



EUROPEAN GREEN CAPITAL AWARD 2014

ZARAGOZA



Zaragoza
AYUNTAMIENTO

Ayuntamiento

Nombre del ayuntamiento: Zaragoza

Tamaño del Ayuntamiento (km 2): 968'69 km²

Número de habitantes del ayuntamiento: 701502 (2010)

Signatario del Pacto de los Alcaldes: Si

Nombre y dirección del Alcalde o Alcaldesa: Juan Alberto Belloch Julbe

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Green Capital Secretariat

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Mayoral Declaration on application for the European Green Capital Award 2014

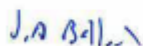
I, the Mayor of Zaragoza, Spain, hereby declare that Zaragoza has submitted an application for the European Green Capital Award for the year 2014.

I confirm that all information submitted in the application is true and accurate.

Yours sincerely,

Juan Alberto Belloch Julbe

Mayor of Zaragoza



Date: October, 11th 2011

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1. LOCAL CONTRIBUTION TO GLOBAL CLIMATE CHANGE

Question 1

Present details of the original and/or most recent Action Plan, including any relevant disadvantages or constraints resulting from historical and/or geographical factors which may have influenced this indicator area negatively.

(max. 1,000 words):

Include details of:

1. Total CO₂ equivalent per capita, including emissions resulting from use of electricity;
2. CO₂ per capita resulting from use of natural gas;
3. CO₂ per capita resulting from transport;
4. Grams of CO₂ per kWh used.

On 17 April 2009, the Government of Zaragoza endorsed the Inventory of Emissions 2005 and the [Strategy for Mitigating Climate Change and Improving Air Quality in Zaragoza \(ECAZ\)](#).

The strategy plan was based on the Emission Inventory 2005 that assessed the starting situation for issuing a diagnosis. There were two previous inventories made in 1991 and 1996. Basic conclusions were also drawn from a comparison study.

The equivalent CO₂ per person calculated in the E.I 2005 gave a figure of 2,814.60 tons, representing the 78.90 % of the total of equivalent CO₂. With equivalent tons we are referring to the emissions of these pollutant produced by fossil fuel combustion, emissions in which our objective and subsequent calculations for the strategy are based on. This figure makes no reference to equivalent emissions coming from the transformation of CO₂ into equivalents from the emission of other greenhouse effect gases.

After this analysis, the strategic map containing the approaches for the development of the ECAZ was prepared. This map has two global objectives, *reduce dependence on fossil fuels and improve air quality*, and five lines of action, *city model, mobility, municipal services, renewable energies and industry*, all of them under the corresponding transversal actions of legislative, taxation and participation and information for the citizens.

With this guidelines and results, it was established the general objective of the ECAZ that considers a global decrease of **CO₂ emission per inhabitant of 30 % for the year 2015**, representing an emission rate of 1.97 tons of CO₂ per person (in direct emissions) in relation to the figure calculated in the inventory.

The actions summarised in the following table focus on one or more of the five action fields planned for the strategy:

Energy saving: application CTE and Municipal Law on new housing
Power saving in housing restoration
Replacement of coal boilers (biomass and GN)
Replacement of gas-oil boilers (biodiesel)
Replacement of conventional lighting devices for low consumption devices

Energy saving: application CTE and Municipal Law on new housing
Plan for changing electrical appliances
Citizen habits
Voluntary agreements of companies
Energy saving
Control and public awareness measures
Sustainable mobility plan
Biofuel
Electric/hybrid/ hydrogen vehicles
Techniques for efficient driving
Transport plans for companies
Waste treatment
Carbon drains
Promotion of renewable energies

Many of the foreseen actions belong to one or more of the lines of actions but they are included in those that, due to quantity or exemplary nature, are considered to be more prominent.

One of the most important assessments of the ECAZ is precisely the interrelation between those action fields and the transversality of its working system: any of the organisms and sectors implied can contribute with devices for reducing emission in more than one of those fields.

It is important to point out that, being a strategy to improve climate change and air quality, certain actions produce a more important saving on the emission of pollutants apart from CO₂, being or not greenhouse effect gases, but affecting in a way or other the reduction of CO₂ emissions.

The transversality of the participation, legislation and taxation entails basic measures in all these areas. Environmental education is basic on citizen participation and information for the actions framed under the motto “*Everyone a little bit*” (“*Cada uno un poco*”).

- ✓ In 2010, 20,571 school children took part in programmes of environmental education under the motto “Stop CO₂” also addressed to any citizen.
- ✓ The guidebooks on good environmental practices were prepared in 2007 for the retailers and catering sectors in order to reduce environmental impact and boost a correct environmental management in small and medium-size firms: 8,000 shops and 5,000 hotels.
- ✓ In homes, the programme of environmental participation “Green Homes” boosts energy saving. In the last year, 296 families have obtained important consumption savings (8.51 % in electricity bills and 3.65 in gas).

The legislative measures comes from the endorsement of (4/2/2005) of an agreement for supporting and boosting *initiatives for developing tools and devices to reduce the emission of green house gases*.

Later on, a Municipal Law (12/4/2007) established the use of ecological fuels in vehicles owned by the Municipality and outsource companies.

The Municipal Law on Power Ecoefficiency and Use of Renewable Energies in Buildings and its Facilities,

was endorsed (24/7/2009) to improve the efficiency of domestic heating installations and boost the construction of bioclimatic buildings with the support of solar energy, after several years of researching and municipal stimulus.

Tax measures have been adopted with discounts for an adequate environmental behaviour in vehicles and power-drawn (50-75 %) or constructions, installations and works (till 30 % for biomass boilers).

The E.I. 2005 was carried out using CORINAIR methodology of the European Agency of Environment. The election was due to the idea of fixing a model of reference with a complex methodology that can perform a thorough analysis of emissions. It also makes a calculation for each of the 18 pollutants studied in the squares of 500 x 500 metres resulting from dividing the city. The complexity of this methodology does not allow technicians an annual updating of the inventory. Therefore, the next one will be carried out in 2015 for valuing the effect of ECAZ during its 10 years of existence.

In order to make it easier the annual updating of the emissions and allow specialists the analysis of the resulting trend, it was adopted in 2005 a decision to carry out calculations from direct consumption data, using a simplified methodology based on the emission factors of the IDAE. It has also been set out an important challenge to carry out a survey for studying magnitude variations obtained with both systems and analysing its cause, once completed a future inventory with CORINAIR methodology. After analysing 2005 data, it can be observed a certain imbalance between both methods.

In order to analyse emissions to the atmosphere and check the efficiency of the measures adopted, we begin with data from direct calculation in 2005.

CO ₂	Total emission /person	t equiv./person (natural gas)	t equiv./person (transport)	g/kWh
2005	4	1.26	1.45	1006.1

Question 2

Details of those targets achieved or not, to date (within the last 5-10 years). Provide a review of how both situations occurred and lessons learned. (max. 800 words)

With the direct calculation method of CO₂ emissions, we analyse the evolution of emissions during the five years of its implementation.

CO ₂	2005	2006	2007	2008	2009	2010
Emission total/person	4	4.13	4.24	4.2	3.78	3.7
t equiv./person (natural gas)	1.26	1.49	1.68	1.69	1.55	1.62
t.equiv./person(transport)	1.45	1.44	1.46	1.36	1.23	1.23
g/kWh	1006.1	1054.17	1105.27	1124.41	1041.59	1051.67

The general objective of the Strategy for Mitigating Climate Change and Improving Air Quality in Zaragoza, a *reduction of a 30 % in CO₂ emissions for the period 2005-2010*, sets out the intermediate objective of reducing a 10% of CO₂ emissions for the period 2005-2015.

It can be observed a downward trend in the total of emissions per person and those due to transport whereas the use of natural gas is increasing. As far as electricity is concerned, the rate of emission by kWh consumed per person is being reduced, mainly due to the high percentage of power coming from renewable sources (more than 70 %) in the composition of the energy mix of Zaragoza.

The annual evolution up to now of the emissions in the four series of values exposed (total, natural gas, transport and electricity), allows us to value the efficiency of the measures adopted to reduce emissions in general and CO₂ in particular, and establishes a first quantification for a half of the period of analysis.

% variation	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2008-2010	2005-2010
Total emission per person	3.23	1.89	-0.90	-10.27	-1.17	-11.32	-7.56
Emission natural gas	18.62	12.42	0.66	-7.92	4.37	-3.89	29.01
Emission mobility	-0.70	1.51	-7.20	-9.39	0.23	-10.12	-15.05
Emission by kW.h	4.19	4.22	0.67	-9.80	-0.58	-10.33	-1.98

It is fundamental for an analysis to take into account the International Exhibition on Water and Environment held in 2008. Expo 2008 has been an event that outstandingly increased the activity in the city during that year and in the years before the event, due to the implementation of important works that have supposed an important restructuring of the city and the slowing down of the results hoped for reducing the emissions by measures planned in the strategy. In 2008, the emissions reached its highest value.

We can observe a fall of a 7.56 % in CO₂ emissions during the period 2005-2010, going up to 11.32 % when analysing the period 2005-2008 due to the increase of activity in the city. This evolution shows us that we are in the good route to fulfil the objective marked for 2015.

Only when talking about mobility it is not 2008 but 2007 the year with the lowest CO₂ emissions, due to the special attention devoted to Expo 2008. Measures on mobility included an increase of metres of cycle tracks, the improvement of the bus lines and frequencies, new car parks, implementation of the commuting network and the Bizi system for renting bicycles, etc. All these projects were implemented in order to minimise the use of private cars. During the period 2005-2010, CO₂ emissions were reduced in a 15 %, a figure over what was foreseen in the strategy.

The emissions produced by natural gas, even though there was a fall in 2009, suffered a global increase, whereas in 2008-2010 there was a fall of 3.89 %. This effect is due, among other things, to the replacement

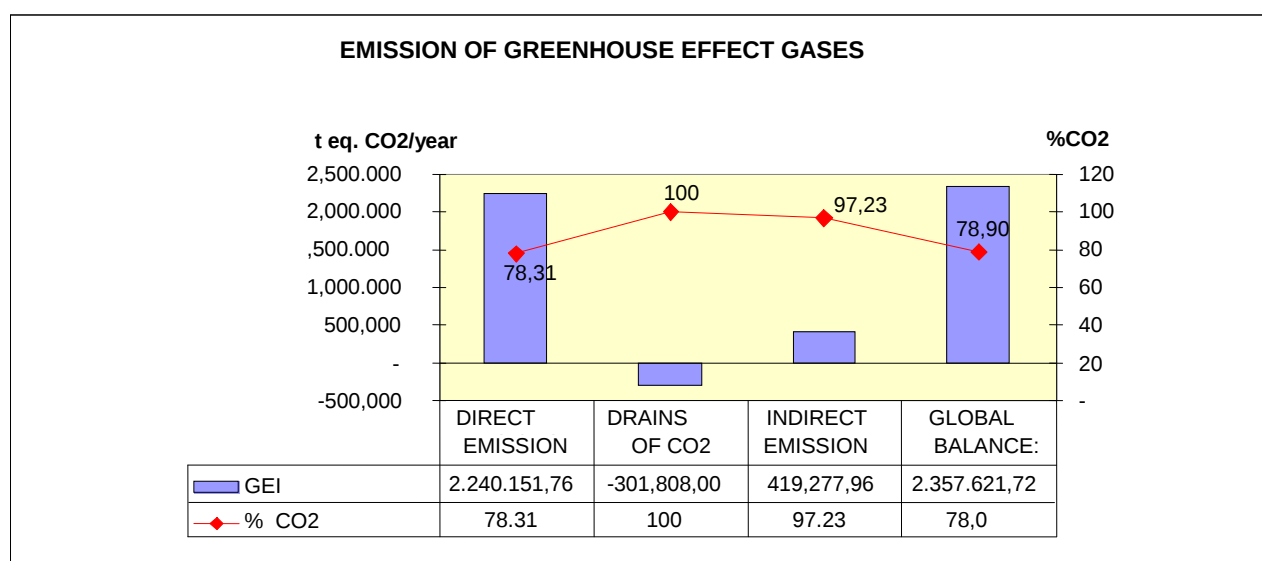
of coal boilers and many gas oil boilers for natural gas use. Apart from that, the Plan of Quality of Industrial Air, with an investment of nearly 100 million Euro in the period 2002-2017, includes actions to reduce the emission of particles among other pollutants, producing a change of fuel use -from fuel oil to natural gas- in a number of boilers.

With reference to electric power, the expected fall of emissions reached the objective foreseen for the year 2010.

Question 3

Plans to meet or revise key targets for the reduction of GHG emissions for the future and proposed approach to achieve these.(max. 800 words)

The Strategy for Mitigating Climate Change and Improving Air Quality in Zaragoza has planned the objective



of reducing emissions for the year 2015. Zaragoza is in the right track to fulfil this. All the foreseen actions have begun and will go on developing till its full establishment.

The degree of development of the actions and results are measured by the indicators of sustainability of the city as well as the results of those actions, measured by the Common European Indicator A2, local contribution to global climate change. The following graphic shows the data obtained in the Inventory of Emission 2005:

Book 18: Updating of sustainability indicators of Zaragoza 2010. Agencia de Medio Ambiente y Sostenibilidad

The Sustainable Mobility Plan, studied in the following chapter, is one of the pillars of the strategy. The actions foreseen continue to be developed and, among them, it can be stressed the tramway in the North-South axis. It is being also developed the second stage and its definitive launching will have an important impact in the decrease of emission in the city.

The Municipality of Zaragoza, through its municipal society Zaragoza Vivienda, has boosted during these years the establishment of bioclimatic criteria in the rehabilitation of new homes (Parque Goya and Ecociudad Valdespartera with more that 11,000). From then on, [the Municipal Law on Energy Ecoefficiency and Use of Renewable Energies in Buildings](#) and their Installations establishes as

compulsory the use of bioclimatic criteria in construction works.

As far as the business-industrial sector is concerned, it is being developed the second stage of the voluntary agreements of the big industries with the City of Zaragoza to implement important improvements related –in the majority of cases- with the quality of the air and energy saving. The investment of this Plan of Quality of Industrial Air is near 100 million Euro for the period 2002-2017.

These actions will be completed with other less important with a clear collaboration character. For example, forming part of the club of Meetings with Agenda 21 local, the pharmacy sector has been chosen to develop a programme of power saving for its characteristics (homogeneity, action agreed by consensus, etc) that make its application easier. The starting point is a study of environmental accounting that assesses the consumption of resources and the measures that could be applied to reduce it. The programme is free and implemented through a collaboration with the University of Zaragoza (Higher Polytechnic Centre). The students use their final degree work to give this service. Once established and valued, the idea is to spread this programme to other retailer sectors, adding efforts to mitigate climate change.

An educational project was launched in 2010 focusing on energy saving and for fighting against climate change in three referential districts on sustainability planning –ecociudad Valdespartera, introduction of rehabilitation elements –Picarral district (both forming part of the European project Renaissance)-, and finally the bioclimatic buildings in Parque Goya. The project will be extended to the rest of the city.

The Municipality of Zaragoza participates in RELACS project “Energy efficiency in tourist accommodation” cofinanced and included in the Intelligent Energy programme of the European Union, aiming at the promotion of energy efficiency and renewable energies in tourist accommodation. The goal is to reduce power consumption in 1,500 MWh/year, the reduction of green house emissions in 1,000 t CO₂/year, and saving of 210,000 €/year through private investment of around 3.6 million €.

The installation of renewable energies is one of the most important bets of the ECAZ. The initial objective foreseen in the Strategic Plan of Zaragoza and its area of influence for the year 2010 –*Production of 400 wind MW in the surrounding of Zaragoza*- **has been easily overcome** with the installation of 712 MW of renewable energy in that year.

There will be a new goal for 2015, to have 850 wind MW and 30 photovoltaic MW of power in the year 2015, or in other words, ENERGY WITHOUT CO₂ for 2015: power for home consumption, public lighting, small shops, N-S tramway and the commuting line only will come from renewable sources.

Following the content and objectives of the ECAZ, the Government of Zaragoza endorsed on 11 November 2010 the *Strategy for Adapting to Climate Change in the City of Zaragoza*, EAZ. Apart from mitigating climate change it is essential to counteract the changes produced. After the endorsement by the EAZ, the goal is to pave the way for a strategy allowing Zaragoza to face successfully adaptation to climate change, removing or reducing the negative effects on health, resources and biodiversity, and contributing to boost economic and technological opportunities in the city.

EAZ measures are related to water saving and water quality, protection ecosystems, and specially the protection of health and safety of people, taking into account territorial planning, land uses and changes in lands uses.

The actions foreseen in the EAZ are beginning to be implemented, and on the other hand a participatory process for establishing new goals for 2020 has been launched.

More information:

www.zaragoza.es/ciudad/medioambiente/atmosfera/estrategia.htm

2. PUBLIC TRANSPORT

Question 1

Present details of the original and/or most recent Action Plan, including any relevant disadvantages or constraints resulting from historical and/or geographical factors which may have influenced this indicator area negatively including.

(max. 1,000 words):

1. Length of designated cycle lanes in relation to total number of inhabitants in the city;

Unit: Meters per inhabitant

'Designated' means for bicycle use only.

Please divide into:

- a) Physically separated, designated lanes along streets and roads
- b) Marked and signed only, designated cycle lanes on streets and roads
- c) Designated cycle lanes removed from road network (e.g. in parks, recreational trails)
- d) Other lanes for bicycle use (e.g. mixed with pedestrians; light motorized, buses, etc)

The third and fourth categories are optional information for qualitative evaluation and should not be counted in the total for the indicator.

2. Share of population living within 300 metres of an hourly (or more frequent) public transport service;

If the share of population living under 300 meter of an hourly (or more frequent) public transport service can not be provided from existing data, please make professional judgment, and provide additional supporting information.

3. Proportion of all journeys under 5 km by private car;

The indicator refers to number of trips (start to end), please inform the unit of the data if different.

Indicator should refer to city area as a whole, please inform if the delimitation is different (e.g. city centre area, entire region, population rather than area based, only commuting trips, etc)

4. Proportion of public transport classified as low emission.

'By public transport classed as low emissions', is meant share of buses in the fleet (owned or contracted by city or region) having certified lower emissions than present most stringent applicable EURO emissions standards (EURO V), for at least one of the pollutants NO_x and particulates, without any other pollutant is higher. Fulfillment of EURO VI is one possible measure of this.

