



Zero-emissions Building

European Green Capital Award 2016

5. Ambient air quality



EUROPEAN
GREEN CAPITAL

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European Commission



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Zaragoza
AYUNTAMIENTO

Spain

5. AMBIENT AIR QUALITY

5A. Present Situation

Describe the present situation in relation to ambient air quality, including any relevant disadvantages or constraints resulting from historical, geographical and/or socio-economic factors which may have influenced this indicator area. Topographical constraints should also be mentioned where relevant. Where available, information/data should be provided from previous years (5 – 10) to show trends.

Make reference to:

1. Number of days per year on which EU target value for ozone was exceeded (8h mean);
2. Number of days per year on which EU limit values were exceeded for PM₁₀ (daily mean);
3. Annual mean concentration of NO₂, PM₁₀ and PM_{2.5};
4. Assess the contribution from local sources and from long-range transport for annual mean concentration of NO₂, PM₁₀ and PM_{2.5}.

The weather of Zaragoza is characteristic of the Ebro Valley, with strong W – NW winds with a speed over 55 Km/h, and anticyclones alternating with instability front systems. This circumstance, with the population of the city, the presence of an important industrial sector and its situation as a logistic platform, has a direct influence on the air quality.

Nevertheless, thanks to the transformation carried out, Zaragoza has succeeded in obtaining a radical improvement in the air we breathe in the city.

Control Network of Air Quality of Zaragoza

Zaragoza has a model for predicting pollution, PRECOZ, allowing us to know the levels of immission that can be gauged in the different points of the city in a period of 48 hours, and compare them with the real data of the seven remote stations that form the CONTROL NETWORK opened in 1990.

The stations are placed according to the concept of agglomeration and microlocation required by EU Directives 1999/30/EC and 1999/62/EC. (graphic 1):

RENOVALES AREA

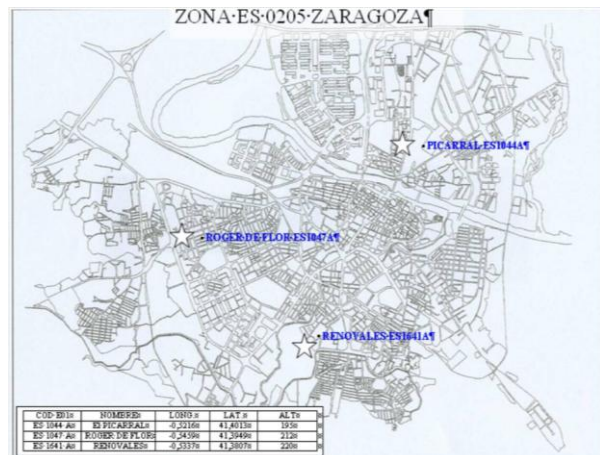
South of the city, **area of urban background level.**

ROGER DE FLOR AREA

City centre, **traffic area.**

EL PICARRAL AREA

North of the city, **area with industrial influence.**



Graphic. 1 Areas ES 0205 of Zaragoza

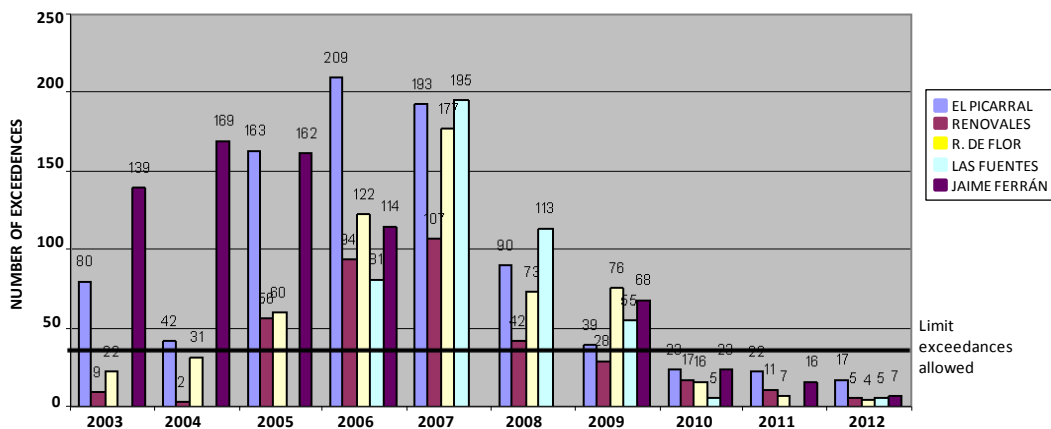
In order to know the general pollution levels of the city, the Control Network counts with other stations.

