energy, noise, air quality, etc)

National (Infrastructure National Masterplan, Energy Strategy in Spain: save and efficiency, Air quality Law, etc)

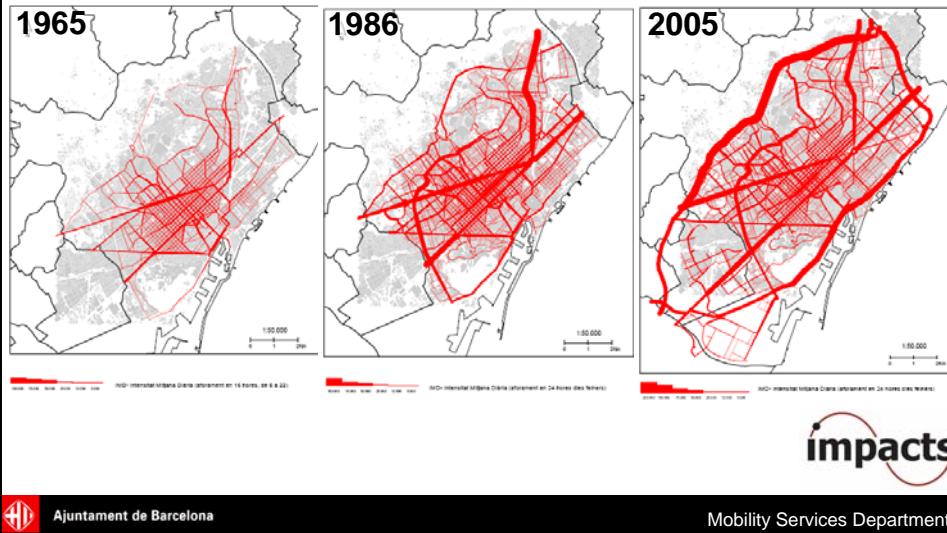
Regional (Mobility Law 9/2003, Energy Plan, etc).

Municipal (Barcelona Energy Plan, Agenda 21, etc)



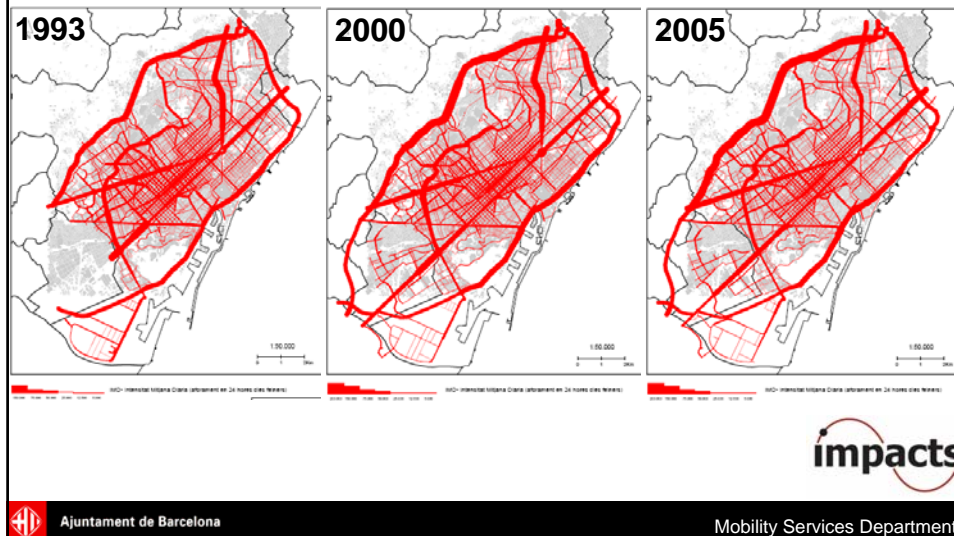
## Urban traffic flows 1965-2005

Heavy increases ...



## Urban traffic flows 1993-2005

... lower increase.

