

EXPERIENCES IN OTHER EUROPEAN CITIES:

✓ Stockholm, Göteborg and Malmö (vehicles with more than 14 years are not allowed to circulate)

✓ Milan and Rome (traffic restrictions in city center)

✓ Londres (survey for the implementation of a LEZ)



OBJECTIVES

To achieve a reduction in inmission levels for PM_{10} , NO_x and hydrocarbons in the city areas with higher values. These values are normally encountered in city centers











ACCESS CONTROL

- Fixed points, in areas with high traffic intensity, mainly in LEZ access points
- Moving points, ramdomly located. They will be combined with traffic guards in charge of LEZ surveillance





ADDITIONAL ASPECTS

- To choose a name for the area allowing its clear identification
- To set up a schedule explaining traffic restrictions
- Communication and Dissemination Campaign on a municipal and regional basis



EMISSIONS REDUCTION

- It is the most beneficial measure out of this Strategy.
- It is a consecuence of the enormous reduction of new vehicles compared to the older ones
- It allows the assessment of the results of its implementation



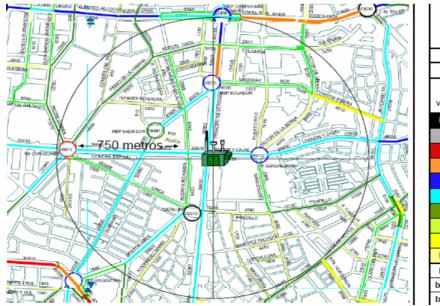






MAIN CARACTERISTICS

- Average speed of circulation used 27 km/h. This speed is taken from the software VMD 2003, property of Madrid City Council, Mobility Department
- Total length of city street network 4.500 km
- Knowledge of daily average intensity data of 1.142 km, by means of software IMD 2002
- The rest not registered, 3.358 km, corresponds to streets with low traffic intensity
- The number of km made per year is 14.363.260.000 km







IMPLEMENTATION OF LEZ

- At a first stage limitation to:
 - ✓ Heavy vehicles not complying with Euro 2 Norm
 - ✓ Taxis not complying with Euro 2 Norm
 - ✓ Ligth transport vehicles not complying with Euro 1 Norm













- ✓ Cars not complying with Euro 1 Norm
- \checkmark Revision of the criteria applied in the first stage





PROGRAMA COPERT III

- Each type of vehicle has different emission factors, what makes very complex the study of total emissions with different vehicles
- Estimation based on an "average vehicle" composed of a percentage of each type of vehicle. This percentage is proportional to its presence in the city (percentage data obtained by direct sampling in city street network)
- It means the withdrawal of 50.000 cars (aproximately 1.000.000 of entrance and exit operations), which means a 10 %
- Trip average distance 12 km
- A vehicle makes 15.000 km per year in trips to/from Madrid
- Temperatures used provided by National Institute of Metheorology (INM)





COPERT III MODEL RESULTS

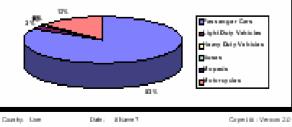
The results of the emissions of each one of the components of the "average vehicle" are obtained together with the total

NOx Emission Results

number of km run in the city

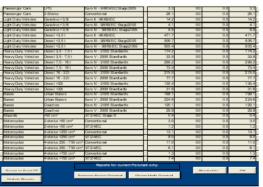
Sector	Hot [1]	Cold Start [I]	Total []
Passenger Cars	4 192	772	4.959
Same in e 4 1,4 1	400	138	525
Same in e 1, d : 2,0 i	100	222	1.045
Classes in a 2-2,0-1	218	81	267
Diesel 4 2,0 1	2 188	325	2 501
Diseasi > 2,0 1	435	11	4.77
199	10	1	10
All the state	28		25
Light Buly Vehicles	1227	174	1.511
Carso in e 4 3,00	10	1	27
Dimat 4 3/8 1	1.318	788	1.464
Heavy Duty Vehicles	1100	0	1 100
Densel 3 (8 + 2,8 +	23	1	204
Direct 2., 8 : 18.1	373		3.73
Diesel 16: 321	303		363
Dimari in 201	762	1	165
Bia ana	1175	0	1.13
Line e Blaze e	1.029		1.023
Coach we	760		152
Hopeda	0	0	0
10 m²			0
Notorcycles	51	0	54
And other 1910 and 7	4	1	
¹ and Child Constant and American States and Child Constant and Child Constant and Child Constant American Ameri	21	1	21
ini nin 2017/2017/2	U	1	17
ini nin 17 Ki es 1			0
Grand Total:	7.949	546	6 36