Information about alternative fuel buses as share of fleet may be given for qualitative evaluation, but is not to be included in calculating the indicator unless the criterion is fulfilled.

Information about rail/light rail transport as shares of total public transport may be given for qualitative evaluation, but is not to be included in calculating the indicator.

1. Length of cycle tracks in proportion to the total number of inhabitants of the city.

In the last years the city of Zaragoza has devoted itself to the task of building cycle infrastructures separated from motor traffic in order to boost the use of the bike as daily means of transport.

The present length of cycle infrastructures separated from motor traffic (July 2011) is 104.145 km.

In the year 2003 Zaragoza had 13.780 km of cycle tracks whereas now the number is 104.145 km, multiplying nearly by 8 the existing network in only 8 years. It has to be pointed out that these data do not take into account the evolution of cycle tracks or green routes out of the traffic network.



On the other hand and in order to make bike circulation easier, it has been boosted the construction of independent lanes and in the year 2010 it has been implemented a measure limiting speed to 30 km/h in secondary streets, favouring cyclists safety in roads and avoiding the use of the pavement by them.

The result is a total of 783 streets that have been limited to 30 km/h with an average length of approximately 300 m and a total of **235 km of pacified or cyclable roads**. Those roads, even though are not exclusively for bikes, they are more safer thanks to speed limit.



Signposting in pacified roads

The typology used for building independent bike tracks in the last years has been a road track separated from traffic. The area has been obtained, in the majority of cases, eliminating a motor traffic lane. Separation consists of polythene pieces that make easier incorporations from the road and viceversa as well as a correct drainage of the street.

More information in <http://www.zaragoza.es/ciudad/viapublica/movilidad/bici>



Cycle tracks separated from traffic in calle Miguel Servet

Another measure that has contributed to increase bike trips in the city has been the launching of a public system of bikes for rent that has been consolidated as an alternative means of transport for the people of Zaragoza. The Bizi service was launched on 28 May 2008, weeks before the opening of the International Expo and had 30 stations and 300 bikes.

Presently, 30 new stations have been built, totalling a number of 130 stations and 1,300 bikes.

The average use of public bikes per day keeps very high levels in relation to other cities with similar systems. During March, the average use in working days has been 8 rides/bike (arriving sometimes at 9.5 rides/bike), an average over 10.5 rides/bike in spring (and even arriving till 12).

One of the characteristics that Bizi Zaragoza keeps from its creation is its decided bet on the bike as means of transport apart from urban leisure use.

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Bike rental

Cycle tracks isolated from the motor traffic network

With respect to cycle tracks isolated from traffic, in other words, routes in natural environments, parks and other municipal areas, we do not have exact data since there are innumerable places adapted to bike circulation in the city and within the municipal territory. Apart from all the urban parks in which bike riding is allowed, we can cite other routes such as:

- ✓ Zaragoza green ring
- ✓ Torrero hills
- ✓ Canal Imperial
- ✓ La Alfranca green route
- ✓ Gállego riverbanks
- ✓ Monzalbarba track

It is difficult to quantify the length of these routes but we can estimate it in **approximately 200 km** of bike tracks in urban and periurban areas.

Pedestrian routes has been kept stable in the last years allowing bike riding there. There is a total of **30.10 km of streets exclusively for pedestrians** where bikes are allowed to be ridden under determined conditions of speed, scale and traffic ([Municipal Law on Circulation of Pedestrians and Cyclists](#))

Traffic in one of the main thoroughfares of the old town – Paseo de la Independencia- will be considerably reduced with the opening of the tramway Line 1, since it will have only one track in each direction (currently it has 3+3). Besides, car traffic in calle Coso (between Plaza de España and Avda. César Augusto ,and Avda César Augusto between the intersection with calle Conde de Aranda and the Roman Walls will be forbidden, becoming **exclusive roads for tram, pedestrians and bikers**.



Recreation of the Roman Walls area with the tram

- ✓ **Population living 300 m away from a public transport with a minimum frequency of one service per hour**

In order to plan the restructuring of the urban transport lines arising from Zaragoza tram Line no 1 (North-South), a covering model for the present network taking into account different socio-demographic variables and population data for 2009 and the following years and covering data of the urban transport network was made in 2009.

Covering of population and use of the urban transport network: bus

	Area of influence from 0 to 100 m	Area of influence from 100 to 200 m	Area of influence from 200 to 300 m	Total
Population 2009	446,298	146,836	69,671	662,805
Population 2011	446,069	155,874	83,326	685,269
Use 2009	166,001	54,282	28,164	248,447
Use 2011	168,645	56,192	31,036	255,873

Covering of population and use (%) of the urban transport network: bus

	Area of influence from 0 to 100 m	Area of influence from 100 to 200 m	Area of influence from 200 to 300 m	Total
Population 2009	65,00%	21,00%	10,00%	96,00%
Population 2011	62,00%	21,00%	11,00%	95,00%
Use 2009	60,00%	20,00%	10,00%	90,00%
Use 2011	58,00%	19,00%	11,00%	88,00%

In other words, until 2009 a 96% of the population of Zaragoza was living less than 300 m away from an urban bus stop.

This percentage has slightly fallen in the year 2011, a 1% mainly due to the fact that the covering analysis was made on the present network in relation to the changeable distribution of population for the period 2009-2011. Presently, it can be taken into consideration that a 95% of the population lives less than 300 m away from an urban bus stop.

It can be affirmed that two of every three residents in Zaragoza is living less than 100 metres away from a bus stop: around 450,000 people.

The covering of the network measured in terms of its use also shows very high levels. Therefore, it can be said that the present network is a collective motor mode that can be qualified as "universal" public transport.

More information on urban transport lines in <http://www.tuzsa.es>

2. Percentage of private car trips of less than 5 km

Taking as reference the last survey on metropolitan mobility in working days of the City of Zaragoza, the number of trips made in the city was approximately 2 200 000 from which:

Nearly 1 255 000 were made on foot within the metropolitan area (57 %). But it must be pointed out that - above all when comparing with other urban places- that all the trips made on foot have been

- ✓ considered in the survey without taking into account its duration or motif (generally they are only considered those lasting longer than 10 minutes when they are not due to study or work (in this in case the 100 % is taken into consideration).
- ✓ 501,000 were made in a motor vehicle, including taxis (23 % of the total of daily trips), considering that all those trip are less than 5 km in length. The number of rides by taxi has been 12,911, therefore if we delete these trip for calculating the percentage there is only a variation of 1 %.

- ✓ The rest of trips are these: public transport with 369,000 (16.7 %) and others such as bikes, wheelchairs, ambulances, roller skates. 16,720 were made by bicycle, representing a 0.76 %

Modo de Transporte	Mun. Zaragoza	Resto CTZ	Total	Mun.Zaragoza % fila	Resto CTZ % fila	Mun. Zaragoza % col.	Resto CTZ % col.
A pie	1.254.923	91.157	1.346.080	93,2%	6,8%	57,1%	39,8%
Autobús urbano	345.997	2.813	348.810	99,2%	0,8%	15,7%	1,2%
Autobús barrio/rural	10.934	3.402	14.336	76,3%	23,7%	0,5%	1,5%
Tren regional/largo recorrido	1.233	172	1.405	87,8%	12,2%	0,1%	0,1%
Otros autobuses	10.839	5.802	16.641	65,1%	34,9%	0,5%	2,5%
Taxi	12.911	153	13.065	98,8%	1,2%	0,6%	0,1%
Coche conductor	363.455	89.627	453.083	80,2%	19,8%	16,5%	39,1%
Coche acompañante	94.931	21.254	116.184	81,7%	18,3%	4,3%	9,3%
Moto conductor	29.077	2.709	31.786	91,5%	8,5%	1,3%	1,2%
Moto acompañante	1.442	72	1.514	95,2%	4,8%	0,1%	0,0%
Bicicleta	16.720	4.140	20.860	80,2%	19,8%	0,8%	1,8%
Furgoneta/camión	6.592	1.901	8.493	77,6%	22,4%	0,3%	0,8%
Autocar de empresa	27.020	1.461	28.481	94,9%	5,1%	1,2%	0,6%
Autocar escolar	12.280	3.243	15.503	79,1%	20,9%	0,8%	1,4%
Silla de ruedas	1.408	114	1.522	92,5%	7,5%	0,1%	0,0%
Ambulancia	196	0	196	100,0%	0,0%	0,0%	0,0%
Autocar	615	168	783	78,5%	21,5%	0,0%	0,1%
Avión	0	33	33	0,0%	100,0%	0,0%	0,0%
Grúa	0	108	108	0,0%	100,0%	0,0%	0,0%
Patines	100	0	100	100,0%	0,0%	0,0%	0,0%
Tractor	154	105	259	59,6%	40,4%	0,0%	0,0%
Transporte adaptado	170	0	170	100,0%	0,0%	0,0%	0,0%
Coche empresa	479	61	540	88,7%	11,3%	0,0%	0,0%
Billete viaje programado	389	0	389	100,0%	0,0%	0,0%	0,0%
Autobús inauguración Ikea	235	0	235	100,0%	0,0%	0,0%	0,0%
Muletas	56	0	56	100,0%	0,0%	0,0%	0,0%
Kart	13	0	13	100,0%	0,0%	0,0%	0,0%
Otros	946	119	1.066	88,8%	11,2%	0,0%	0,1%
Ns/Nc	4.244	653	4.897	86,7%	13,3%	0,2%	0,3%
Totales	2.197.341	229.266	2.426.608	90,6%	9,4%	100,0%	100,0%

3. Percentage of public transports that can be qualified as "low carbon"

The fleet of buses of the company that operates urban transport in Zaragoza includes 338 vehicles, 11 of them giving service to Persons with Severe Reduced Mobility (PSRM), 4 tourist buses and the rest (323) belonging to the 38 existing lines covering the whole metropolitan area.

From the 38 lines there are 2 circular, 5 shuttles and 31 with service that can be call regular or considered as the rest of the network.

The transport network has a length of 628.6 km that is covered in 41.42 hours. In other words, the average speed is 15.2 km/h with 323 vehicles.

From the 11 vehicles giving service to the PSRMs, 9 use biofuel at 30 %; from those devoted to the Tourist Service, all of them use a mix combustion also with 30 % of biofuel, without being necessary a change of engine. From the rest of the fleet -323 vehicles-, 117 use a 30 % of biofuel and 70 % of gas oil.

On the other hand and referring to the level of emissions, the fleet has 70 vehicles that comply with the rule EURO V on emissions. They work entirely with B30. 26 units were bought in 2008, 35 in 2009 and 9 in 2010.

2 articulated and 20 conventional buses will be added to the fleet at the end of the year. They will surely be EURO VI, replacing vehicles with 14 years of service.

Also there is a hybrid bus on loan from Tata Hispano Tuzsa, urban transport operating company in Zaragoza. The aim is to experiment and evaluate hybrid technology as a means of ecological efficiency and environmental respect. The fuel cost savings is 30% and significantly lower emissions.

It has to be taken into account that several bus lines will be replaced by the first tram line of Zaragoza that is being constructed. This will reduce the kilometres of the present network, forcing the reorganisation of the rest of lines.

The new Line 1 also includes the construction of two car parks to reduce traffic of private vehicles in the city centre.

Moreover, in these times when there are 93 hybrid taxis Zaragoza, with a tendency to increase in this type of vehicle.

From the end of 2010 Zaragoza has 41 points for recharging electric vehicles in different places of the city. It can be also highlighted the recent launch of other 4 points included in the regulated parking contract in public roads allotted to a new concessionaire in October 2010 and that included it as an improvement.

Even though the number of vehicles in Zaragoza is relatively small, the city has made a real declaration of intent since the launching of this pilot experience, allowing it to keep on working for a sustainable city and a clean mobility.



Question 2

Details of those targets achieved or not, to date (within the last 5 - 10 years). Provide a review of how both situations occurred and lessons learned.

Particular reference should be given to the reduction of total transport volume and encouraging a shift away from transport by car. (max. 800 words)

Goals reached until now

As for **cycle mobility**, the use of bikes is producing a big change in the model of city and the number of citizens that use this means of transport is increasing, **nearly multiplying by 4** the number of ridings in only **four years (2007-2011)**. From a nearly negligible value appearing in the “Survey on Daily Mobility 2007” for bike rides (16,720) now we have approximately 60,000 every day.

The Municipality of Zaragoza is carrying out a decided bet to change the model of city used in the last times for a more sustainable and safe one using public transport and mainly the tram as well as other clean ways such as the bicycle but without forgetting trips on foot. Right now it is being developed the Phase 2 of tramline no 1. Phase 1 is already in service.



Tramline no 1. Stage 1 (2011)



Tramline no 1 (2013)

As for the promotion of non-motorized transports such as the bicycle, it is not enough to recommend its use but is also necessary to build the necessary infrastructures and adopt other measures that can be accepted by the citizen. Everybody must be able use ot for travelling in the city without risks and without annoying pedestrians.

Therefore, it has been developed a pack of measures for promoting and raising public awareness that, in parallel to the implementation of the infrastructures, are going to integrate the bike in the usual means of transport of the city.

An opinion survey has been recently made about bike habits in the city, carried out simultaneously in several Spanish cities that has given us interesting results about cycle mobility in the city and the way it is perceived by the citizens. This “Bike Barometer” has given us very interesting information such as the following one that shows the goals obtained in the last years.

- ✓ There is a 41.5 % of bike users in Zaragoza, in other words citizens that use the bicycle with a certain frequency.
- ✓ **Concretely, 9.8 % of the people surveyed use the bicycle nearly everyday, a 9.5 % at least one per week and a 7.4 % goes by bike on weekends. 8.8 % uses it sometime every month, and a 6.0 % with less frequency.**
- ✓ The percentage of daily users of bikes in Zaragoza is more than 3 points over the whole of Spain, even though the global proportion of users is similar.
- ✓ Nearly half of the people of Zaragoza (48.8 %) never or nearly ever rides a bike but they know how to do it.
- ✓ More than 500,000 citizens of Zaragoza know how to ride a bike (according to data of the National Institute of Statistics they are 564,207 people between 12 and 79 years old) (Municipal Register 2009)
- ✓ Nearly 300,000 people of Zaragoza own a bike for personal use
- ✓ More than 230.000 use the bike from time to time
- ✓ **Nearly 55,000 residents in Zaragoza ride by bike every day or the majority of days.**
- ✓ 69.2 % of the people of Zaragoza have at least a bike at home. Concretely 17.5 % has one, 22.3 % has two and 29.4 has three or more.

We are going to show graphically the evolution of cycling infrastructures in the last year. We can clearly observe the change of criteria adopted by the City and its clear bet on the implementation of infrastructures in the city centre. Bicycles must not only be a type of leisure but also a means of transport valid for any kind of trip, offering a safe alternative to private motorized vehicles.





Question 3

Plans to meet or revise key targets for the future and proposed approach to achieve these. (max. 800 words):

Refer to:

1. Reduction of overall demand for transport;
2. Reduction of individual motorised transport;
3. Promotion of less environmentally damaging modes of transport.
- 4.

Plans / future goals and strategies to be followed

In reference to **cycle mobility**, in 2010 took place the drawing of the Master Plan for Bicycles_for the period 2010 - 2025.

Zaragoza's White Book of the Bicycle details the promotion policy of the bike as a means of transport in our city. That policy must be comprehensive and promote the use of sustainable means of transports as a real alternative to the use of private motorized vehicles, as well as the acceptance by the citizen and the promotion of biking culture.

The Master Plan also presents how must be the cycle network of Zaragoza, revising the former plan (Plan of Sustainable Mobility 2006) where several chapters were devoted to the promotion of cycling mobility. The Master Plan not only focuses on the metropolitan area but also studies its surroundings and specifies the procedure for implementing the different types of cycling routes. It also includes a Strategic Plan for developing measures for the promotion and raising of public awareness that, in parallel to the construction of the infrastructures, can integrate the bicycle among the usual ways of transport used in the city.

Right now, the sectoral programs defined in the Strategic Plan that include the PDBZ (Master Plan of the Bicycle of Zaragoza) are being developed. Different and very important future actions included in the Strategic Plan can be highlighted:

The Plan includes in the infrastructures section:

Increase of the cycling network: the Master Plan for the bicycle proposes to make an inventory of the urban cycling networks and the periurban network of roads and cycling tracks (the data on km of cycling paths have not been checked yet) as well as the boosting of projects to complete the basic urban cycling network and the implementation of cycling tracks. It envisages a list of priority infrastructures which supposes **40 km**

more of independent tracks in the city. On the other hand, the Master Plan urges the correction and improvement of determined points of the network, keeping and conservation, reinforcement of the number of bike parks and the promotion of intermodality with other means of transport.

A section is also devoted to rules on road safety including guidelines for the spreading of the Municipal Law on Circulation of Pedestrians and Cyclists, introduction of protection measures against thieves and boost of optional insurance for cyclists.

With respect to education and promotion, the Master Plan emphasizes the implementation of activities for awareness and training as well as spreading initiatives as wells as promotion for society in general and determined collectives in particular.

For more information: <http://www.zaragoza.es/ciudad/viapublica/movilidad/bici/plan.htm>

The launching of the Barometer of the Bicycle not only has contributed with data and the effects of the bike integration policy carried out in the last years, but also has served to prove the potential of the bike in a city as Zaragoza in which rainfall is scarce and geography makes easy the use of non-motorized means of transport.

With reference to the launching of Line 1 of Zaragoza's tram, the reordering of the bus lines that are in competence and coincide with the tram line are being planned. The objective of this reordering is trying to get a complementary public transport network optimising the social and economic profitability of the service. The goal is that the new bus networks and tramline no 1 could obtain a figure similar at least to the present coverage of 300 m for the 96% of the population.

The degree of overlapping of the present bus lines with the tram in construction is a 29 %, which means that 11 bus lines coincide at least in a 40% of their route. Therefore, its suppression is being studied even though stretches not coinciding will be adjusted to the new bus lines representing a 32% of the demand.

There are 4 lines that not interact in any way with the tram line. With respect to the demand, these lines do not reach a 5 % of the total of bus trips.