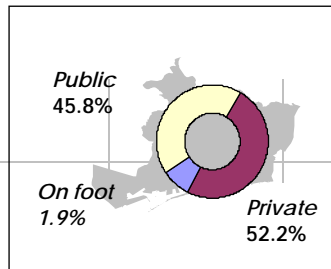
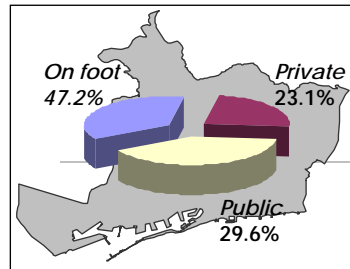


## Mobility tendency and future prognosis

### Current situation (2006)

### Base scenario

Mode of transport	Internal	%	Int/Ext	%	Total	%
Private Car	1.026.667	23,1%	1.335.601	52,2%	2.362.268	33,8%
Public Transport	1.314.000	29,6%	1.172.200	45,8%	2.486.200	35,6%
Foot and bicycle	2.094.208	47,2%	49.000	1,9%	2.143.208	30,7%
	4.434.875		2.556.801		6.991.676	



Internal trips: **4.434.875**

Int-ext trips : **2.556.801**



## Mobility tendency and future prognosis

### Future Tendency (2018)

Mode of transport	Internal	%	Int/Ext	%	Total	%
Private Car	1.298.871	21,3%	1.647.457	47,1%	2.946.328	30,7%
Public Transport	1.585.970	26,0%	1.774.553	50,7%	3.360.523	35,0%
Foot and Bicycle	3.207.137	52,6%	75.040	2,1%	3.282.177	34,2%
	6.091.978		3.497.050		9.589.028	

2.946.000 private car trips mean 20,8 million of veh-km/day, of which 24,5% will be done within congestion levels higher than 90% (13% in 2004)

**It's not sustainable in mobility and environmental framework!!**



## Mobility tendency and future prognosis

### Alternative A: Keep the current levels of congestion (Mobility Pact)

Mode of transport	Internal	%	Int/Ext	%	Total	%
Private Car	1.055.710	17,3%	1.363.714	39,0%	2.419.424	25,2%
Public Transport	1.810.132	29,7%	2.054.835	58,8%	3.864.967	40,3%
Foot and Bicycle	3.226.136	53,0%	78.501	2,2%	3.304.637	34,5%
	6.091.978		3.497.050		9.589.028	

- All new trips between 2006 and 2018 will need to be taken up by public transport or be done on foot or by bicycle.
- 525.000 trips would be transferred from private car to public transport.



## Mobility tendency and future prognosis

### Alternative B: Kyoto Protocol

We integrate the environmental aspects:

Total emissions CO2 < 1,15 Total emissions CO2 (1990)



Mode of transport	Internal	%	Int/Ext	%	Total	%
Private Car	889.705	14,6%	932.002	26,7%	1.821.707	19,0%
Public Transport	1.963.166	32,2%	2.481.281	71,0%	4.444.447	46,3%
Foot and Bicycle	3.239.106	53,2%	83.768	2,4%	3.322.874	34,7%
	6.091.977		3.497.051		9.589.028	



## Mobility tendency and future prognosis

### Alternative B: Kyoto Protocol

13.2 million of vehxkm would be done (20% less than 2006) and 9,4% of the network would be congested over levels higher than 90%.



**The necessary public transport supply to guarantee the new modal split (46% public transport) would exceed 2018**



## Mobility tendency and future prognosis

### Final Mobility Model

**Main goal: keep the current congestion levels of traffic network (2006) and the Kyoto Protocol performance**

#### Hypothesis:

- Increase the average occupancy of vehicles from 1,2 to 1,4 persons/vehicle.
- 120 g/km of CO2 average production in all vehicles fleet (the European Commission goal is to achieve 120 g/km of CO2 in new vehicles in 2010)



## Mobility tendency and future prognosis

### Final Mobility Model

Mode of transport	Internal	%	Int/Ext	%	Total	%
Private Car	1.129.720	18%	1.459.317	42%	2.589.038	27,00%
Public Transport	1.706.514	28%	1.937.317	56%	3.643.831	38,00%
Foot and Bicycle	3.276.435	54%	79.725	2%	3.356.160	35,00%
TOTAL	6.112.669	100%	3.476.359	100%	9.589.028	100,00%

✓ **The vehxkm/day would be 6% less than nowadays.**

✓ **Internal public transport trips should increase 30% (392.514)**

! **Internal-external public transport trips should increase 65% (765.117)**

➤ **Revision of the Infrastructure Director Masterplan (ATM-2006?)**

➤ **Revision of the Outskirts Train Masterplan (Adif, RENFE, FGC)**



## Barcelona final mobility model

### Strategic goals:

- **Safe mobility:** Reduction of number of accidents.
- **Sustainable mobility:** Reduction of mobility environmental consequences.
- **Equal mobility:** The right to mobility.
- **Efficient mobility:** Reduction of mobility as a necessity, optimising supply.