(1) The number of days where the levels of mobile eight-hour average of ozone was exceeded has increased in the last years in parallel to the fall in the levels of nitrogen dioxide registered (graphic 2).

Remote Station	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
El Picarral	-	-	-	-	-	-	4	-	2	2
R. de Flor	-	-	-	-	-	-	-	-	1	1
J. Ferrán	6	-	-	-	18	14	3	7	2	10
Renovales	-	-	-	-	23	4	14	7	3	3
Las Fuentes				-	13	-	2	1	35	28
Centro									2	8

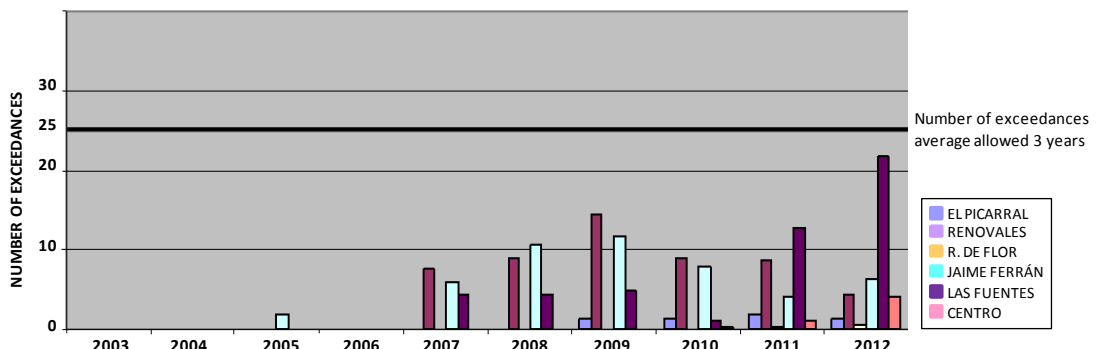
Graphic 2. Days when average ozone value is exceeded

Graphic 3 indicates that the objective value of the EU has not been overcome in any circumstance or year.



Graphic 3. Evolution in 3 years of the number of annual exceeding days of the threshold value of 120 µg/m³ of protection of the population against ozone in the last 10 years

(2) The number of exceeding days has been reduced from the year 2010, not exceeding the 35 days over 50 µg/m³ of average daily value allowed by legislation. The period with a highest figure corresponds with structural interventions for transforming the city that, once finished, have produced a lesser number of exceeding days, even under the allowed figures (graphic 4).



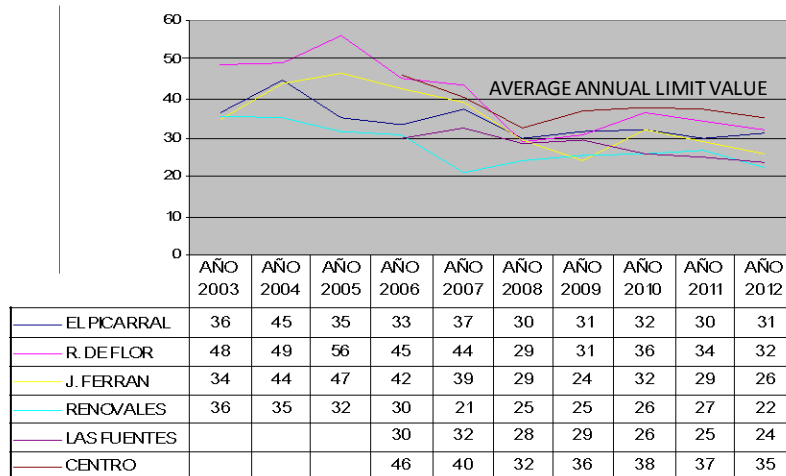
Graphic 4. Number of exceeding days by year of the daily average threshold value in particle matter PM10 in the last 10 years