Finally, 60 % of the lines forming the network (23 lines) must be reordered to "feed" the new way of transport or in other cases delimit its continuity with respect to its current route. From the point of view of the demand it must be said that it represents nearly two of the three trips made in public transport right now.

In principle and without having received yet the conclusions for the reordering of the 38 lines of the urban transport, the reduction of km of bus route will be considerable.

In the revision made by the PIT (Intermodal Plan of Transports/2006), Zaragoza urban roading has more than 13 km of bus tracks, most of them with only one flow direction. Nearly over 2 km of the roading has a two flow direction track (in other words, around 4 km of bus lanes). The buses have not the exclusive use of those lanes since taxis can use them when they are not occupied.

Zaragoza has several exclusive lanes reserved on the flow direction, favouring shorter trips by bus instead of using the private vehicles that must use longer alternative routes. This is the case of calle Conde de Aranda or Coso. The attached map includes the existing stretches of bus lanes, including details on the lack of

continuity and the scarcity of equipment on the global roads structure. One of the goals to reach with the construction of tram line no 1 is endow the network of bus lanes with a continuity and operational capacity that it has not right now. Therefore, the stretches of the current network should be connected and new stretches built.



The Zaragoza City Council has been recognized with the “Spanish Sustainable Mobility Week 2011 award”, organized by the Spanish Ministry of Environment, Rural and Marine Affairs within the celebrations of the European Mobility Week.

It has been awarded for these permanent initiatives:

- ✓ Implantation of Tramway, Line 1.
- ✓ Promotion of the bike as a mode of transport.
- ✓ Installation of electric vehicles charging stations in underground and ground parking lots.

Among all these measures, the jury has valued specially the support given to the use of the bike, a task where “Zaragoza is a leading city for this in Spain”.



Bus lanes year 2011

3. GREEN URBAN AREAS INCORPORATING SUSTAINABLE LAND USE

Question 1

Provide the percentage of green and water areas (public and private) and soil sealing in relation to the overall city area, including trends over the past five to ten years.

(max. 500 words plus map):

Add a map indicating:

- ✓ The proportion of areas located within the inner city / on city boundaries;
- ✓ The distribution across the city;
- ✓ Size of areas,
- ✓ Fragmentation;
- ✓ Soil sealing (m2) per capita.

Zaragoza is a compact city with a territorial model that includes, from a sustainable perspective, the city and its surrounding area . Its population is 701,502 people, with an extension of **96.868.8 ha**.



The consolidated urban land occupies 3.147.90 ha and non-consolidated urban land is 1.056,65 ha. The total surface classified as urban by the PGOU is 4.204.55 ha.

Delimited land for development –all mainly for residential use- has 79.97 ha. Non-delimited land for development for residential use is 1.427.32 ha, making a total of 1.507.29 ha, whereas 1.295.03 ha of the PGOU still in force is for non-delimited land for developing for productive uses. The total of land for development is 2.802.32 ha.

The group of General Urban Systems have 1.271.22 Ha and the General System for Development has 1.456.22 Ha. General System not for Development has 1.602.08 Ha. The total of General Systems established by the PGOU has 4.329.52 ha.

The total of previous land is 11.336.39 ha.

The remaining municipal land -85.532.41 ha is classified as land not for development.

Two very important supramunicipal projects have been approved related to land not for development of the PGOU currently in force: 1st Zaragoza Logistic Platform (PLAZA), and 2nd the Recycling Technological Park López Soriano (PTR).

Three rivers and the Canal Imperial de Aragón flow across Zaragoza. On their banks there is riverain forming some areas of special environmental interest and for citizens' leisure such as groves, abandoned meanders, lineal routes with trees, etc. These are the lengths of the rivers and the Canal Imperial:

River Ebro 32,510 m.

River Gállego 15,057 m.

River Huerva 13,831 m.

Canal Imperial de Aragón 41,341 m.

667 water ha (data from the IAEST given by J. Millán)

Zaragoza has 11.918,551 m² of green areas.

The spatial fragmentation of the parks and green areas is high in the zones surrounded by the third ring road. The rest are around the old town and the fourth ring road.

Question 2

Present details of the original and/or most recent Action Plan, including any relevant disadvantages or constraints resulting from historical and/or geographical factors which may have influenced this indicator area negatively.

(max. 1,000 words):

Including:

- ✓ The percentage of citizens living within 300m of public green urban areas,
- ✓ Percentage of green areas, water areas, residential areas, industrial / economic areas, mixed areas, brownfields (this will provide important background information on the character of the city and is not an evaluation criterion in itself);
- ✓ New developments: proportion of brownfield sites, densification in the inner-city or

- urban cores, on greenfields;
- ✓ **Population density in built-up areas in inhabitants per hectare (city area minus green and water areas);**
- ✓ **Population density for new developments in inhabitants per hectare.**

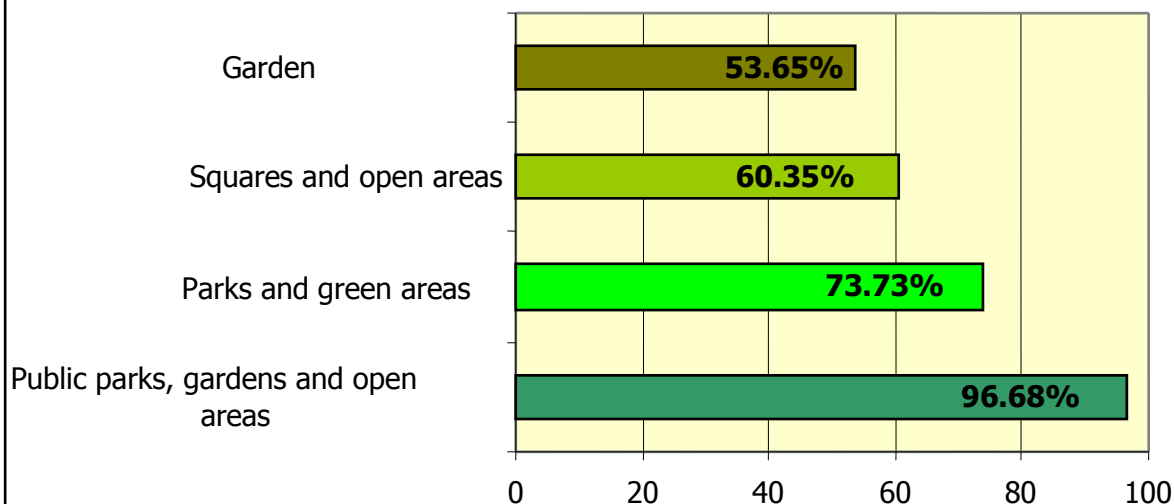
When approved the Agenda 21 Local, the common European indicators presented in the Summit of Hannover 2000 were incorporated. One of those indicators, A4, Availability of Green Areas and Public Services was considered to be compulsory and it was launched from the very beginning.

Agenda 21 establishes as one of its basic principles citizen participation and includes different organisations and associations taking part in the Sectorial Board of Agenda 21 Local and participates in the decisions and surveys made on sustainability.

The development of the above mentioned indicator was carried out by collaboration between the City of Zaragoza, the Department of Geography of the University of Zaragoza (an organ forming part of the Sectorial Board of Agenda 21 Local and expert on analysis of geographic information systems.

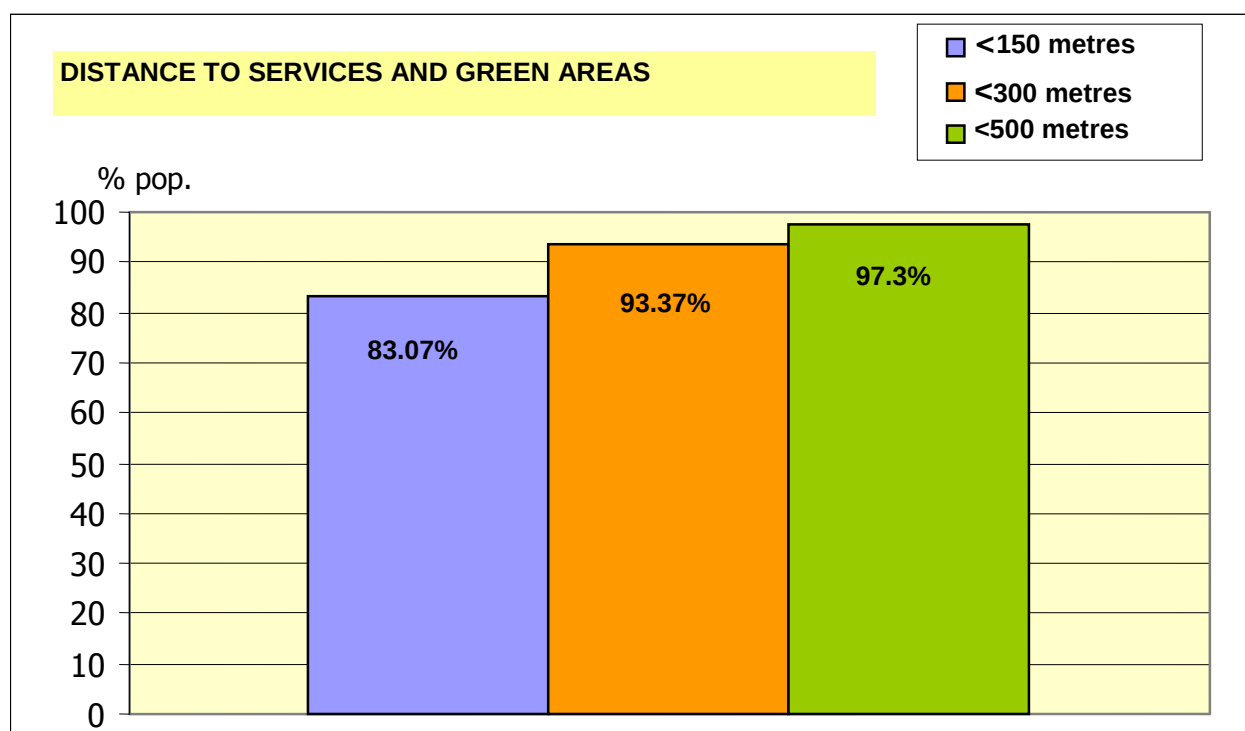
The survey se showed that in 2001 a 83.07 % of the population was living less than 300 metres away of public services and open areas in general. Referring only to public green areas, it can be said that a 96.68 % of the population is living less than 300 metres away from a green or open area, including gardens, sport areas, etc. Talking more concretely of parks and public green areas, the percentage is 73.73 %.

POPULATION LIVING LESS THAN 300 m. AWAY FROM GREEN AREAS AND OPEN ZONES



This survey offers an exhaustive and detailed information on concrete data for the different services or green areas.

Its updating has been made this year since it was necessary to establish a longer period because the city has suffered very important changes during the last years produced by Expo 2008 and other circumstances. Therefore, a period of adaptation was essential.



Density in built areas is 232 people/ha, considering also urban land without green areas. Density in new developments (Valdespartera, Parque Venecia,...) is approximately 210 people/ha and can reach 240.

Question 3

Details of those targets achieved or not, to date (within the last 5 - 10 years). Provide a review of how both situations occurred and lessons learned. (max. 800 words):

Make reference to:

- ✓ **Minimising the total area of derelict and contaminated land;**
- ✓ **Increasing or sustaining population density in built-up areas while protecting green areas and providing a high quality of life within densely populated areas;**
- ✓ **Renovating urban land and renewing urban design to make city living attractive and enable a more sustainable lifestyle (e.g. short distances to services and facilities reduce the transport demand and promote walking and cycling; multi-apartment houses save energy for heating, cooling, reduce infrastructural needs);**
- ✓ **Limiting urban sprawl by cooperating with the neighbouring municipalities;**
- ✓ **Integrating current and future changes such as economic growth, demographic or climate change through sustainable land use planning.**

Agenda 21 Local considers a compact and multifunctional model of city, boosting an efficient and adequate use of the systems included in energy consumption. Citizens must have their necessities covered without making long trips, producing a fall in the use private vehicles.

Measures for energy saving in buildings have been implemented in the residential, institutional and services sector. From 1998, there has been a bet on bioclimatic housing with 12,000 licenses. Today, all the dwellings of Zaragoza that pretend to obtain a license must comply with the guidelines of the Municipal By –Law on Saving, Efficiency and Use of Renewable Energies and Construction endorsed in 2008.

RENAISSANCE Project has reached energy saving in 616 new dwellings and 400 restored houses. Other actions have also been implemented such as the installation of green and/or solar covers, different projects of Sociedad Zaragoza Vivienda, etc.

As far as mobility is concerned, the Plan of Sustainable Mobility includes different actions:

- ✓ **Restriction of road traffic in the city centre: 40,522 m2 with preference for pedestrians and six areas 30**
- ✓ **Reinforcement of cycle tracks in the city centre (144 km) and creation of 152 km of cycle tracks for connecting Zaragoza with other municipalities of the metropolitan area.**
- ✓ **High capacity transport: commuting network, light train and tramway**
- ✓ **Construction of 15 new car parks, 44,000 places for residents and 15 commuting point**
- ✓ **Reorganisation of the bus network for coordination with high capacity axes, and construction of 40 km of urban bus lanes and 36.5 km for access to commuting point.**
- ✓ **Municipal By-Law 6 for mechanically-drawn vehicles : discounts for hybrid vehicles and vehicles energetically classified**
- ✓ **Reorganisation of the bus network. High-capacity axes and reinforcement of bus lanes.**

Talking about the industrial sector, this has been the most controlled sector in the last year by the Municipality of Zaragoza, especially in what we can consider as big industries. This tracking supported by

voluntary agreements carried out by the companies, has given positive result such as a 14 % reduction of the emissions between 1996, date in which the previous inventory and still in force, IE2006, was made.

The actions of the industrial sector were launched from 2002, with the Environmental Audit of el Picarral district for measuring atmospheric environmental quality of this district and extended later on to include the most important factories of the city.

The actions are fundamentally related to its productive process, including those related to waste dumping and noise, as well as the decrease of emissions to the atmosphere.

The Municipality of Zaragoza also makes specific inspections on the land where industrial activities have been developed and demand the implementation of remediation actions when industrial practises have produced alterations in land due to:

- ✓ Existence of rules forbidding dumping
- ✓ All the industrial areas are linked to the municipal sewage network
- ✓ The inspection made to check if the industrial activities are managed in an adequate way their waste and if they have the necessary equipment to reduce emissions and avoid dumping in its land
- ✓ Control of installation project in order to check that the production and storage facilities to prevent pollution.

It must be highlighted the relevance of the co-generation systems of these big industries. With more than 7,000 MW installed in Spain, Zaragoza has 339 MW of the 578 MW available in Aragon, being one of the cities with a biggest installed power from this system of energy production.

The model of city proposed by the PGOU and that is being developed now combines internal transformation, renovation and regeneration with different ways of lenght growth.

On the one hand there is the renovation plans for consolidated districts such as the Old Town, Picarral, Oliver, Arrabal and Delicias and others being planned. On the other hand the widening "contained" (in borders and ring roads) of the city towards the periphery with new districts such as Arco Sur, Valdespartera, Parque Goya, Parque Venecia, in which the majority is social housing with bioclimatic characteristics.

Talking about green areas, the development of the plan in the last ten years has been articulated around:

- ✓ Recovery of the river banks as proposed by Expo 2008
- ✓ Boosting of the green belt
- ✓ Advance towards the creation of a long green grid

Urban green areas 2003-2010			
Green area	2003 (m ²)	2011 (m ²)	
Parks and gardens zone I	2793453	5151529	
Parks and gardens zone II	635562	935752	
Parks at the Gállego	0	66000	
Water Park and Expo river front	0	1400000	
Plaza Park	0	678000	
Venecia urban pine forest close to Cuarte Park	150100	150100	
Urban pine forest between Municipal Sport Centre and Cala Verde	83990	83990	
Urban pine forest between 3rd and 4th ring road	2373200	2373200	
Periurban pine forest of Venecia Valdegurriana	857700	857700	
Total	6894005	11696271	169.66% increasing

Question 4

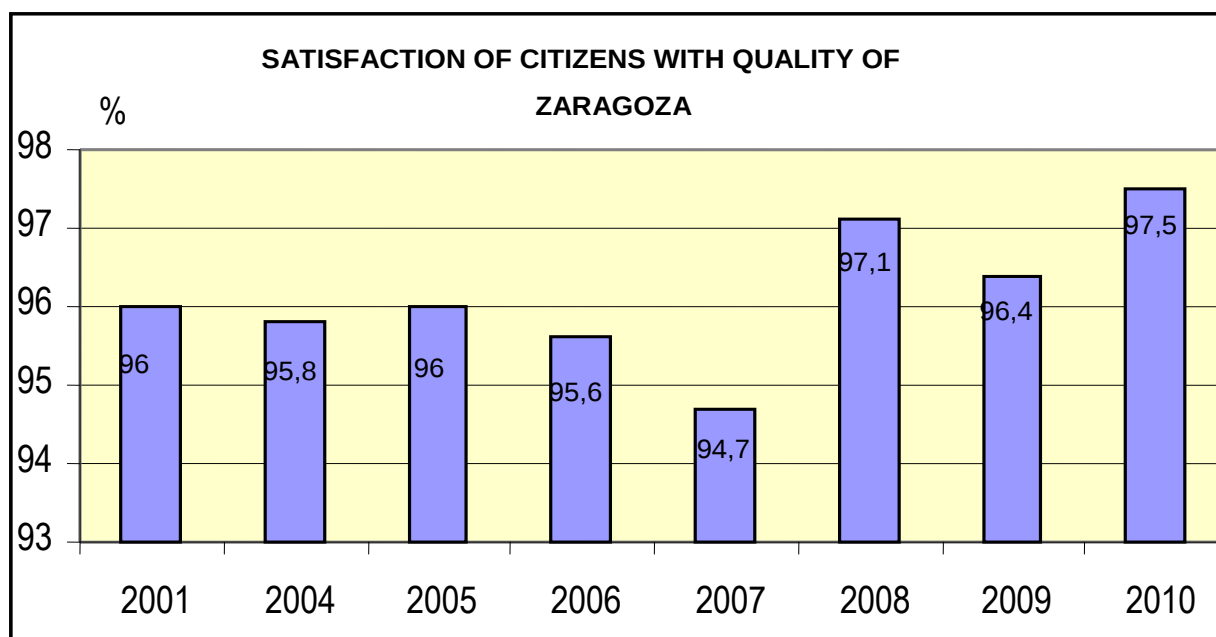
Plans to meet or revise key targets for the future and proposed approach to achieve these.
 (max. 800 words):

With particular reference to the establishment and management of green urban areas (public and privately owned) taking into consideration their function:

- ✓ People's quality of life and recreation;
- ✓ Additional ecosystem services and functions such as regulating water balance, balancing climate extremes, filtering air pollution, education, etc.
- ✓ Rehabilitation of brown field sites, derelict and/ or contaminated land

The quality of life reached in Zaragoza is high as it is shown by the results of another European Common Indicator, A1, "Satisfaction of the Citizens with their Local Community" that every year presents a percentage over 95% in the number of citizens satisfied or very satisfied with their quality of life.