## Action Proposals

Action	FIELD							
	Pedestrian	Bicycle	TPC	Private vehicle	UMD	Road safety	Environment	Town planning
<b>1. SAFETY MOBILITY</b>								
<b>1.1 Action on users behavior</b>								
1.1.1 Invest on speed and safety control measures	X	X	X	X	X	X		
1.1.1.1 Insist on the strict performance of the obligation of protection systems use (crash helmet, seat belt and child retention systems) and promote its use.				X		X		
1.1.1.2 Continue the application of speeding control measures (radars, police)				X	X	X		
1.1.3 Offer specific training courses to 125cc motorcycle drivers				X		X		
<b>1.2 Improve on infrastructures and traffic management</b>								
1.2.1 Develop a progressive traffic pacification plan at the road network ("Zones 30")						X		
1.2.1.1 In case of secondary and local road network, it is necessary to apply new street design to favour non-motorised transport modes and to reduce the maximum speed to 30 km/h or less on coexistence areas.						X		
<b>1.3 Make a collection, an analysis and an accurate disclosure of the information about accidents</b>								
1.3.3 Based on the accidents reconstruction, develop research studies about accidents causes, redesigning the urban space to increase the road safety.						X		
1.3.4 Evaluate social costs related to accidents happened in Barcelona						X		
<b>2. SUSTAINABLE MOBILITY</b>								
<b>2.1 Reduce the greenhouse effect (performance of the Kyoto Protocol)</b>								
2.1.2 Increase the public and official transport vehicles fleet that use cleaner fuels than derived from crude oil fuels (gas, bio-fuels, etc)							X	
<b>2.2 Reduce the atmospheric contamination</b>								
2.2.1 Control annually the vehicle contaminant emissions (sulphur oxide, nitrogen oxide, carbon monoxide, COV, lead, PPS, fumes and ozone). Verify the performance of European rules.							X	
2.2.3 Consider ecological criteria on the municipal vehicles fleet renovation: emissions (gr/m), efficiency and use of bio-fuels.			X	X			X	
2.2.6 Introduce reverse discrimination measures to the cleanest vehicles on: restricted circulation areas (CA), access to some stops (public transport), parking, traffic restriction on cases of elevate contaminant concentration.			X	X	X		X	
2.2.8 Consider the "environmental capacity" concept on the city mobility planning.	X	X	X	X	X	X	X	X



## Action Proposals

Action	FIELD							
	Pedestrian	Bicycle	TPC	Private vehicle	UMD	Road safety	Environment	Town planning
<b>2. SUSTAINABLE MOBILITY</b>								
<b>2.4 Reduction of noise pollution</b>								
2.4.1.2 Use preferably "sound reductor" asphalt, specially on the basic network streets.							X	X
<b>3. EQUITABLE MOBILITY</b>								
<b>3.1 Guarantee a comfortable space for pedestrian and bicycles movement</b>								
3.1.1 Improve on pedestrian mobility conditions	X							
3.1.1.1 Check traffic lights with criteria that give the possibility to pedestrian to cross the street safely and comfort	X							
3.1.1.3 Offer gradually more motorcycle and moped parking out of the pavement, in order to lend to the elimination of pavement occupation. Creation of a "Area Verda" for motorcycles.	X			X				
3.1.1.4 Make projects of pedestrian specific signposting all over all the historic downtowns of city districts.	X							
3.1.2.1 Improve and develop a direct, safe, coherent and comfortable bicycle network that connect all the city interest point with different neighborhoods. Whenever doesn't exist this bicycle network, the road bicycle ride has to be consider.		X						
3.1.2.2 Increase the bicycle parking supply, on the public way, in public car parks and private car parks.		X						
3.1.2.4 Give a boost to potent bike-sharing network over the city ("bicing")		X						
3.1.2.5 Facilitate the combination between bicycle and public transport displacements, making parkings and bike-sharing points near the collective transport stations, to build an individual public transport system (ITS)		X	X					
3.1.2.9 Keep and make a constant tracking of the bicycle municipal register of Barcelona		X						
3.1.4 Keep watch on the performance and inform of the rights and duties of bicycles and pedestrians	X	X						
3.1.5 Reduce the number of parking spaces on the road and increase the parking space out of the road	X	X	X	X	X			
3.1.6 Commence the Orderly check of the porters that regulate the parking spaces construction so that tends to reduce or eliminate minimums and also tends to regulate maximums over certain levels, depending on the building use.	X	X	X	X	X		X	X