This

tendency

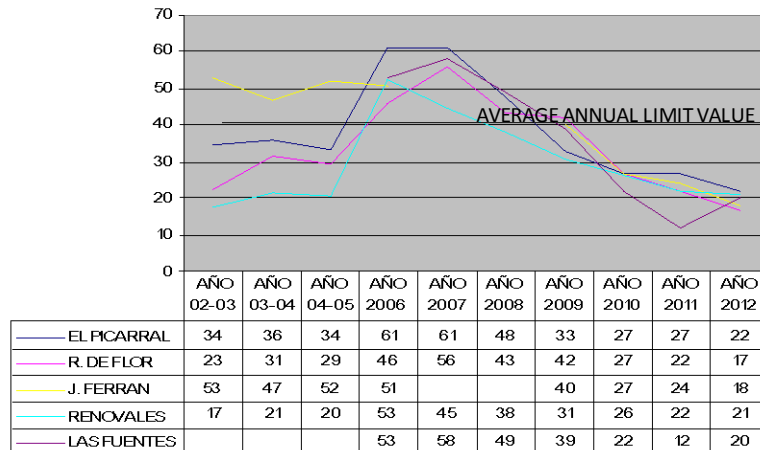
has continued during the last years with the introduction of measures related to industry and urban mobility. A tendency that is expected to continue in the following years.

(3) There has been a fall in the evolution of NO₂ (graphic 5). The annual average established in 40 µg/m³ has not been exceeded.



Graphic 5. Evolution of the annual average of NO₂ in the last 10 years

From the year 2008, It can be appreciated a fall in the annual average of PM₁₀ particles in the air, with immission values under the threshold, and approaching those indicated by the WHO (graphic 6).



Graphic 6. Evolution of the annual average of particle matter PM₁₀ in the last 10 years

A measuring system by the gravimetric method of the polluting element PM_{2.5} was placed in 2009. The annual averages recorded during this period are under what has been established by legislation: 25 µg/m³ (graphic7).

Annual Media PM _{2,5} µg/m ³	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Renovales							16	13	12	12

Graphic 7. Annual average of PM_{2.5}. µg/m³

(4) The fall experimented in the immission levels of air pollution during the last four years is mainly due to all the actions launched for improving ambient air quality.

- ✓ Industries (specially foundries and paper factories) have worked to improve its facilities, reducing pollution
- ✓ Compared to the year 2008, urban mobility replanning has produced a reduction in the use of private vehicles, with a 14.5% reduction in the use of private vehicles in entrance roads and a 28.3% in the city centre.

Zaragoza Strategy against Climate Change and for Air Quality, developed for several years, is and will be a tool for improving air quality in the city.

5B. Past Performance

Describe the plans and measures implemented over the last five to ten years for the improvement of ambient air quality. Comment on which measures have been most effective.

Particular reference should be given to:

1. *Existence and implementation status of an air quality management plan;*
2. *Local measures taken to improve air quality and quantify their effect on air quality;*
3. *Information to the public (both inhabitants and tourists) on air quality levels (e.g. web pages, information screens) in order to increase public awareness and behavioural change.*

Zaragoza has developed in the last ten years big structural changes that have provoked that, during different periods, the city has suffered the consequences of big works, producing higher levels of particles. Moreover, due to the complication of urban traffic in those periods and the increase in the number of vehicles, the levels of nitrogen dioxide also have occasionally increased.