Satisfaction of the citizens with the quality of life of Zaragoza



Zaragoza Strategy of Adaptation to Climate Change, EAZ, establishes measures related to territorial planning, land uses and change of land uses. The goal is to reach an adequate planning policy adopting measures to increase green areas and regulate constructing, orienting it towards the construction of better prepared dwelling in order to fight against the effects of climate change and favouring the well-being and energy saving by the residents

The compact city is the best model for the sustainability conditions of Zaragoza, since it has a 5.65% of artificial soil.

Green areas have an essential role in the improvement of the quality of life of the citizens, directly because they keep biodiversity within the city and improve the surrounding areas, and indirectly favouring the improvement of the quality of air and eliminating risks derived from climate change.

Increasing the available green areas in the planning of new developed zones and reinforcing those of old areas with parks and gardens, trees in the streets and green squares and green roofs and walls, we are contributing to create shady areas and moderate temperature, reducing the demand of energy and the risk of flood as well as environmental noise and the availability of healthy leisure places.

Zaragoza Strategy for Adaptation to Climate Change includes different measures that are being implemented to establish the necessary conditions to create high-quality public areas. These infrastructures and also those related to sustainable transport and other similar, have to boost a "sustainable behaviour" in the citizens, with information campaigns and facilitating the means to reach those goals.

The future proposal for Zaragoza is a strategic plan that articulates the city and its surrounding area in a compact, glocal and polycentric urban model in which the connections of the city with the closing and the global surrounding area will be kept and boosted.

4. NATURE AND BIODIVERSITY

Question 1

Present details of the original and/or most recent Action Plan, including any relevant disadvantages or constraints resulting from historical and/or geographical factors which may have influenced this indicator area negatively.

(max. 1,000 words)

The environmental work was boosted permanently with the launching in 2000 of the Agenda 21 Local of Zaragoza and the draft is based on to the so-called Objective 1 "Integrate nature in the city".

Zaragoza has also a General Plan on Urban Planning, a comprehensive tool to classify and regulate the use of municipal land. It has also given a regime of different degrees of protection to certain areas of the territory attending to its natural values, identifying them as land of special urban protection.

Different commitments have been signed on biodiversity conservation, among them: support to Aalborg Charter and Hannover Declaration (2000), support to the Spanish Network of Cities for the Protection of Biodiversity (2008) and endorsement this year of the Countdown Declaration 2010 of the International Union for Conservation of Nature.

The city of Zaragoza has also presented its candidacy to be Biodiversity Capital 2010, promoted by Fundación Biodiversidad and has won the 3rd Contest of Projects for Increasing Biodiversity promoted by the Spanish Federation of Municipalities and the Ministry of Environment (2010)

Nevertheless and in spite of having a general action framework on biodiversity based on the Agenda 21 Local, there were gaps in the municipal policy. There was not a comprehensive plan to develop the municipal environmental management. Therefore, in June 2011 ends the drawing of the Strategy for the Conservation of Biodiversity in Zaragoza.

On the other hand, in relation to biodiversity, the municipality of Zaragoza presents natural conditions that favour the existence of an exceptional natural heritage and a strength and opportunity to launch sustainability actions. Zaragoza is a land of contrasts that includes from water to forest ecosystems, from steppes to agricultural and urban ecosystems.

Zaragoza is one of the vastest municipalities of Spain with approximately 100,000 ha, where a 38% of the municipal land is officially protected by the LIC (Place of Community Importance), ZEPA (Zone of Special Protection for Birds), or are singular zones protected by the Special Plan of Urban Planning.

There are 1,609 species, 561 of fauna (276 included in catalogues or red lists) and 1,093 of flora (11 included in catalogues) registered in the city.

Against this territorial reality, the municipal action plans on biodiversity concern the natural and the urban environment, the protected areas and the public areas, therefore the municipal administration includes the whole of the territory.

These are some of the results obtained during these 10 years of activity towards sustainability:

- ✓ **Urban nature:** Zaragoza has given a quantitative and qualitative jump regarding green areas: from 3 200,000 m² at the beginning of the decade to 8 270,000 m² at the end of it. In other words, there has been an increasing in green areas of **more than 2.5 times**.

That means that our ratio per habitant recorded right now is **11.74 m²/inhabitant, one of the best of Spain**.

- ✓ **The 93.37 % of the population of Zaragoza has green public areas** and basic services less than 300 metres away since there are green zones and big parks in the surroundings of the consolidated city and its perimeter. Two big urban parks play a recognised role: José Antonio Labordeta Park and the Water Park.
- ✓ **Forest ecosystems:** Forest areas have notably developed thanks to the active reforestation policy that implemented by the Municipality from the 1950s. The total surface of trees (reforested and natural) is **2,762.5 ha**. And the ratio of forest surface (reforested and natural) per inhabitant is **39 m²/inhabitant**.
- ✓ **Water ecosystems and wetlands:** three big natural corridors converge in Zaragoza -the rivers Ebro, Gállego and Huerva- that have been the target in many projects that have formed part of the Plan for the Restoration of the Riverbanks.

Several humid areas are also scattered in the semiarid territory of Zaragoza. We can highlight the Galacho of Juslibol, a former meander of the Ebro owned by the City, that offers a contrast of riverbanks, steppe, orchard and plaster cliffs, and gives shelter to a big number of species of flora and fauna. The Galacho is included in the Man and Biosphere Programme (MAB) of the UNESCO.

- ✓ **Steppe ecosystems:** They cover a continuous area of (33,526 hectares) at the south of Zaragoza. The conservation degree is good and there is singular flora and fauna catalogued.
- ✓ **Agricultural ecosystems:** This the second most important use of land in the municipality, with approximately a 46 % of the territory. It includes traditional orchards and irrigated and unirrigated lands.
- ✓ **Green and blue Zaragoza:** Zaragoza's Green Belt is the first continuous road in the city for pedestrians and bikers. With a length of 30 km, its goal is to form a big lineal park connecting the majority of the areas with a high environmental value.

On the other hand, 40 km of riverbank parks at the Ebro, Gállego, Huerva and the Canal Imperial de Aragón have been recovered.

This blue and green net connects wide natural areas, integrating bike tracks, municipal equipments, areas for children and leisure areas.

- ✓ **Spreading and education on biodiversity:** in the context of the Agenda 21, it has been launched a specific management structure to facilitate the participation of the citizens (Agenda 21 Board, commissions, permanent secretariat, meetings club...) as well as many campaigns for increasing public awareness and formation by through the Municipal Cabinet of Environmental Education.

Question 2

Details of those targets achieved or not, to date (within the last 5 - 10 years) as described above (Question 1). Provide a review of how both situations occurred and lessons learned.
(max. 800 words)

Make reference to:

- 1. Managing areas designated for nature protection and biodiversity as described in question 1;**
- 2. Protecting nature in other open spaces;**
- 3. Promotion of public knowledge and understanding of nature and biodiversity, particularly among young people.**

First, Zaragoza Strategy for the Conservation of Biodiversity –that includes international and national guidelines related to the conservation of biodiversity and post 2010 objectives- has been endorsed.

The Strategy sets out 3 action axes (legal and institutional action on biodiversity, and social and participation elements, to reach 4 goals:

- ✓ Consolidation of biological and landscape diversity.
- ✓ Fully integration of biodiversity in the municipal policy
- ✓ Reduction or elimination of present or future threats.
- ✓ Secure the full participation and involvement of the citizens of Zaragoza.

The actions focusing on biodiversity can be summarised as this:

-Urban nature

- ✓ Consolidation and maintenance of urban green areas
- Endorsement of the Master Plan on the Parque José Antonio Labordeta

Forest ecosystems: the objectives reached in the seven mounts directly managed by the Municipality can be summarised as it follows:

- ✓ Planning: plans to promote sustainable forest management such as: Management Plan for Uses and Landscape Planning of Torrero Mount, and advance for the Special Plan of Peñaflor Natural Reserve.
- ✓ En 2005, Torrero Mount obtained the Certificate of Sustainable Forest Management (certificate FSC).
- ✓ Forestry: implementation of selective thinning and pruning for improving the fitosanitary conditions of the forests.

- ✓ Reforestation: successive stages of reforesting, increasing the total sum to more than 1,700 trees and 270,000 € have been implemented in the last ten years.

Wetland ecosystems

Galacho of Juslibol: from the moment the Municipality bought this abandoned meander of the Ebro in 1994, its management has been continuous and many actions have been implemented such as:

- ✓ Endorsement of the Special Plan for the Galacho of Juslibol (2004)
- ✓ Construction of an information centre (2007) with furniture and a bioclimatic building for serving as education centre for educational and leisure functions.
- ✓ Adaptation of routes, planning and signalling of paths, periodical study of water species, among others.
- ✓ Management of other wetlands: Ojo del Cura pond

Agricultural ecosystems:

- ✓ The Municipality of Zaragoza owns 7,150 ha of agriculture land that are rented to citizens in order to continue the traditional agricultural exploitation.
- ✓ Orchards and agroecological market

Species of wild flora and fauna: the goal is to improve foundations for knowledge:

- ✓ Research on birds of prey: nest-making for red kites (2004-2006) and golden eagles (2006), and evolution of nest-making couples for birds of prey in the Peñaflor reserve (annual).
- ✓ Annual monitoring of primilla kestrels.
- ✓ List of birds included in the Steppe Plan (2010).
- ✓ Research and monitoring of the birds at Ranillas meander (2010)

Control of exotic invading species:

- ✓ Budgerigar: from 2004, monitoring and control works have been done. 73 nests have been retired, 3,023 have been sterilised and 106 adults have been captured from 2005 to 2010.
- ✓ Florida sea turtles: from 2003 to 2006, 118 of them have been captured in the Galacho of Juslibol by environmental volunteers.

Green and blue Zaragoza: the objective is the consolidation of the connection between urban and periurban areas of the city as well as the integration of its rivers:

Green net: the 30 km of Zaragoza's Green Belt (2008) are structured in 9 lineal consecutive stretches that surround the city, 4 circuits and 7 exits. The belt goes around the river Ebro and the Canal Imperial, running through the south of the city and its surroundings.

The extension of the Green Belt on the north of the city was endorsed in 2011. The work focused on the rivers Gállego and Ebro and supposed a total of **26 km** for pedestrians and cyclists (49 949, 95 Euro).

Blue net:

Water Park: Thanks to the International Exhibition on Water (2008), one of its greatest areas -the Water Park- opened. It is a new concept of urban park combining wide green areas, services and activities in a surface of 120 ha.

Ebro river: the actions of the Additional Plan of EXPO 2008 (2006-2008) for restoring the riverbanks meant the recovery of 14 areas (750,800 m² and 90.3 million €) and two singular elements, the Third Millennium Bridge (25.20 million €) and the dam of the Ebro (22.20 million €).

Gállego river: two restoration projects of the above mention riverbanks plan were implemented (more than 10 million €).

Huerva river: drawing up of the Master Plan for the river Huerva and baseline survey of the path of the river Huerva.

Education, public awareness and spreading of information

It can be highlighted the programmes of environmental education on the Galacho of Juslibol launched in 1985, with the participation of more than 125,000 students, the orchards for schoolchildren (more than 80), the reforestation of the municipal mounts (more than 120 ha), programmes for advertising the rivers and their riverbanks as well as activities in parks and urban surroundings.

Question3

Plans to meet or revise key targets for the future and proposed approach to achieve these.
(max. 800 words)

Plans to reach or modify key goals for the future, and the strategy to follow.

Firstly, the short-term goal is the development of the general guidelines included in Zaragoza's Biodiversity Strategy, through plans, programmes and projects focusing on the three action axis.

The short and medium-term goals pretend generally:

- ✓ First of all, improve the background for knowledge on biodiversity.
- ✓ Favor the connections between the urban and the periurban surroundings of the city.
- ✓ Consolidate the forest areas and the restoration and integration of the rivers.
- ✓ Monitoring and actions on species of wild flora and fauna.
- ✓ Fight against invading exotic species.
- ✓ Spreading of the values of biodiversity among the population, etc.

- ✓ Implementation of documents and management plans.

Forest ecosystems:

The following goals to reach are set out:

- ✓ Go on with the forest plan to increase the surface of municipal forests and contribute to the goals of reducing greenhouse effects gases. The aim is to reach 600 reforested hectares in 2015.
- ✓ Development of sustainable plans for the management of forests.
- ✓ Improvement of the structure of the forest masses to fight fires. This is one of the most threatening factors in these areas of the Mediterranean region.

Wetlands: Galacho of Juslibol:

The objective is the development of the goals of the Special Plan for the Galacho of Juslibol:

- ✓ Settlement of the water public domain in the river Ebro.
- ✓ Recovery of prairie ecosystems of the meander through ovine cattle.
- ✓ Study of the evolution and advance of the galacho through periodic bathymetries.
- ✓ Control of exotic invading species: annual study of fish banks through electric fishing, and control of the European turtle and the American crab.
- ✓ Plan and implementation of a network of ecomuseums forming part of the special plan for the galacho.

River ecosystems: the goal is the restoration of the bank areas, improving as far as possible the natural dynamic of the river and trying to recover the areas of river mobility:

- ✓ Go on with the restoration of the Gállego riverbanks, including planting of riverbank vegetable species, signalling, equipment.
- ✓ Regulation of activities producing an impact, especially extraction, and restoration of the already existing.
- ✓ Endorsement and development of the Master Plan for the river Huerva.

Steppe ecosystems:

The objective is to consolidate the special plan recently endorsed and integrate the planning of uses with the rest of planning devices:

- ✓ Processing of the Special Plan of the Steppe and the land not to be developed in Zaragoza and integration in other tools such as the General Plan of Urban Planning of Zaragoza.
- ✓ Possibility creation of a future Steppe Park of Zaragoza.

Green and blue Zaragoza:

Zaragoza's Green Belt is conceived as a **network able to articulate the different green areas of the city in order to develop sub-belts and branches**. Its goals are:

- ✓ Full construction of the north green belt with the necessary equipment.
- ✓ Create new sub-belts

Biological corridors:

other areas act as biological corridors, mainly rural roads. A list of public roads was made in 2009 that must be completed and increased as well as the implementation of its conservation, signalling and regulation of uses.

Urban ecosystems**Wild species of flora and fauna:**

- ✓ Implementation of the rehabilitation project of the farrowing pen for the improvement of the habitat of the lesser kestrel, winner of the 3rd Contest for the Increase of Biodiversity, with an economic prize of 100,000 Euro.
- ✓ Maintenance of a feeder for scavenger birds of prey in the municipal mount.
- ✓ Continue to make the lists of birds living in the mounts, wetlands and rivers, and revise the inventories already existing.
- ✓ Control of nests of peregrine falcons and lesser kestrels

Fight against exotic invading species.

- ✓ Treatment for the population of budgerigars in the city of Zaragoza. The works began 10 years ago will continue.
- ✓ Regulation of other species such as starlings and seagulls.

Education and spreading of information on nature and biodiversity

The programmes of environmental education on biodiversity will go on: Galacho of Juslibol, orchards for schoolchildren, study of rivers and riverbanks, parks and city surroundings, specific programmes on invading species.



5. QUALITY OF LOCAL AMBIENT AIR

Question 1

Present details of the original and/or most recent Action Plan, including any relevant disadvantages or constraints resulting from historical and/or geographical factors which may have influenced this indicator area negatively. (max. 1,000 words)

Make reference to:

1. Number of days per year on which EU limit values were exceeded for PM10 (daily mean of $50\mu\text{g}/\text{m}^3$);
2. Number of days per year on which EU limit value/long term objective for ozone was exceeded (8h mean of $120\mu\text{g}/\text{m}^3$) ;
3. Annual mean concentration of NO2 and PM10 and PM2,5.

In 1988 started the project of an **automatic control network of atmospheric pollution** for knowing city data in real time at every moment.

This new CONTROL NETWORK was launched in 1990 with seven remote stations placed in seven points of the city.

The initial places of the remote stations were distributed in both banks of the river Ebro:

- ✓ Right bank:
 - Avd. Madrid with Avd. Navarra crossroads
 - Roger de Flor, end of Avd. Madrid at los Enlaces
 - Luis Vives, in front of Parque Grande
 - Miguel Servet with Compromiso de Caspe crossroads
 - Paraninfo, University site at the beginning of Gran Vía
- ✓ Left bank:
 - El Picarral, in calle San Juan de la Peña
 - Jaime Ferrán, in Cogullada industrial area.

Directive 1999/62/EC of 22 April on limit values of sulphur dioxide, nitrogen dioxide, particles and plumb in ambient air, for setting and developing -with other subsequent guidelines- the general planning for evaluation and control of air quality indicated in the Directive 96/62/EC of the European Council of 27 September, known as Framework Directive

In the year 2001 and based on the suitability report on location of remote stations, a zonification of the city of Zaragoza was made.