## Action Proposals

Action	FIELD							
	Pedestrian	Bicycle	TPC	Private vehicle	UMD	Road safety	Environment	Town planning
<b>3.1. EQUITABLE MOBILITY</b>								
<b>3.2. Improve on the access of reduced mobility people</b>								
3.2.2 Increase the accessible itineraries, introducing more traffic lights with acoustic signalling and reporting to interested groups	X							
<b>3.3. Increase the safety and autonomy of childs</b>								
3.3.1.3 Adapt the most popular itineraries between home and school for the Barcelona children, in order to increase the displacements on foot and by bicycle.	X	X				X		
3.3.2 Invest on safety measures around urban parks and leisure areas	X	X	X	X		X		
<b>3.4. Guarantee the right to mobility to the sectors that don't have private vehicle (specially young people and old people) and to the ones that don't want to make an abusive use</b>								
3.4.1 Invest on the public transport frequency improvement in the less served zones and increase the service timetables. Permanent suitability of the network to population needs			X					
3.4.1.1 Give a boost to the surface collective transport at "Zona Franca"			X					
3.4.2 Increase the underground network and tram network over the high demand zones that are not covered by the high capacity collective transport			X					
3.4.3 Audit periodically the measured and perceived quality of the TP services (comfort, information, safety, cleanliness, preservation, ...)			X					
3.4.4.1 Provide space for touristic buses parking			X					
<b>4. EFFICIENT MOBILITY</b>								
<b>4.1. Reduce the distances that are need to be covered to access to different urban uses</b>								
4.1.1 Include proximity criteria to the services and urban compactness to the city town-planning approach								X
4.1.3 Boost on night and silent UMD, specially in the food branch that traditionally suppose a daily distribution and very atomized					X			



## Action Proposals

Action	FIELD							
	Pedestrian	Bicycle	TPC	Private vehicle	UMD	Road safety	Environment	Town planning
<b>4. EFFICIENT MOBILITY</b>								
<b>4.1.0 Promote new strategies for UMD like "microplatforms" or the provide from centralized places (Sant Andreu)</b>								
4.1.1.1 Analyze the practicality of organize the loading and unloading operations on alternate days, timing or activity sectors, among other operations.					X			
<b>4.2. Optimize the private vehicle use</b>								
4.2.1 Institutionalize the car-pooling in the city in order to increase the average occupation of vehicles and decrease the traffic				X			X	
4.2.2 Forbid the circulation, in certain circumstances, of vehicles with one driver				X			X	
4.2.3 Boost the use of new technologies (GPS, GPRS/3G) to optimize the last service, besides of avoid them to operate without passengers			X				X	
<b>4.3. Reduce the displacement time, specially the congestion one</b>								
4.3.1 Boost the road information management and the collective transport modes information, on real time, to the user, to the own service and at the access	X	X	X	X	X			
4.3.1.3 Establish communication between the traffic detection systems and the traffic lights network, in order to improve on the traffic smooth flow through the traffic lights coordination and the activation of special plans to respond to conflict situations			X	X	X			
4.3.2 Create <b>sagregate axis</b> of collective transport and high occupation vehicles (VAD) on surface, at the access and at the urban road network.			X	X				
4.3.2.1 Improve the buses commercial speed (bus lane extension, traffic lights priority), but giving priority to this service over the main streets of the city			X					
4.3.2.2 Improve the connections between the train networks among them and with the rest of modes			X					
4.3.2.3 Boost and/or follow up the BUS-VAD lane construction to the main access of the city (B-23 between Molins de Rei and Av. Diagonal, C-58 between Ripoll and Av. Meridiana and C-31 between Badalona/St. Adria and Pl. Girona).			X	X				
4.3.3 Boost, create and improve on intermodal stations, both metropolitan and urban level			X	X				
4.3.3.8 Action PDI IN10 and XE18: Discussion parkings at FDC and Riera stations. Increase of the current capacity and location of new parkings. Give special importance to the connection points: Baixador de Vallvidrera, Les Planes and the crossroads point			X	X				
4.3.4 Promote the access improvement at the port, roads and rails					X			
4.3.5 Obtain the maximum benefit of the available infrastructures				X				
4.3.5.1 Apply technological improvements that permit maximize the public transport service frequencies			X	X	X		X	