But, once the big works in the city have been completed, the city recovers its calm and the immission levels recorded fulfill the quality goals of the European Union, and frequently, those recommended by the WHO.

In the industrial sector, the City has carried out an intense control on big factories, with a reduction of a 14% in emissions in the period from 1996 to 2005.

An Environmental Audit of El Picarral (very populated industrial district) was made in 2002 with the participation of the most important factory of the city north area. As a result, voluntary agreements between three important companies included in the *Catalogue of Potentially Polluting Activities* and the Municipality were signed, searching for the most adequate conditions for its activities in the heart of an urban district.

(1) An improvement on ambient air quality -both in its annual average values and in the number of exceeding days recorded in periods of a year and as it is shown in the above mentioned graphics- has been obtained thanks to the Action Plan for an Strategy against Climate Change and for Air Quality as well as the change experimented by the city.

(2) The closing of the ring roads has reduced the number of road trips of heavy vehicles in the city and also has produced a reduction of a 17.2% in the levels of nitrogen dioxide immission between 2006 and 2012.

The use of cycle tracks also favours city traffic and the use of bikes has increased.

The actions in the industrial sector previously mentioned and others related to noise and pumping were developed in two stages:

FIRM	Result stage 1 2002-2007	Result stage 2 2009-2011
SYRAL IBERIA, S.A.U. (antes TATE&LYLE)	Elimination of 95% of smell produced	
	Budget: 20,000,000 € 8,000,000 elimination of smell 12,000,000 System for reducing nitrogen oxide	Budget: 6,070,000 € 70,000 elimination of smell 6,000,000 Other environmental measures
S.A.INDUSTRIAS DE CELULOSA ARAGONESA	Reduction of more than 95% of nuisances produced by smell	
	Budget: 40,000,000 € 13,000,000 Elimination of smell	Budget: 3,000,000 € 3,00,000 Elimination of smell
TORRASPAPEL, S.A.	System of electrostatic filters, reduction of 97 % of particles	
	Budget: 11,000,000 € 3,000,000 Elimination of smell	

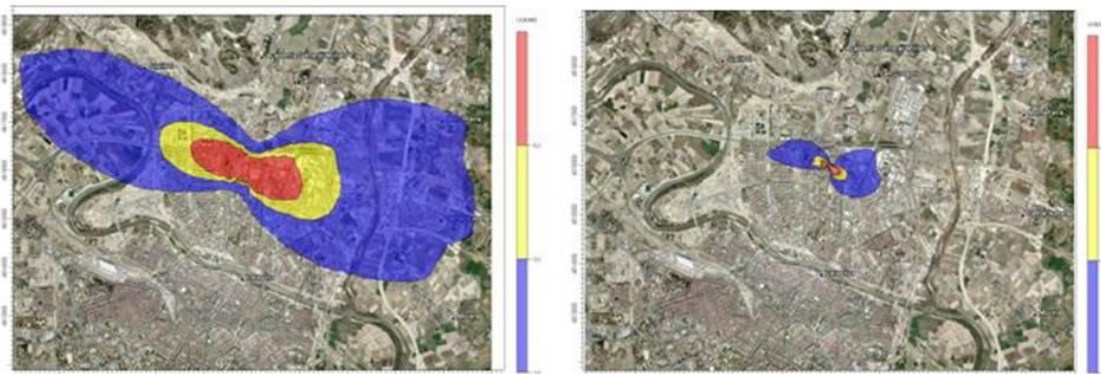
In the period 2002-2007, taking as a starting point the Environmental Auditory of El Picarral district and a survey made by Montañana rural district, actions were made producing a reduction of a 95% of suspended air particles.