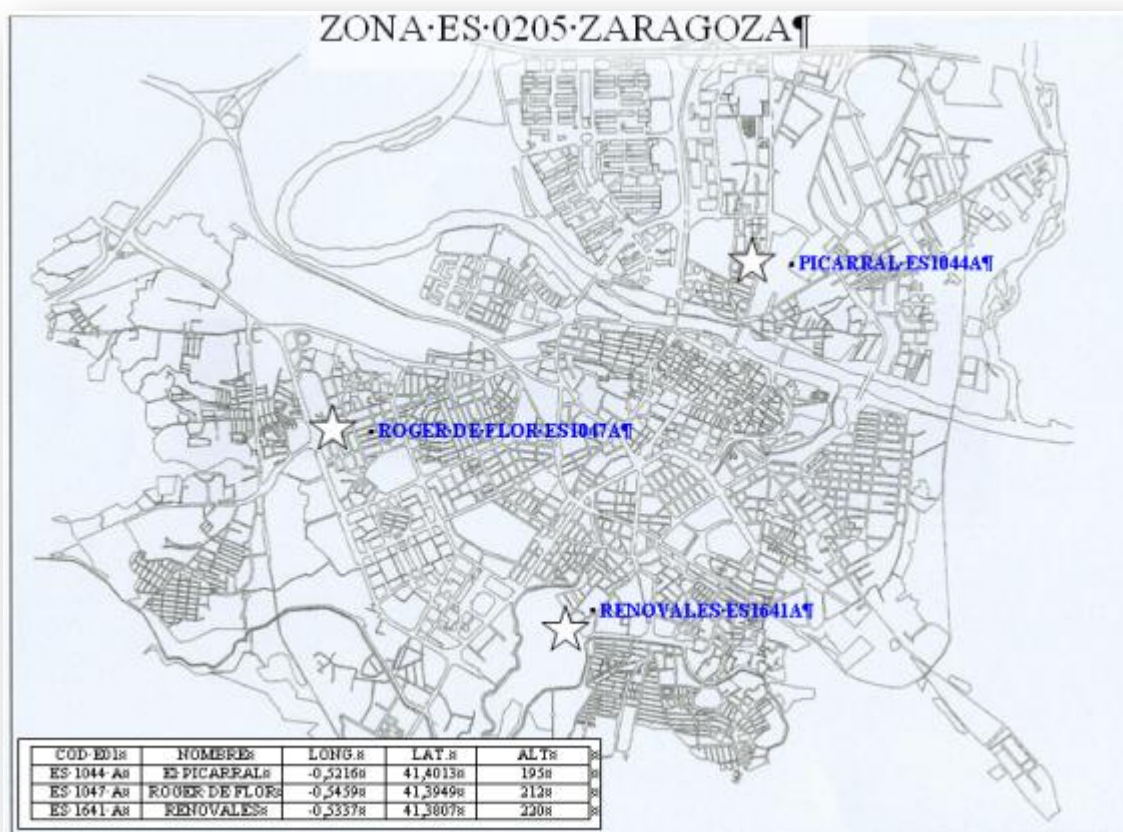
According to the concept of conurbation in point 9 of article 2 of the Directive 1999/30/EC on air quality, the city can be divided in several zones:

2. **ZONE A.-** South area of the city that includes the urban place that is totally consolidated and an area of expansion and growth. **Background level zone.**
3. **ZONE B.-** City centre area delimited between the above mentioned area, zone A and the right bank of the Ebro. It is an zone with a high density of population, important structural planning changes and essential residential and commercial services. **Traffic zone.**

4. **ZONE C.-** North area of the city at the left bank of the river Ebro, with an important density of population. It is a residential and industrial zone experimenting a clear growth and expansion. Zone with industrial influence.

Therefore, EUROAIRNET European Network has focused on remote stations placed in different sites:

- ✓ El Picarral
- ✓ Roger de Flor
- ✓ Luis Vives



In 2004, a proposal was presented for a new location of some of the remote stations in order to carry out the micro-location requirements established by the Directive 1999/62/EC on the characteristics of location of the measuring points. Due to the lack of budget to undertake all the necessary works - including Avd. de Navarra station- the relocation of Miguel Servet and Paraninfo were the only changes made.

The transformation carried out gave the results shown in these tables:

The evolution in the number of days overcoming the daily average limit value established in $50 \mu\text{g}/\text{m}^3$ is shown in the following table (from 2002 to 2010). In bold the numbers exceeding the allowed limits by law

Overcome of daily average value of PM10 $50 \mu\text{g}/\text{m}^3$	Year 2002	Year 2003	Year 2004	Year 2005	Year 2006	Year 2007	Year 2008	Year 2009	Year 2010
El Picarral	60	80	42	163	209	200	126	47	23
M. Servet	118	118	83	171	111				
Luís Vives	1								
R. de Flor	14	22	31	60	124	193	104	101	16
A. Navarra	172	97	69	164	234	283	256	55	
Paraninfo	18	14	11	10	9				
J. Ferrán	183	139	169	161	114	195		90	23
Renovales		9	2	56	111	121	58	44	17
Las Fuentes					81	195	146	79	5

The evolution of the annual average of the particulated matter pollutant PM₁₀ is shown in the following table. It can be observed a fall of that value from 2008.

Annual average PM10 $\mu\text{g}/\text{m}^3$	Year 2001	Year 2002	Year 2003	Year 2004	Year 2005	Year 2006	Year 2007	Year 2008	Year 2009	Year 2010
El Picarral	36	34	38	31	51	61	61	48	33	27
M. Servet	51	43	44	37	51	61				
Luís Vives	30	23								
R. de Flor	33	25	29	30	32	46	56	43	42	27
A. Navarra	56	52	42	38	49	58	75	73		
Paraninfo	45	30	32	28	27	31				
J. Ferrán	73	59	47	49	55	51			40	27
Renovales		17	22	20	32	53	45	38	31	26
Las Fuentes						53	58	49	39	22

Annual average NO2 $\mu\text{g}/\text{m}^3$	Year 2001	Year 2002	Year 2003	Year 2004	Year 2005	Year 2006	Year 2007	Year 2008	Year 2009	Year 2010
El Picarral	49	24	36	45	35	33	37	30	31	32
M. Servet	90	81	67	58	63	51				
Luís Vives	78	76								
R. de Flor	59	47	48	49	56	45	44	29	31	36
A. Navarra	85	70	55	61	68	64	65	51		
Paraninfo	93	82	68	62	71	61				
J. Ferrán	54	43	34	44	47	42	39	29	24	32
Renovales		42	36	35	32	30	21	25	25	26
Las Fuentes						30	32	28	29	26
Centre						46	40	32	36	38

The device for taking up measures in the laboratory by gravimetry was installed in the air pollution control network in the year 2009. It is included in the Collaboration Agreement with the Directorate-General of Air Quality of the Government of Aragon for measuring the Average Exposition Index of population to that kind of pollution in Spain. This fulfils what the Directive 2008/50 establishes on air quality and for a cleaner air In Europe. The attached table shows the annual averages recorded for pollutant PM2.5 during the periods registered.

Annual average PM $2,5\mu\text{g}/\text{m}^3$	Year 2009	Year 2010
Renovales	16	13

No of times the average value of 8 hours of ozone 120 µg/m ³ was exceeded	Year 2001	Year 2002	Year 2003	Year 2004	Year 2005	Year 2006	Year 2007	Year 2008	Year 2009	Year 2010
El Picarral	-	-	-	-	-	-	-	-	4	-
M. Servet	-	-	-	-	-	-				
Luís Vives	-	-								
R. de Flor	-	-	-	-	-	-	-	-	-	-
A. Navarra	-	-	-	-	-	-	-	-	-	-
Paraninfo	-	-	-	-	-	-	-	-	-	-
J. Ferrán	3	-	6	-	-	-	5	14	3	7
Renovales		-	-	-	-	-	7	4	14	7
Las Fuentes						-	6	-	2	1

Quality air data were the starting point to analyse the situation. The first step was to make an Emission Register.

The analysis of the conclusions of the Emission Register 2005 was the foundation for planning the strategy to be applied and for establishing the fields in which there were necessary or essential to perform certain or the most appropriate actions for the implementation of different measures. The result is Zaragoza Strategy on Climate Change and Air Quality, from now on ECAZ.

The following step was to carry out a first estimate on the expected evolution of the emissions just in case the present trend continued, taking also into account factors such as the number of inhabitants and vehicles, the growth of the city, etc.

After this analysis, it was drawn up the strategic map containing the approaches and development goals of the ECAZ and its two global objectives: reduce dependence on fossil fuels and improve air quality.

In order to achieve these two objectives, five action fields were established. City model, mobility, municipal services, renewable energies and industry, and the actions to be implemented are defined are interrelated.

All this has been implemented under the corresponding transversal actions of legislative, fiscal and citizen participation and information.

Question 2

Details of those targets achieved or not, to date (within the last 5 - 10 years). Provide a review of how both situations occurred and lessons learned. (max. 800 words)

Include:

- 1. Existence and implementation status of an air quality management plan;**
- 2. Local measures taken to improve air quality and 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 change behaviour.**

The setting up and implementation of the Action Plan for the Strategy of Climate Change and Air Quality as well as the change underwent by the city –as the above tables show- have improved air quality both in annual average values and also in the number of times the pollutants requested have overcome the limits every year.

The development of determined actions implemented in the city such as the improvement of infrastructures, the construction of bike tracks, the intermodal station, the increase of pedestrian areas, the fitting-out of the development area of Expo 2008, the construction of Montecanal, Valdespartera, Parque Goya districts as well as the opening of Plaza and Castellón road industrial areas, etc, and the first stage of the tramway, has made the city to suffer the consequences of those works. Top levels of particled matters and an increase in the levels of nitrogen dioxide have reached due to the modification and difficulty in road traffic and the increase in the number of vehicles.

Once finished the above mention big works, the city is recovering its calm and the immission levels recorded are going down.

Bike tracks also favours traffic in the city, a way of transport that is increasing. Ring-roads also has produced a drop in the traffic of heavy vehicles and clearing in the streets.

The actions implemented in the industrial sector have also contributed to improve air quality since there has been a fall of emissions. Therefore, its impact in the immission values recorded

has also been positive. *Three leading industries in the catalog of potentially polluting the atmosphere are located in what today are two populous districts of the city (and Montañana Picarral). The Air Quality Plan of the City of Zaragoza, through voluntary agreements with these companies, looking for the right conditions for its operation in the heart of an urban neighborhood.*

In the period 2002-2007, based on the Environmental Audit Picarral and a studio in Montañana, established actions to improve air quality in the city along with other improvements complemented by noise and discharges. Between 2009 and 2010 was developed Picarral Map odors resulting in a significant reduction in odors produced in intensity, frequency of perception and impact area. In 2011 will take additional action to remove residual mild discomfort. For its part, the company raises Montañana drastically reducing the odors emitted in the process, decreasing the emission of particulates and other pollutants and improve the quality of the discharge in a project completed in 2017.

The overall budget plan achieves virtually 100 million euros.

Air quality information is put daily at the population disposal through several channels.

In the press. Several newspapers present information on the last days, from Monday to Friday, in every measure point of the control network. On the other hand, an information panel shows permanently data on immission levels in every measure point and about every pollutant measured during the day, with updated information from Monday to Friday. The information panel is placed in a central and very busy area. The information presented in the panel and in the press is easy to understand since it is shown as an histogram including data qualification. Therefore, the information arrives intuitively to the whole of the population.

Data on immission levels of air quality are also available through the municipal website. Levels recorded the day before in every measure point are daily updated. Figures -more concretely daily averages- are recorded. This page also gives the possibility to visualize the historical data recorded on every measured station. Information on immission levels can also be consulted every day.

Public awareness is developed through a campaign on environmental education developed during the year for students from the last primary education cycle till education for adults as well as university and post-degree and master courses. Alertness and information on air quality is spread on these actions that can be developed in order to contribute to its improvement.

Question3

Plans to meet or revise key targets for the future and proposed approach to achieve these.

Please provide details on assigned budgets. (max. 800 words)

Adaptation to the Directive 2008/50 transliterated in the Royal Decree 102/2011 of 28 January, that establishes adaptation applied to:

- ✓ Obligation of measuring determining pollutants from 1 January 2013 such as As, Cd, Ni and BaP, as stipulated in Annex I, section I, which establishes the objective values for everyone of them:
- ✓ Quantity of mercury in ambient air.
- ✓ Replacement of analysers of nitrogen dioxide and particled matter due to the expiring date for control network devices given by the manufacturer.
- ✓ Quantity of particled matter -PM2,5 and benzene, C₆H₆ in agreement with the minimum number of measure points determined in the Annex IV for diffuse sources, taking into account the number of inhabitants of the areas.
- ✓ Adaptation of different measure points such as those at Avd. de Navarra, being moved to the Intermodal Station zone and/or Actur (Poligono Rey Fernando). Relocation of point in Jaime Ferrán to another place in the same industrial area, according to the characteristics included in the Directive.
- ✓ Updating of the information system for population on the existing immission levels of pollution in the city, as it is established in Chapter V on the exchange of information and in the article 28 on public information.
- ✓ Updating of the inventory of the emission map for its incorporation in the pollution prediction system, PRECOZ. This is essential for the prediction produced by the system to answer to the real situation of the city, due to the change experienced from the last inventory.

This fact is highlighted in the last report of CIEMAT on the maintenance works in the prediction system PRECOZ carried out in 2010. Different situations where forecast far exceeded in some moments the measures made by the own analysers from remote stations were produced that year, since the emission data incorporated in the system reflected the situation in 2004-2005, when the emissions inventory was made. This situation is very different now due to the present industrial position of our city, and the improvement and changes in this sector.

The amount of several of the above compulsory actions included in the European Directive 2008/50 for obtaining a cleaner air in Europe and that must be implemented in a short period of time, would be 600,000 Euro.

Zaragoza has also experienced in the last years an important transformation that has not finished yet. Therefore a new zoning -an idea examined in the present laws on air quality- is being considered.

The Strategy on Climate Change and Air Quality of Zaragoza has been planned to last until 2015, year in which all the actions included, for instance sustainable mobility, efficient work of the municipal services, establishment of renewable energies as well the measures implemented in the industrial city surroundings must finish.

6. NOISE POLLUTION

Question 1

Present details of the original and/or most recent Action Plan, including any relevant disadvantages or constraints resulting from historical and/or geographical factors which may have influenced this indicator area negatively.

(max. 1,000 words):

Provide details on:

1. Share of population exposed to noise values of L (day) above 55 dB(A);
2. Share of population exposed to noise values of L (night) above 45 dB(A).

Zaragoza has always been a pioneer in the control and management of noise as it is proved by the drawing up of noise maps in 1990 and 1998, a survey on social perception made in 1990 and the publication of two municipal by-laws for protection against noise and vibrations, one in 1986 and the other in 2001. The interest and sensitivity on noise pollution by the Municipality continued with the publication in 2006 and 2007 of a [Noise Strategic Map \(MER\)](#) that allows us to update diagnosis on noise and gives us an answer to the ruling demands established by the Directive 2002/49/EC and its transposition to State legislation by the Law 37/2003 on Noise. It has also been planned and endorsed [an Action Plan against Noise 2010-2015 \(17.02.2011\)](#) that includes corrective and preventive measures to improve indexes for tracking its impact in Zaragoza.

One of the most important aspects in drawing up this noise map is that it squares with the Law 37/2003 named Strategic Noise Map and has been made using a specific methodology detailed in the Directive 2002/49/EC.

The application of this methodology, among other things, allows as to:

- ✓ Compare the results of Zaragoza MER with those from other Spanish or European cities.
- ✓ Analyse the efficiency of preventive and correcting actions, and know the evolution of sound quality in our city in the long run.
- ✓ Research into the noise sources that characterise the environmental sound of Zaragoza.

This methodology is based on the use of calculation methods and is similar to that used for the elaboration of 1998 noise map.

Three indexes for tracking acoustic quality that reflects the impact of the different environmental noise sources in Zaragoza have been calculated in Zaragoza's MER: exposure to environmental noise of non-developed lands, exposure of the population to noise from out of the dwellings, and sensitive buildings.

In the section of exposure of the population is also included the [European Common Indicator B8](#) that is included in the initiative **"Towards a Profile of Local Sustainability. European Common Indicators"** endorsed in Hannover Summit in the year 2000. The goal of this European Common Indicator B8, Noise Pollution, is to quantify the number of people exposed to dangerous noise, levels and it was adopted by the city with other European indicators. Before calculating these indicators, noise levels produced by every source (streets, road, railway and industry) are analysed individually, and then the global noise level in a concrete area.

Zaragoza Map has produced these results

Population exposed from the levels calculated in the external facades of Zaragoza dwellings

% Population exposed	Day >65 dBA	Night > 55 dBA
Global	16	21
Streets	16	20
Roads	1	3
Railway	0	0
Industry	0	0

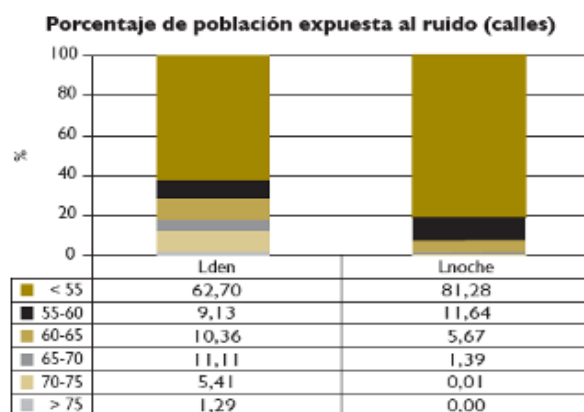
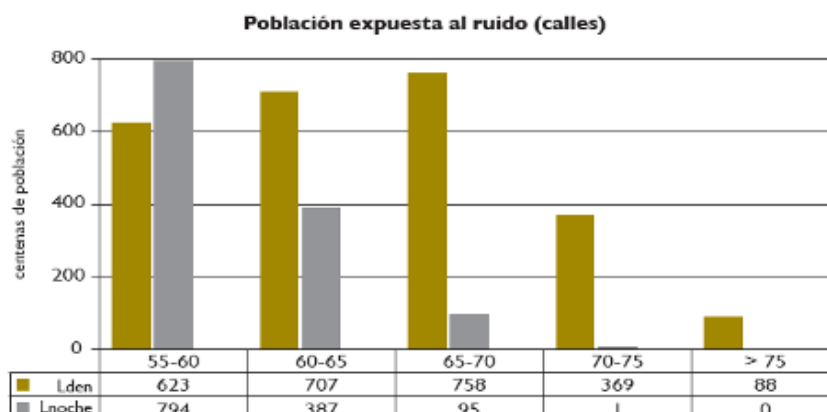
(MER 2006-2007)

The evaluation made is referring to the population potentially exposed, since the indicator represents the existing noise level in the external facade of the buildings. These level do not allow us to extrapolate directly the levels inside the building since they are determined by the quality of noise insulation on the facades.