New receivable



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Pollutant: N0x							
Sector	Subwector	Technology	١Г	Total (t)			
				Urban	Runal	Highway	Total
Passangar Cars	Casoline < 1,4 I	BCE 15/00-01		83	0.0	0.0	5
Passongor Cars	Casoline < 1,41	BCE 15/02	П	9.2	0.0	0.0	
Passiangar Cars	Classifing < 1,41	BCE 15/03	1	35.6	0.0	0.0	3
Passongor Cars	Classifine < 1,41	BCE 15/04		177.9	0.0	0.0	17
Passion gor Cars	Caspine < 1,41	Euro I - 9 MANYEEC		236.5	00	0.0	23
Passenger Cars	Casoline < 1,41	Euro II - 94/12/EC	П	79.3	0.0	0.0	7
Passongor Cars	Classifing < 1,41	Euro III - 98/89/EC Stage20.00	1 🗆	80.8	0.0	0.0	3
Passion gor Cars	Case Ine 1,4 - 2,0 I	ECE 15/00-01		12.0	0.0	0.0	1
Passiangar Cars	Classifine 1,4 - 2,01	BCE 15/02		13.4	0.0	0.0	
Passonger Cars	Gasoline 1,4 - 2,01	BCE 15/03	H	28.9	0.0	0.0	2
Passonger Cars	Gasoline 1,4 - 2,01	ECE 15/04		240.8	0.0	0.0	24
Passongor Cars	Gaseline 1,4 - 2,01	Euro 1-9 1/441/EEC		429.2	0.0	0.0	42
Passiangar Cars	Gasoline 1,4 - 2,01	Euro II - 94/12/EC		148.9	0.0	0.0	14
Passion gor Cars	Casoline 1,4 - 2,0 I	Euro III - 98/89/EC Stagi20.00	H	174.2	0.0	0.0	17
Passion gor Cars	Casoline>2,01	ECE 15/00-01	1 1	4.4	0.0	0.0	
Passonger Cars	Casoline>2.01	ECE 16/02		21.8	0.0	0.0	2
Passion gor Cars	Case In e > 2,01	BCE 15/03		19.8	0.0	0.0	
Passongor Cars	CaseIne>2,01	ECE 15/04	H	19.5	0.0	0.0	10
Passion gor Cars	CaseIne>2,01	Euro I - 9 1/441/EEC		109.1	0.0	0.0	10
Passion gor Cars	Casoline>2,01	Euro II - 94/12/EC		32.5	0.0	0.0	3
Passiangar Cars	Caseline>2,01	turo III - 98/89/EC Stegi2000		80.1	0.0	0.0	8
Passangar Cars	Okean1 <2,01	Conventional	H -	33.2	0.0	0.0	3
Passangar Cars	Okese1 <2,01	Euro 1-9 1/441/EEC	1 🖿	220.3	0.0	0.0	22
Passongor Cars	Okean1 <2,01	Euro II - 94/12/EC		298.8	0.0	0.0	29
Passiangar Cars	Chesia1 <2,01	Euro III - 98/89/EC Etago2000		1907.1	00	0.0	540
Passongor Cars	Orease1 <2,01	Euro N - 9869/EC Stage 2005	H	541.7	0.0	0.0	54
Passongor Cars	Chese1 > 2.01	Conventional	1 -	33.1	0.0	0.0	3
Passangar Cars	Dese1 >2.01	Euro I-9 M44VEEC		78.5	0.0	0.0	7
Passargar Cars	Chesical > 2,01	Barts # -94/12/EC	-	921.4	0.0	0.0	9
Passongor Cars	Okean1 >2,01	Euro III - 98/89/EC Stegi2000	H	205.3	0.0	0.0	28
Paesenger Cars	UPG	Euro III - 98/89/EC State(2000	i H	85	0.0	0.0	



Madrid Área de Gobierno de Medio Ambiente y Servicios a la Ciudad



ESTIMATION OF ENVIRONMENTAL BENEFITS

- Aplication of model COPERT III to emissions calculation, metodology proposed for road traffic by the European Environmental Agency
- Reduction of daily average intensity values in the city: 10 %
- Enlargement and improvement of public transport
- Pollution reduction: especially relevant for nitrogen oxides, main goal of this
 Strategy
- Total reduction amount close to 8.000 tons

Pollutant	Emissions					
	2004	1 st Stage	2 nd Stage	Reduction (%)		
NO _X (t)	16.750	12.270	8.789	47,53		
CO (t)	96.431	91.985	82.477	14,47		
PM (t)	1.120	687	704	37,14		
CO ₂ (kt)	4.227,7	4.223,3	3.895,8	7,85		