## Action Proposals

### Outstanding actions

#### 1. To increase the private vehicle occupation rate

- Introduce BUS/VAO lane on the city accesses: B-23, C-58, C-32, ...
- Found reverse discrimination measures: Lower toll roads, exemption in front of possible restrictions (episodes of elevate contaminant concentrations, ...)

#### 2. To increase the public transport market share of the intern mobility

- PDI
- Proposals for the PDI revision

#### 3. To increase the public transport market share of the connection mobility

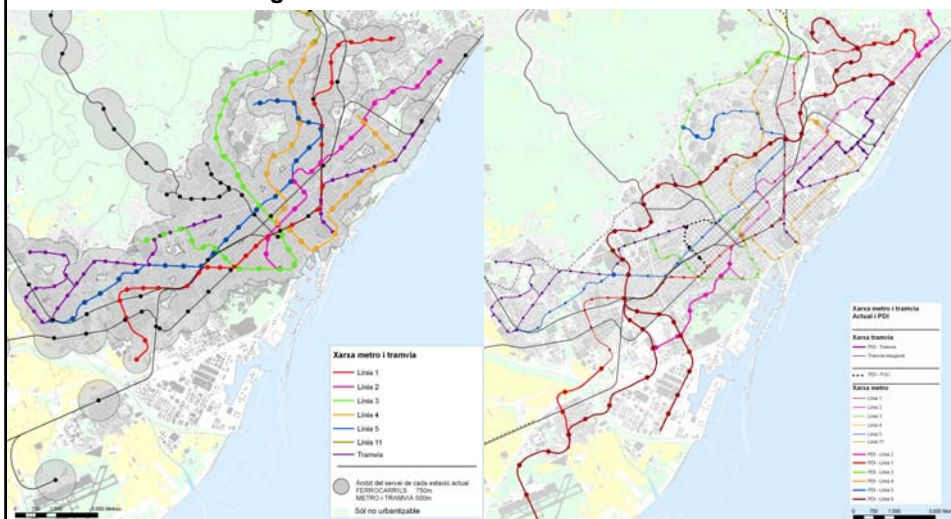
- PDI
- Proposals for the PDI revision
- Outskirts Railway Masterplan