European Common Indicator B8:

Population exposed to noise (streets)

Percentage of population exposed to noise (streets)



The main results identified in the diagnose from the indicators for tracking acoustic quality have been:

- ✓ Surface of the city suffering different types of decibels by every source of environmental noise and taking into account the contribution of all of them: 11.3 of the surface over 50 dBA L night.
- ✓ Population suffering the different types of decibels by every source of environmental noise and considering the contribution of every source. 21 % of the population over 55 dBA Lnight. Sensitive buildings suffering levels over quality goals: 24% in streets and 12% in roads.
- ✓ The plan introduces different preventive measures for 11 new urban developments foreseen in the General Plan of Urban Planning in which measures should be adopted.

The analysis of the results has allowed us to extract the following conclusions:

- ✓ The main source of noise is road traffic whereas the biggest percentage of population exposed is produced by street traffic.
- ✓ Noise impact produced by industries and railway, except in concrete circumstances, is not important.
- ✓ For improving acoustic quality in the consolidated areas of the city is necessary to reduce the noise produced by urban traffic.
- ✓ For preventing noise pollution in future developments of the city is necessary its prevention.

Question 2

Details of those targets achieved or not, to date (within the last 5 - 10 years). Provide a review of how both situations occurred and lessons learned.
(max. 800 words)

On 31 October was endorsed by the Plenary Session of the City of Zaragoza the "[Municipal By-Law for Protection against Noise and Vibrations](#)." Article no 8 "Acoustic Conditions in New Urbanisations" force the implementation of a survey on the acoustic impact, the replanning of buildings or the adoption of correcting measures (acoustic barriers) in order citizens to have adequate acoustic conditions and in agreement with the limits established by the municipal by-law.

From then on, every new projects is subjected to a strict control by the Agency of Environment.

During all these years, different structural and preventive actions, among other corrective measures, have been implemented.

Among them we can highlight:

- ✓ Creation of areas with a maximum speed allowed of 30 km/h
- ✓ Reduction of roadsides for private car use, widening of pavements, cycle tracks (see section 2. Sustainable Mobility).
- ✓ Tramway (1st stage finished). Once finished, a reduction of 4 dB is foreseen. The tramway is going to reduce a 50 % of private traffic in the main avenues of the city from north to south (nearly 13 Km), and a 40% of buses. Therefore, it will produce a new sustainable mobility that will affect the whole city.

- ✓ All the municipal vehicles and machinery or those working for the City, must be low-noise level machines (art 24 of the Municipal by-law). This is one of the sections of the green conditions stated by the Municipality.
- ✓ Establishment of night leisure areas at the river banks after its restoration thus producing small leisure zones away from residents and allowing them a successful combination of leisure and rest.
- ✓ Opening hours at night have been reduced.

Among corrective actions:

- ✓ Acoustic barriers in black points
- ✓ Railway lines instead the transport of truck goods by railway (Papelera Torras S.A.), avoiding inhabited areas
- ✓ New routes for goods transport of the factories SYRAL, S.A. AND SAICA has been opened, avoiding inhabited areas.

DIFFICULTIES

All these measures –above all the structural ones and despite the development of important media campaigns stressing environmental benefits- have had a strong social answer. The car continues to be considered by part of the population as a good and a right that cannot be waived.

Nevertheless and despite the criticism received, the Municipality goes on with its plans to reduce noise levels, air quality and mitigation of CO₂ levels.

Question 3

Plans to meet or revise key targets for the future and proposed approach to achieve these. (max. 800 words)

An action plan against noise has been made and endorsed for the period 2010-2015 as an answer to a long-term vision of Zaragoza related to the strategic and sustainable mobility plans of the city. Its effectiveness will depend also on the behaviour of the citizens. The global objective is a reduction of 1'3 dBA in the city.

Goals

- ✓ **INTEGRATE NOISE IN THE MUNICIPAL MANAGEMENT:** Noise has to be one variable more in decision making on city design, especially in planning, municipal services and transport
- ✓ **REDUCE THE IMPACT OF THE AFFECTED AREAS:** Reduce the impact of noise sources and avoid future problematic situations
- ✓ **PRESERVE QUIET AREAS:** Keep noise levels in quite areas and improve its environmental sound quality.

Actions

Diagnosis and tracking tools:

- ✓ Improvement of traffic information of the noise map and recalculation of the indicators: the main noise source of the city is road traffic so it is essential to have detailed information on it. Improvements will focus on more precise characterisation of the roads with less traffic and the analysis of noise levels in roads with speed limit under 50 km/h. This will produce more precise indicators and maybe more reduced results.
- ✓ Survey focusing on citizens perception of sound quality and evaluation of nuisances caused by an excess of noise
- ✓ Analysis of other sources: night leisure, RSU and cleaning. Some noise sources producing an acoustic impact have not been focused by the Strategic Map but it is necessary their inclusion in the management and actions against noise. Specially important is night leisure, RSU collection and urban cleaning
- ✓ Analysis of noise levels in sensitive buildings and distribution of uses for identifying those really affected and issuing improvement proposals
- ✓ Definition of tracking indicators showing the improvements reached
- ✓ Public information.

Related to law and management tools:

- ✓ Analysis of the implications of the RD 1367/2007 on noise management and system for giving an answer to it
- ✓ Adaptation of the municipal by-law to the Law and the RD.
- ✓ Identification of procedures for new residential and industrial developments
- ✓ Creation of a coordination commission for the management of noise and also other ways of institutional coordination.

Decision making tools:

- ✓ Definition of the management chart. Endorsement of the figures.
- ✓ Definition of the human, technical and economic means necessary and available for its management. The firsts action for the implementation of these tasks is to make a diagnosis of the means available and the lack of others.

Other ways of transport and infrastructures:

- ✓ Integration of noise in the Plan of Sustainable Mobility. The first task will be to launch a joint working group to identify the most important nodes of the Mobility Plan, where noise has to be taken into account to improve the quality of life
- ✓ Hierarchical organization of the most important situations for defining the zone plans. It is compulsory to define the criteria and all the sound sources. Once identified, they will be parameterised to determine those that will be targeted for a short-term action (taking into account the available means), the kind of action and the relation cost/effectiveness
- ✓ Institutional coordination: the action plan for sources that do not belong to municipal management will depend on the person responsible of the source
- ✓ Requirements for new transport infrastructures: as prevention tool, it is necessary to consider the requirements for these new sources in relation to RD1367/2007

- ✓ Systems for monitoring airport noise that will allow us to know the levels of noise produced by this source in determined areas of the city, and the degree of pursuance of the schedules and routes of commercial flies
- ✓ Endorsement of noise zonification. It is necessary to put to the vote the noise zonification and analyse the areas that overcome the target levels and the prevailing sources in every case
- ✓ Requirements for new sensitive residential areas and integration of recommendations in urban planning: in compliance with quality goals and the definition of the procedure
- ✓ Definition of goals in quiet areas. Municipal coordination to compile information on its use, study the strategy to protect its sound environment and consider the creation of a specific entity acting as a framework for future protection actions

In relation to the municipal services:

- ✓ Include the improvement advices issued from the analysis foreseen to be made on the activities of maintenance and municipal cleaning, public transport and works.

In relation to economic activities:

- ✓ Commerce. Improve the management of its activities by a municipal by-law
- ✓ Leisure. Improve the management of these activities by a municipal by-law. Actions in saturated areas: control of leisure places and concentration of costumers in the streets
- ✓ Presentation to managers of the existing industrial facilities of the new municipal by-law on noise and its new requirements. For new facilities: definition of the procedure for acoustic control as a condition to obtain a license.

7. WASTE PRODUCTION AND MANAGEMENT

Question 1

Present details of the original and/or most recent Action Plan, including any relevant disadvantages or constraints resulting from historical and/or geographical factors which may have influenced this indicator area negatively.

(max. 1,000 words):

Include details on:

1. Amount of waste per capita; Household, Municipal;
2. Proportion of total/biodegradable waste sent to a landfill;
3. Percentage of recycled municipal waste.

- ✓ Urban waste and separated collection.

Waste management is included in the third objective of Zaragoza's Agenda 21 Local: *Boost the development of clean technologies and adopt waste management operating systems.*

The launching document of the Agenda 21 Local, adopted on 27 June 2001, develops different actions, among them:

- ✓ Boost minimization of waste: home, work, industrial companies, service companies, education institutions, etc.
- ✓ Promote separated collection and guarantee the continuity of the process
- ✓ Create an industrial area for recycling scrap and test centres applying recycling technologies
- ✓ Give an adequate use to mud produced by water purification plants.

This document also establishes the promotion of sustainability indicators in Zaragoza and its annual updating. As a complement of the 10 European common indicators proposed by the UE at Hannover Summit, 24 specific local indicators were planned, four of them in the category of waste:

	WASTE INDICATORS
R1	Urban waste collection
R2	Urban waste using separated collection
R3	Dangerous waste stored in strong rooms
R4	Clean points

a) Urban waste collection

In accordance with the legislation in force, the City of Zaragoza manages all the waste depending on it. On 1 February 2009 opened the new Centre of Urban Waste Treatment of Zaragoza, CTRUZ, that collects all the waste produced by the city.

The Specific Local Indicator R1 measures annually the quantity of waste coming into the dump site, more concretely home garbage, central heating ashes, hospital waste similar to urban, markets, road cleaning, dead animals and confiscated products, big-size waste and conventional industrial waste.

b) Separated collection

Light containers are collected in Zaragoza from 2000. From the opening of the new Centre of Treatment of Urban Waste of Zaragoza, CTRUZ, Zaragoza stores and manage this kind of waste. Before, from the beginning of waste collection in 2000, it was sent out of the city to be separated.

Apart from light containers, the city makes a separated collection of glass containers, paper and cardboard, used batteries, clothing, electric and electronic waste and vegetal oil, among others.

Glass recycling began in 1984 and from 1993 takes place in the whole of city. Vicasa, a company uses recycled glass as work material for its production, is the recovery firm. On 3 December 2004 was signed an agreement between the Municipality of Zaragoza, the Government of Aragon and ECOVIDRIO, a firm that represents the Integrated Management System foreseen in the Law 11/97 of 24 April on Light Containers.

Batteries are collected from 1993 thanks to an agreement with the Government of Aragon, awarding annually its treatment to a manager. Waste collection is made in fix and mobile clean points, urban furniture (municipal street information boards,), cages and rural districts.

From 1994, paper collection is made by the recovery company Reasa.

Local Specific Indicator R2 focuses on measuring urban waste collected separately.

c) Collection in clean points

Specific Local Indicator R3, "Clean Points "complements with the previous one in order to make separated collection easier for the citizens of Zaragoza.

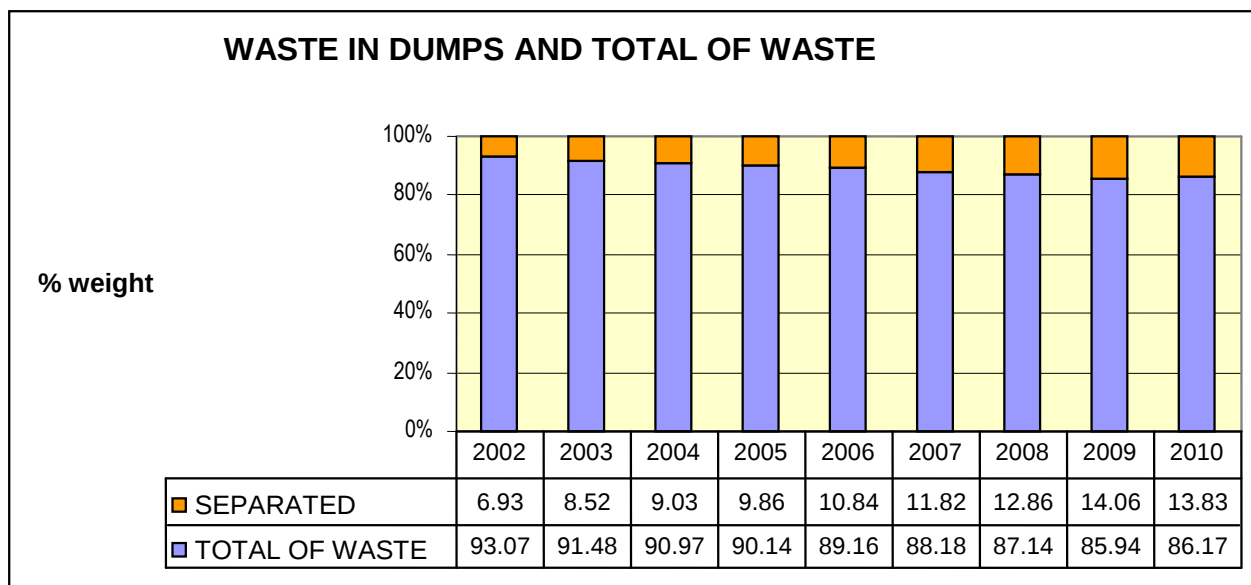
There are four fixed clean points in different areas of the city, and from 2007 there four vehicles acting as mobile clean point that collects and separates different kind of waste: rubble from minor works taken to the CTRUZ, furniture (approximately one half for recovery and the other half for the CTRUZ), and scrap metal, batteries, paper-cardboard, glass, electrical appliances, lighting waste (lights, fluorescent lights), vegetal oil and used clothing, that are sent to the corresponding recoverer.

d) Total of waste and percentage of selected collection

ORGANIC MATTER (t)	LIGHT CONTAINERS	GLASS (t)	PAPER-CARDBOARD (t)	BATTERIES (kg)	VEGETABLE OIL (litres)
230.632	8.716	8.040	20.258	4.140	5.822

The difference of percentage between waste separated collection that later will be recover and the total of waste is considered during the preparation of the indicators as one of the sub-indicators included in the Specific Local Indicator R2. The evolution of the percentage is shown in this graphic that presents a progressive increase of separated collection until 2009. The fall in

2010 can be produced by the general crisis and a reduction in the collection of paper-cardboard, light containers and batteries. The only product that has increased has been waste glass.



Specific Local Indicators. Cuaderno 18. Actualización de los indicadores de sostenibilidad de Zaragoza 2010. Agencia de Medio Ambiente y Sostenibilidad.

e) Waste produced by municipal departments

All the paper is recycled and collected by a company of the city. The total recycled is 90.26 tons, the 0.45 % of the total of paper recycled in the city.

All the toners used in printers are also recycled and the company in charge guarantees the same in its machines.

Office equipment not used are managed by an authorised manager.

Municipal furniture and fittings are collected by a foundation integrated in the network of fair trade.

The City of Zaragoza in order to make recycling easier for the citizens uses recycled paper in all its activities and has placed batteries containers and oil collection points in the different municipal departments.

Question 2

Details of those targets achieved or not, to date (within the last 5 - 10 years). Provide a review of how both situations occurred and lessons learned.

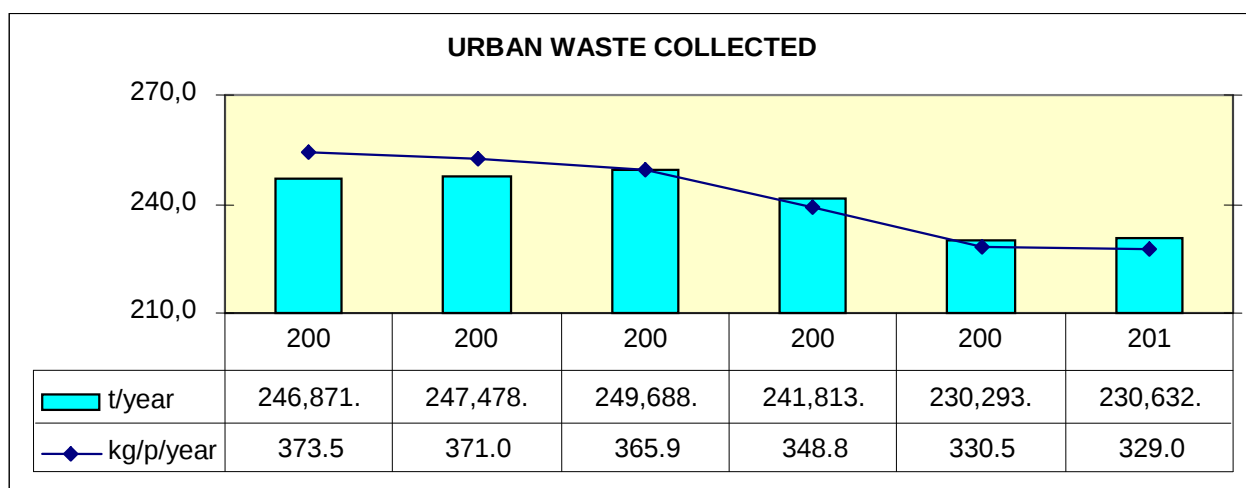
(max. 800 words):

Make reference to:

1. reduction of the amount of waste produced;
2. the amount of waste sent to landfills, particularly biodegradable waste;
3. measures which have promoted awareness raising programmes

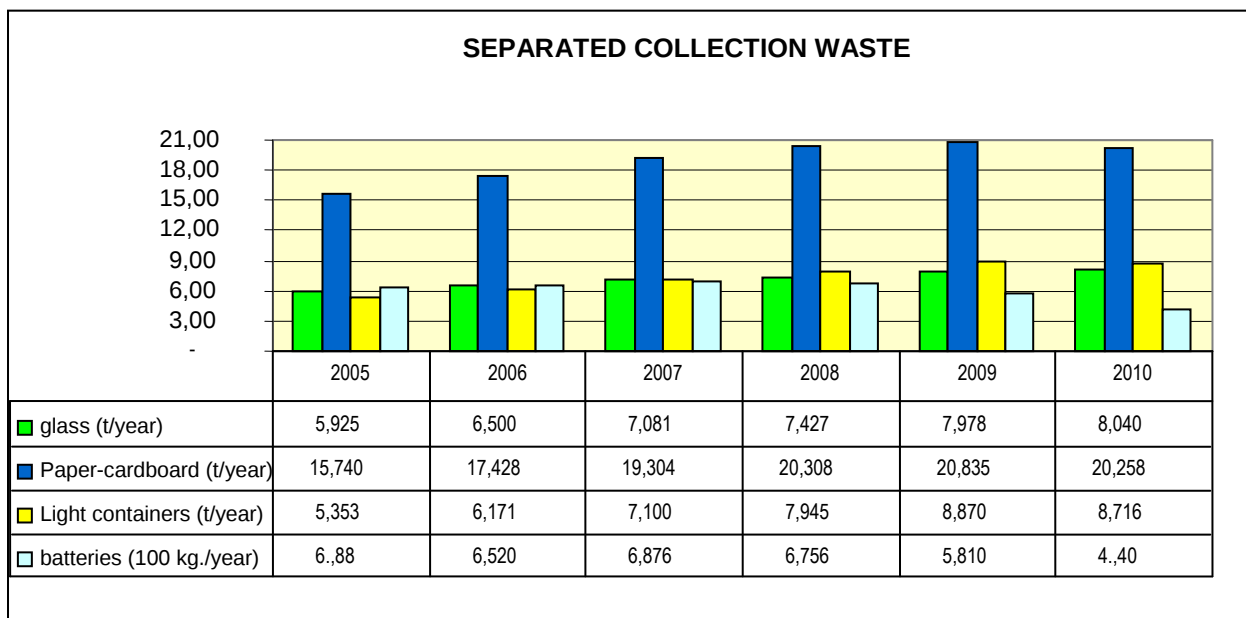
2. Evolution of the quantities of collected waste

Evolution in the last years can be seen in this graphic corresponding to the last updating of the indicators. It can be seen that the fall in quantity of waste into the dumping place is progressive. In the last year the figure of 329 kg/person has been reached. Comparatively, the data of 2009 indicate that, with 330.57 kg/person, Zaragoza figures are much lower than the national average with 547 kg/person (Spanish Environmental Profile 2010. Mº de Medio Ambiente y Medio Rural y Marino).