Between 2009 and 2010, the *Map of Smells of El Picarral*, showing an important reduction in the intensity, frequency of perception and impact area of the smells produced, as well as a reduction of a 90% in the smells detected. New actions were carried out in 2011 to eliminate the slight residual disturbances and nuisances were not detected among the residents.

Moreover, the factory Celulosa Aragonesa has considered a dramatic reduction of smells, a reduction also in the emission of particles and other pollutants, and the improvement of the quality of dumping, all included in a project that will end in 2017.

The global budget for the plan is around 100 million euro.

The result of these actions is shown in the graphics 8 and 9. It can be observed the reduction reached both in the surface and in the intensity of the smells.



Graphic 8. Map of smell immersion 2000 – 2010



Graphic 9. Map of smell intensity (arithmetic mean 2009-2010) and future situation

(3) Zaragoza has daily information on the quality of the air through several media:

Press. Several local papers present a review of what has happened in the previous days in every measurement point of the control network

Information board. Placed in the city centre, it shows in a permanent way the data of the levels of immission in every measure point about every polluting element recorded during the previous day

Website of the City. It offers the daily average value recorded the previous day at every measure point, with information daily updated.

Public awareness is fostered by the Campaign of Environmental Education, from primary school to the university.



Graphic 10. Campaign of environmental

Therefore, the citizens know the data of the surveillance of the air quality made and receives information on the actions that can be implemented for contributing to improve air quality in the city.

5C. Future Plans

Describe the short and long term objectives for the future, proposed plans and the proposed approach and measures for their achievement. Quantify the effects of proposed measures on air quality.

Emphasize to what extent plans are supported by commitments, budget allocations, and monitoring and performance evaluation schemes.

The goal 2020 of Zaragoza is to reach immission levels under those recommended by the World Health Organization related to particles in ambient air, nitrogen dioxide and ozone.

Another goal of the city is to adapt its management of ambient air quality to the Directive 2000/50 transposed in the Royal Decree 102/2011 of 28 January, trying to get an improvement of the control indicators:

- ✓ Systematize the measurement of pollutants As, Cd, Ni and BaP, as indicated in the Annex 1, section 1, establishing the objective values for any of them
- ✓ Measuring of mercury in the atmosphere
- ✓ Replacement of analysers of nitrogen dioxide and particle matter in the control network
- ✓ Measuring of particle matter PM_{2,5} and benzene C₆H₆ in agreement with the minimal number of points of fix measurement determined in the Annex 4 for diffused sources, taking into account the number of inhabitants of the centers of population or urban areas
- ✓ Adaptation of different present-day measuring points such as that placed at Navarra Ave., and its replacing in the area of the Intermodal Station and/or the Actur district (Rey Fernando industrial area). The measuring point of Jaime Ferrán Str. is also put in another point of the same industrial area with appropriate characteristics to the indications of the Directive
- ✓ Updating of the system of public information in real time for showing the levels of immission of pollution in the city, as established by the Royal Decree 102/2011 on air quality.
- ✓ Updating of the inventory of the emissions map for its inclusion into PRECOZ system for the predicting pollution. Thanks to it and due to the structural changes made, the prediction produced by the system can answer strictly to the real situation of the city.

This fact has become evident in the last CIEMAT report on the maintenance works carried out in 2010 on the prediction system PRECOZ. During that year, different situations were presented in which the prediction made largely overcame in some moments the measurement made by the own analyzers of the remote stations, since the emission data incorporated in the system answer to a reality existing in the period 2004-2005 when the inventory of emissions was made. This situation is far away from the current industrial reality of our city, due to the improvement and change in this sector.

The transformation of the city has not finished yet, therefore a new zoning can be necessary. This idea is included in the present legislation on ambient air quality.

Zaragoza Strategy on Climate Change and Air Quality is planned to be developed until the year 2005. Every action foreseen focusing on a sustainable mobility within the city, a bigger efficiency of the municipal sectors, the introduction of renewable energies and investments in the industrial sector must be implemented.

5D. References

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