## Action Proposals

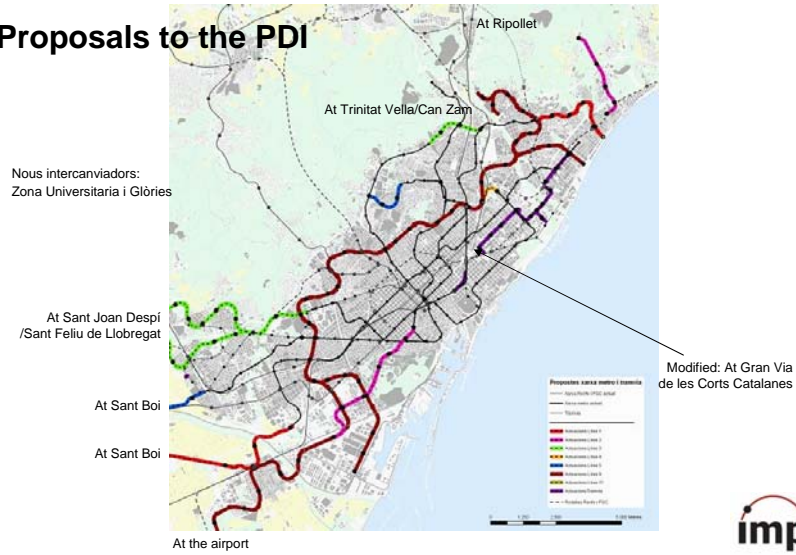
### Current mesh coverage

### PDI 2001-2010



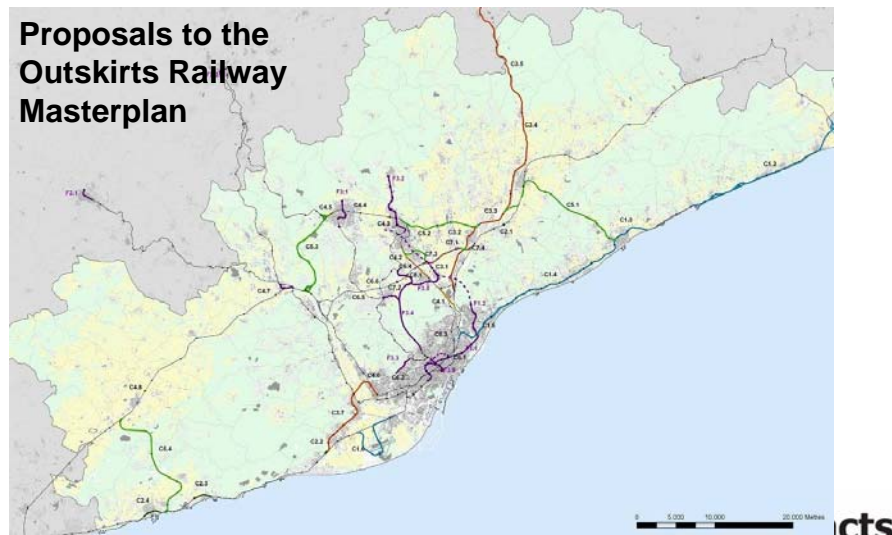
## Action Proposals

### Proposals to the PDI



## Action Proposals

### Proposals to the Outskirts Railway Masterplan



## Mobility Observatory

Sustainable Mobility Indicators		2000	2006	2008	2012		
Energetic consumption	Reduction of the energetic consumption (kg/citizen)		256	231	219	DNM	TERM
CO2 emissions	CO2 tones related to 1990		1,37	---	1,20	DNM	
Noise	% population who live within spaces with noise levels higher than 65 dbA		52%	52%	15%	DNM	
Higher levels of NOx, SOx, O3, solids and CO than the limits established	Days/year		45-77	35-68	according to law		TERM
Number of years of the bus fleet	Years	6,9	6,7	6,4	6,0		TERM

DNM: *Mobility National Directives*

TERM: *Transport and Environment Reporting Mechanism*

PEIT: *Infrastructure Transport Strategic Plan*



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## Mobility Observatory

Sustainable Mobility indicators		2000	2006	2008	2012		
% intramunicipal mobility on foot and bicycle	% intramunicipal on foot and bicycle/total trips	37%	47,2%	45,7%	49,9%	DNM	
% Intramunicipal mobility by public transport	% intramunicipal TP/total trips		30,3%	35%	34%	DNM	
% Intramunicipal mobility by private car	% intramunicipal PC/total trips	25%	23,1%	19,1%	22,4%		
% Intermunicipal mobility by public transport	% intermunicipal TP/total trips	41%	45,8%	48,1%	47,8%	DNM	
% Intermunicipal mobility by private car	% intermunicipal PC/total trips	64%	52,2%	43,5%	50,2%	DNM	
Bicycle network per citizen	m bicycle lanes/1000 citizens	68	79	208	195	DNM	
Bicycle network related to the traffic network	km bicycle lanes/ total length traffic network	8,4%	9,7%	21,4%	33,0%		

DNM: *Mobility National Directives*

TERM: *Transport and Environment Reporting Mechanism*

PEIT: *Infrastructure Transport Strategic Plan*



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