Specific Local Indicators. Agencia de Medio Ambiente y Sostenibilidad

With reference to separated collection and as it has been explained before, there has been a constant positive evolution until 2009, whereas in 2010 it can be seen a reduction due probably to the crisis and the decrease in the purchase of these products.



Specific Local Indicators. Agencia de Medio Ambiente y Sostenibilidad

Comparatively, in 2009 the percentage of glass collection per person (11.45 kg/person) was under the Spanish average (15.25 kg/p), whereas collection of paper-cardboard in Zaragoza (29.91 % kg/person) was over that of the rest of Spain (2 4%) (Perfil ambiental de España 2010. Mº de Medio Ambiente y Medio Rural y Marino).

Between 2005 and 2010 the increase of the quantity of waste produced by these sectors was 28% in glass and 21% in paper-cardboard.

The sector of light containers has experienced an increase per person over 50%, reaching 12.44 kg per person in 2010. There are no figures to be compared with the national average.

Public educational campaigns have been launched periodically during the last years periodically make people aware of the necessity to minimize waste, boost separated collection and launch all this in an adequate way using advisory booklets, press notes, radio and TV ads, etc.

2) Boosting of clean technologies

a) CTRUZ, Municipal complex of urban waste treatment

Urban waste is managed by a complex infrastructure that gives a service of quality to the citizens and respecting environment and sustainability. The main goal is to minimize waste management and its subsequent recovery.

CTRUZ was launched on 1 February 2009 and is one of the biggest Spanish plants for the integral management of urban waste, representing an important step ahead on the management of urban waste in Zaragoza and the 61 villages around it, and a strong bet on waste recovery and recycling.

The complex, with a capacity of 450,000 tons of waste/year and 15,000 tons of containers, has different treatment lines separating organic waste from the rest of it, with a fermentation process to obtain biofuel and transform it into energy and compost.

The objective of the plant is to recover 8,800 t of plastic by year, saving 9,500 t of oil. 360 t of aluminium are also foreseen to be recovered.

16,248 tons have been recovered in 2010 coming from organic matter in homes. The rest includes iron and non-iron materials, glass and plastic.

Finally, 24,045 tons of compost and 3,648,272 kWh of electric power have been produced from waste.

b) Pneumatic waste collection

Valdespartera is the first district of Zaragoza where a system of pneumatic waste collection has been launched as foreseen by the partial plan but not being compulsory. Every residential block has to boxes where residents put organic waste in closed bags and containers made on materials except glass. From the boxes, waste is propelled by two tubes to 60 km/hour to a central collection point where it is compacted and introduced in containers to be driven to places where recovery will be verified. There is a clean point close to the collection centre with 2,500 m2 for special waste (electric appliances, rubble, batteries, x-rays, paint, oil).

c) Containers

There is a container for separated waste collection less than 150 metres of every dwelling, according to the results of the survey made by the Indicator A4 of the EU, "Accessibility of the Citizens to Public Green Areas and Services, and Basic Equipments.

The collection of urban waste in Zaragoza is mechanical. There is 85 containers accessible for handicapped people with a side entry of easy access. The Municipality of Zaragoza and Fundación de Disminuidos Físicos de Aragon (DFA) have collaborated.

Since 2008 there have been replacing the types of containers to collect 1,000 liters with the rear cargo trucks other than 3,200 liters of lateral load. This will reduce the number of containers in public road and also with the new fleet of vehicles are able to reduce the emission of pollutants into the atmosphere and reduced noise levels.

There is also 30 new underground areas carrying waste from separated collection (glass, paper and cardboard and containers and bottles) with an easier use for handicapped people and a better use of roads and pavements.

Some glass containers have a special opening for easy access with key deposit in the case of bars and restaurants.

Question 3

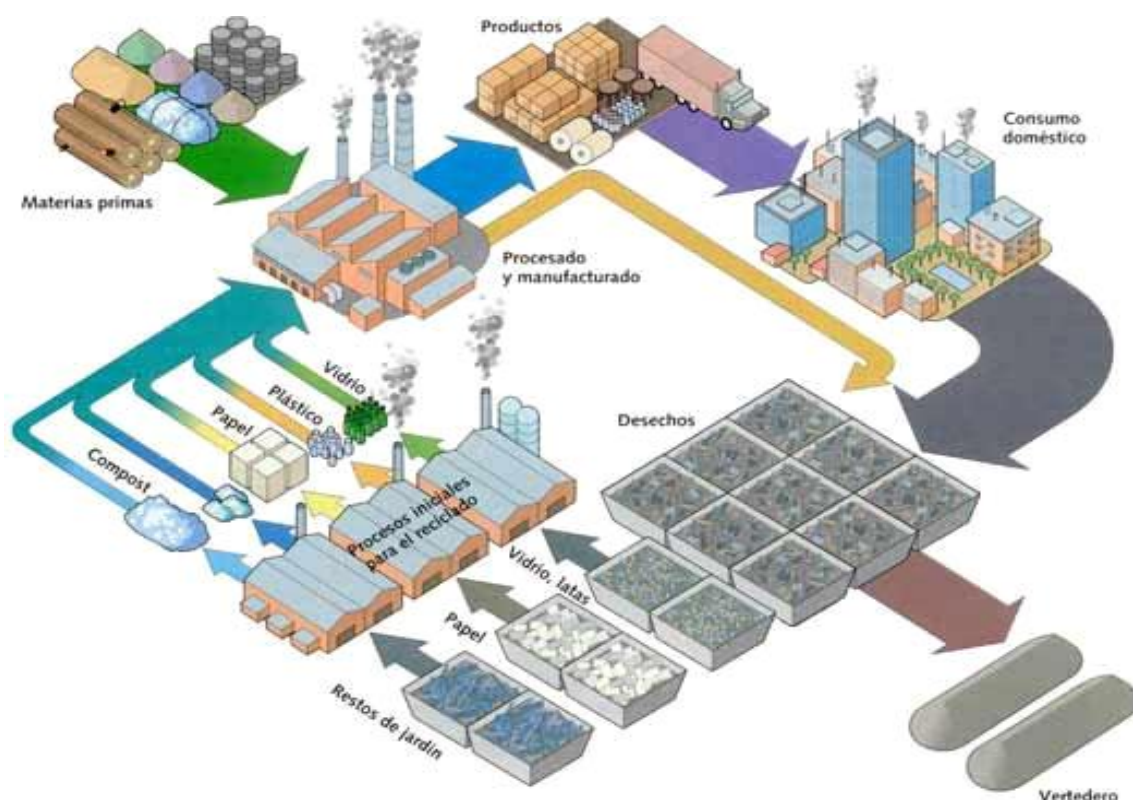
Plans to meet or revise key targets for the future and proposed approach to achieve these.

(max. 800 words)

3. Municipal complex for treating Zaragoza urban waste

The Municipal Complex for Treating Urban Waste of Zaragoza includes a complicated working system in order to develop in an adequate way all the possibilities involved in this field, and being one of the challenges for the future of waste treatment in Zaragoza.

Raw materials – Products - Home consumption - Processing and manufacturing – glass – plastic – paper – compost - initial processes for recycling – waste - glass, tin cans – paper - garden remains - dump place



Organic and the rest of waste is collected in the same container placed in the CTRUZ where it receives a primary treatment, metal selection, paper, etc, separating organic matter. Then, organic matter suffers a bio-methanisation process through which electric power is obtained and the resulting material is sent to the compost area for its commercialisation.

The complex is divided in two areas: services and treatment. The services area includes access, car park, control building, weight and sewage systems and the laboratory. The treatment area includes a zone for urban waste, a zone for inert waste, another area for conventional industrial waste, a zone for dead animals and goods confiscated, and a store-deposit for home batteries.

Around 800 tons of urban waste are deposited there every day. Home waste coming from the collecting trucks with a density of 500 kg/m^3 , once deposited with a compacting shovel is extended and compacted. A processing is done in cells approximately 2 m high already compacted and covered by 20 cm of land or by a double cover. Therefore, waste suffers a

anaerobic fermentation process and become mineralised. In order to eliminate the gases produced during the fermentation, chimneys full of stones every 50 metres are placed to avoid the formation of gas pockets of concentration that could produce and spontaneous ignition. The main gases produced are methane, water vapour, carbon dioxide and hydrogen sulphur. Another process is done to degasify the tank incorporating power exploitation of the biogas produced. The full bottom of the valley is channelled to collect the leachate that can be produced and drove to a waterproof-polyethylene-high-density bag (leachate bag).

The CTRUZ also treats other types of waste such as industrial conventional produced by cleaning of factories, restaurants, and productive processes similar to the urban one or by the disposal of rubble from small works.

With reference to furniture and big volume waste, the Municipality is incorporating in a progressive way their recovery through non-lucrative social-oriented institutions.

CTRUZ also has a range of light containers to treat those waste coming from separated collection.

Finally, the CTRUZ has a draining dump for the rejection tank.

Last June opened the Classroom for Public Awareness and Training on Waste Management. It is a wide area divided in different thematic rooms to explain in a didactic and attractive way all that can related to waste treatment and recycling. The classroom has been especially designed to receive visits of students of Primary and Secondary Education but also all kind of groups (neighbours association, associations of old people, cultural groups,...), and even university students.

Its aim is to make citizens aware, mainly school children, of the importance of waste recycling, its correct separation and its subsequent treatment. The history of waste collection is also summarised and examples of daily objects made from recycled material are presented.

8. WATER CONSUMPTION

Question1

Present details of the original and/or most recent Action Plan, including any relevant disadvantages or constraints resulting from historical and/or geographical factors which may have influenced this indicator area negatively. (max. 1,000 words)

Make reference to:

1. Proportion of urban water supply subject to water metering;
2. Water consumption per capita (in l/capita/year for households and business);
3. Water loss in pipelines;
4. Compliance with the EU Water Framework Directive and related Directives.

1. Reference to urban water supply regulated by meter

In 1994 began the works of Zaragoza Strategic Plan. Environment protection and the sustainable management of the resources was a constant feature. As a result of this, the actions issued from Zaragoza water policies are included in the Action Plan of the Agenda 21 Local with the basic objective of reducing water consumption.

Zaragoza, with a water consumption of 82.6 hm³ in 1994, fixed an objective for 2010 of 65 hm³/year, a goal that was reached in 2006.

The action lines that allowed the city to reach the objectives were:

- ✓ First Plan for Improving Quality and Water Supply Management.
- ✓ Boosting water saving in organisms and public centres with the installation of water saving technologies.
- ✓ Charge and punitive measures.
- ✓ Development of programmes of public awareness and education.

Zaragoza has **a water meter for every 2 inhabitants**. It is important to take into account that only **1 of every 600 users do not have a meter** due to technical or economic reasons.

Consumption control will be made by meters with different codes that will allows us to differentiate several kind of consumption: home, commercial, industrial, irrigation, etc.

The following table presents data from 2010.

Meters for home consumption or similar	305,679	90.48%
Meters for commercial consumption or similar	28,852	8.54%
Meters for industrial consumption or similar	1,599	0.47%
Irrigation, air-conditioning, fire	1,046	0.31%
Without meter (by hand)	552	0.16%
Total policies	337,728	

- ✓ **Reference to water consumption per person.**

The different campaigns to make people more aware of the necessity of a responsible consumption of water

has produced a lowering under 110 l/person/day, a figure clearly under the national average that is around 154 l/person/day. The strong reduction of home consumption shows that the majority of the population has assimilated the necessity of a rational water consumption and the use of saving devices. The following table presents the evolution of home consumption from 2000.

Year	m ³ total measured in home uses and similar	Population 31/12	litres / person / day
2000	30.348,390	613,433	136
2001	30.152,510	622,601	133
2002	29.905,184	628,400	130
2003	30.233,534	641,581	129
2004	30.504,197	650,592	128
2005	29.864,630	660,895	124
2006	29.882,252	667,034	123
2007	28.581,816	682,283	115
2008	26.879,816	693,086	106
2009	26.769,055	696,658	105
2010	26.741,780	701,502	104.4

✓ **Reference to water leakages registered in pipes**

A municipal plan has been implemented allowing the city to reduce water leakages in the supply network and eliminate hyperchloration problems in the network. As it will be shown later in more detail, an investment effort has being made to renovate piping.

Water leakages in the supply network will be 9 hm³ from the 60 hm³ distributed, which would mean a 15 %. But this percentage will be inferior after measuring consumption in public gardens. The network of meters is being now extended to many areas with gardens and trees watered with water that has not been measured.

✓ **Reference to the enforcement of the Framework Guideline on Water.**

The Municipality of Zaragoza plans and implements the municipal by-laws based on an efficient use of water, both in the [Municipal By-Law for Saving and Efficiency in the Use of Water and in Taxes](#), assuming the principles of the Framework Guideline on Water in aspects that form part of the municipal powers such as:

- ✓ Principle of recovery of water service costs.
- ✓ Efficient use of water through water saving devices and a progressive billing.
- ✓ Prevent water pollution by means of punishments/discounts, according to the level of the polluting charges when there are high-performance sewage-treatment plants.
- ✓ Supply of water of quality with the application of the best available techniques.

Question 2

Details of those targets achieved or not, to date (within the last 5 - 10 years). Provide a review of how both situations occurred and lessons learned.

(max. 800 words):

Make reference to:

1. Proactive leakage management;
2. Network rehabilitation;
3. Non-domestic metering;
4. Byelaw implementation in relation to efficiency in water usage;
5. Main efforts to use the tariff system to improve water supply;
6. Awareness raising campaigns.

✓ Reference to the preventive management of water leaks

The Municipality has set new actions in its second improvement scheme for a better control of the water network, dividing in sectors the whole distribution network. Its correct management of is an essential part to reach the general objective of reducing the consumption and boosting and efficient use of drinking water.

The low tension network of Zaragoza could be composed by more than 70 sectors, that working in a normal way should be isolated from one another even though in given moments such as bursts or lack of supply could be connected again.

The City of Zaragoza, thanks to the development and improvement of sectorization and the use of with techniques for controlling water leakages, pretends the automation and application of the most advanced technology for the exploitation of supply and sanitation networks.

Sectorization allows us an hydraulic analysis of the network, increasing our knowledge and detecting working problems very fast.

✓ Reference to the renovation of the system

The City manages and keeps the treatment plan of Casablanca that distributes water to the whole municipal area and even nearby municipalities.

The modernisation plan of the infrastructures related to water management in the city of Zaragoza is a direct consequence of the project for taking water of quality from the Pyrenees and solving the problems derived from the poor quality of water (due to its high natural salinity) in the city.

During the Plan, the rhythm of renovation and restoration of piping has been increased, reaching an annual rate of about 33 km. 15 km correspond to actions for road refurbishment, including the renovation of all the pavements and services.

The following table compares the evolution of the materials used in the network during the period 2001-2010.

Material	2001	2010
Fibre cement	451 km	299 km
Ductile iron	367 km	756 km
Reinforced concrete	77 km	68 km
P V C	64 km	55 km
Grey cast iron	44 km	25 km
Polyethylene	12 km	34 km
Others	9 km	6 km
Renovated	0 km	3 km
Total	1,024 km	1,246 km

The general panorama of the distribution network has changed very significantly during this period, since the adequate materials (ductile iron, polyethylene and the renovated stretches) have passed from a 37 % of the total while drawing up the Plan in the year 2000 to a 63.6 % right now. The most problematic materials (fibre cement and grey cast iron) have passed from 48.3 % to 26 %.

Renovation made in the supplying network has had a very substantial effect in the decrease in the number of bursts, that have passed from 0.70 km/year to 0.31 km/year.

2002	0.59
2003	0.48
2004	0.46
2005	0.46
2006	0.33
2007	0.32
2008	0.27
2009	0.31
2010	0.28

✓ Reference to non-domestic water meters

There is usually a meter for every activity. They are being placed in all the municipal facilities and garden areas for several years.

consumption (m ³ /year)	3,868	'9
Commercial consumption (m ³ /year)	282	'2
Industrial consumption (m ³ /year)	906	
Domestic consumption, air conditioning, fires (m ³ /year)	15	

All the activities taking water from the water table or surface water courses -sent back to the municipal sewers- also have a meter.

✓ **Reference to the implementation of rules promoting an efficient use of water**

A new municipal by-law on water was endorsed in January 2011. The Municipal By-Law for Saving and an Efficient Use of Water has been issued with the support of every municipal department involved, and collects in one text all the rules of the City of Zaragoza focusing on the management of the water cycle, including also aspects such as the guarantee of supply and the quality of water, efficiency, fostering sustainable habits, and the right of the citizens to be informed.

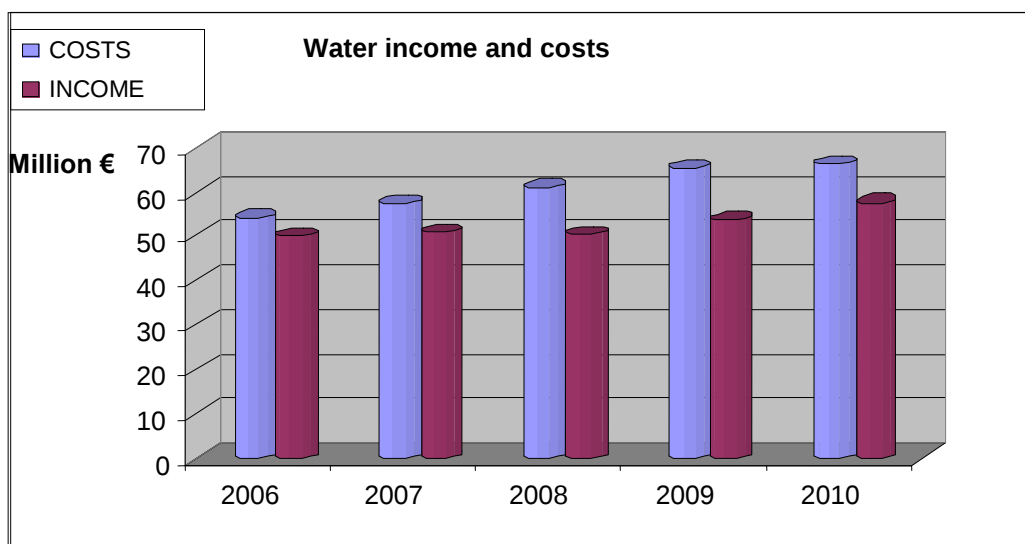
✓ **Reference to the effort for using a tariff system for water supply**

The municipal policy of the City of Zaragoza tries to redistribute charges in a non-homogeneous way what can be seen in the Municipal By-Law on Taxation that is revised every year. This law reflects a social character:

- ✓ Favours citizens with a low rent (retired people, unemployed, large families, etc).
- ✓ Promoting an efficient use of water (water price is reduced a 10% for families that have consumed a 10 % less in the last year. This measure is being applied now to more than 33,000 citizens from the 325,000 policies).
- ✓ Favours families, since the first 6 m³ /month consumed at home obtain a reduction of more than 50% of the cost price. This reduction is applied to a 30 % of Zaragoza's dwellings.
- ✓ Penalising an excessive consumption. The price of m³ in the third stretch is nearly 5 times higher than the first one.

At the same time, it is fostered the reduction of waste water pollution coming from industrial activities, since sanitation charges are proportional to waste pollution.

The charges system tries to balance all the costs and incomes of the water cycle.



A balance of costs and income in the water cycle is not reached despite the annual increase of charge over the ICP since it is applied a strong reduction on water consumption by economic and social incentives for responsible consumers. Therefore, income cannot increase in the foreseen quantity.

On the other hand, strong investments to restore the distribution network and reduce leakages continue.

10. Campaigns for increasing public awareness

The different campaigns to make people aware on the necessity of a responsible consumption of water, has served to reduce home consumption to less than 110l/person/day, a figure clearly under the national average of about 154 l/person/day. This strong reduction of home consumption shows that the majority of the population is aware of the importance of a rational use of water at home and of saving devices.

It is difficult to get the foreseen goals without a complex information and citizen participation planned to modify consumption habits.

The campaigns have been planned both for homes and for school children as well as for professionals, businesses and institutions that try to turn the citizens into the protagonists of the change, with also water policies issued by the Municipality.

9. The approximate cost of the campaigns from 2002 is around 2.500,000 Euro and have been implemented establishing two basic lines:

- ✓ Share with non-government organizations the guidance and spreading of the campaigns.
- ✓ Implementation with its own resources through the involvement of the different municipal areas, more concretely the Cabinet of Environmental Education of the Agency of Environment and Sustainability.

We are going to mention now the main projects implemented:

- ✓ Zaragoza, Water Saving City
- ✓ 50 Good Practices on Water Use
- ✓ Zaragoza, a water saving city: 100,000 Commitments
- ✓ Optimizagua
- ✓ Switch project
- ✓ Green Homes
- ✓ Education commitment proposal for rivers

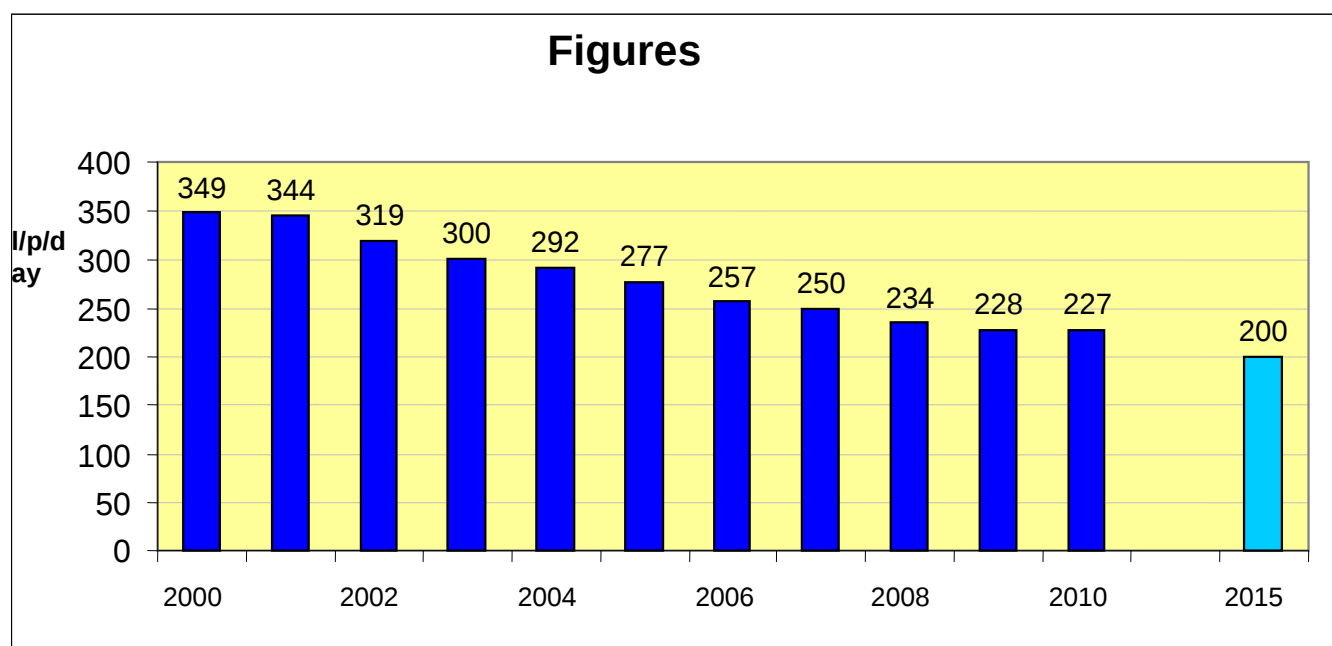
Question 3

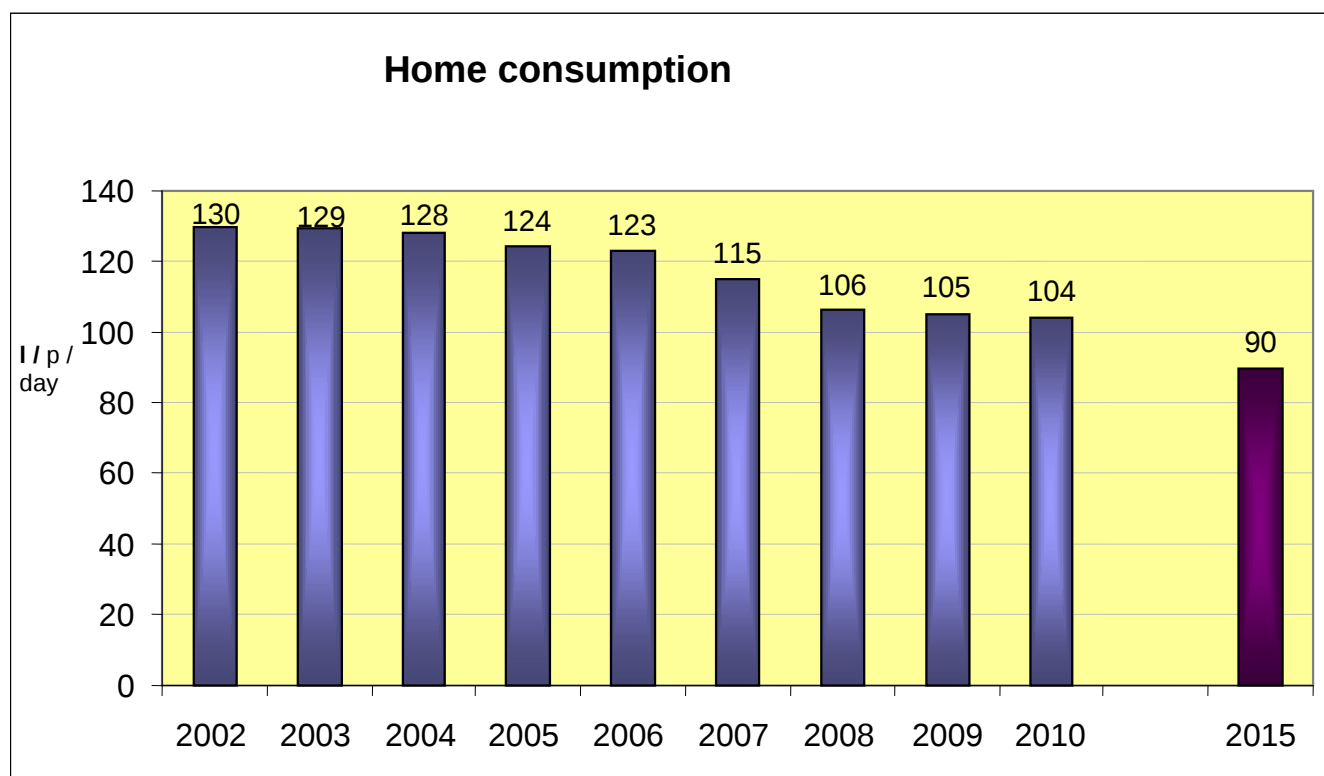
Plans to meet or revise key targets for the future and proposed approach to achieve these, including measures incorporating preparedness of water infrastructure to deal with future impacts of climate change. (max. 800 words)

Plans for goals related to water management for 2015 are being made, taking into account the long road already walked that makes it difficult to get gradual reductions in water consumption from now on. Therefore, it has been set out the possibility to reach:

- ✓ A total water consumption in Zaragoza of under 58 million m³/year, We are now in 60 but population will go on increasing
- ✓ A home consumption under 100 litres/person/day, reaching even 90. Currently we are in 105, but the citizens are aware that there is an extended use of saving devices and will be difficult to maintain the improvement of this parameter.
- ✓ Get a reduction to 200 litres/person/day. It also can be important the reduction that can be obtained from the services sector, above all with a more efficient municipal consumption, the biggest consumer of water in the city.

The following graphics show the evolution of these basic parameters related to water management, and the improving goals for 2015.





Every municipal department involved in water management is working within the framework of a new action plan allowing the city to reach the objectives established and based on the working lines developed for deepening into them.

Other important elements are the endorsement of the Municipal By-Law for Saving and Efficiency in Water Use, endorsed on February 2011, and the development of programmes based on R&D&I with the creation of a business cluster for an efficient use of water. Its goal is to become an international referent in knowledge and innovation for an efficient and sustainable use of water in the city, boosting qualified employment.

Economic sustainability of waste waters. Work is done under the principle of recovering all the costs of the water cycle. Therefore the municipal government will increase supply and sanitation charges over the CPI every year. But the willingness of the citizens to reduce home consumption has produced income to be under what it was foreseen. The following graphic shows the evolution of income and costs during the last years.

9. WASTE WATER TREATMENT

Question 1

Present details of the original and/or most recent Action Plan, including any relevant disadvantages or constraints resulting from historical and/or geographical factors which may have influenced this indicator area negatively.

(max. 1,000 words):

Make particular reference to waste water services quality, focusing on:

1. Access to service;
2. Flood occurrences and management;
3. Economic sustainability;
4. Infrastructures sustainability (treatment capacity, treatment level; drainage systems rehabilitation);
5. environmental sustainability (energy efficiency, renewable energy, pollution prevention efficiency; sludge treatment and final disposal, public health;
6. Integration into water management in general closing the cycle (efficient water use, treated waste water reuse).

Make particular reference to the Urban Waste Water Directive.

Question 2

Details of those targets achieved or not, to date (within the last 5 - 10 years). Provide a review of how both situations occurred and lessons learned.

(max. 800 words)

Question 3

Plans to meet or revise key targets for the future and proposed approach to achieve these.

(max. 800 words)

The city of Zaragoza is in an excellent situation concerning waste water treatment, with a 98% made. This service depends on the Municipality according to the terms of the Community Directive 91/271 on the treatment of city waste water and the legislation transposing this rule to the Spanish law RDL 11/95 and RD 509/96. The city has also an advanced plan for completing in a short period of time the treatment of the other 2%, as it will be detailed later on.

Zaragoza has two treatment plants working full time that are obtaining regularly a performance corresponding to secondary treatments and also systems for eliminating phosphorus.

- ✓ Almozara treatment plant, with capacity to treat waste produced by a population of 100,000 inhabitants and a daily volume of flow of 34,560 m³/day, opened in March 1989.

La Cartuja plant has a capacity for treating waste water produced by 1 200,000 inhabitants and a daily volume of flow of 259,200 m³/day. It was opened in May 1993.

Both infrastructures have enough capacity for treating all the urban waste of the city, since the population of Zaragoza is 698,186 inhabitants -according to the census at 1.1.2011- and the population according to BOD5 is approximately 950,000 inhabitants.

The results corresponding to the year 2010 of plants in volume of flow treated and average levels of pollution in waste and purified water are these:

La Almozara treatment plant: Volume of flow treated: 11.017,484 m³

	TSS (mg/l)	BOD5 (mg/l)	QOD (mg/l)
Waste water	215	209	425
Treated water	16	11	6
Performance(%)	92.6	94.7	84.2

La Cartuja treatment plant: Volume of water treated: 55.759,130 m³

	TSS (mg/l)	BOD5 (mg/l)	QOD (mg/l)
Waste water	377	32	
Treated water	20	11	86
Performance(%)	94.7	96.6	87.1

These results correspond to the analysis made during this year by the [Municipal Institute of Public Health](#), organism that, among other issues, makes the analytic control of these facilities.

It must also be pointed out that, even la Almozara treatment plan has not reached its limit of capacity. The Municipality has a collector that allows the city to send surplus water of this facility to la Cartuja plant that has enough treatment capacity.

To mark the revision of the sensitive zones made in 2006 by the Ministry of Environment, Mequinzenza dam, placed in the low course of the Ebro, was included in this category. From 2013, these two infrastructures will treat phosphorus according to the terms established in the Directive 91/271. La Cartuja sewage treatment plant has a system for eliminating phosphorus (average performance of 85.4 % in 2010), and la Almozara has launched this process during the first months of 2011.

In order to improve their balance of power, both sewage treatment plants have systems for producing power from the organic matter contained in mud and produced during the treatment process. The treatment of mud in la Almozara plant is made through anaerobic digestion. Therefore it has an engine that uses biogas produced in the digestion, 1.752,743 kWh in 2010. In la Cartuja plant, mud treatment is made by incineration, with a vapour turbine that uses hot from fumes. 3.869,700 kWh were produced during 2010.

An 80% of the mud produced by la Almozara plant is removed by farmers and used in wheat and corn fields. A 20 % is taken to the Recycling Technological Park of Zaragoza for passing a composting process through the organic fraction of urban waste.

La Cartuja mud, after been thickened by gravity and dehydrated by tumblers, is incinerated in a fluidised bed roster after a dry process. The main goal is its exploitation for producing power and obtain an important reduction of the volume of waste taken to the safety deposit.

A modification of the contractual conditions has been recently introduced in la Cartuja plant, including among other issues the implementation of work by the franchiser company to improve its balance of power. The actions are:

- ✓ Installation of frequency variations in equipments suffering from different levels of charge
- ✓ Improvement of the lighting system of the plant
- ✓ Optimization of the vapour system of the turbine to increase the production of electric power
- ✓ Construction of a mini-hydraulic power station making use of the waterfall produced when pouring clean water to the river
- ✓ Optimization of the input system for sending oxygen into the biological reactors
- ✓ Improvement of the ventilation and deodorising system of the plant.

This package of works will get a reduction slightly over 5.000,000 kWh/year

From 2002, the city has a plant for the adequate treatment of mud produced during the drinking water treatment, consisting of a dehydration process avoiding dumping to one of the watercourses of the city, and recovering the water contained in the mud, around 5 hm³/year. The dry material obtained during the dehydration process is sent to a cement factory and employed as a component for making that product. This is the only aspect in which water reusing takes place up to a certain point, since the existence of an abundant aquifer near the surface makes it possible its use for the irrigation of green areas and different industrial consumptions.

The Municipality of Zaragoza is making an effort to put costs on a level with income derived from the water cycle, mainly related to sanitation and waste water treatment.

The reduction of water consumption mainly at home and the industrial sectors do not offer a balance between income and costs, even though income has recovered a 96% of the total of costs for sanitation and water treatment.

It has to be taken into account that the costs derived from the investment made for the construction of La Cartuja plant -around 9 million €/year and that will be finished in 2013- are included in the sanitation costs.

La Cartuja plant -built to treat waste water for approximately one million people- has produced an important innovation in the plants built in Spain. This infrastructure was planned to have the least possible environmental impact. Therefore, all the processes underwent by waste water and mud is made in closed and compact buildings and facilities. Noise by acoustic insulation and bad smell are avoided since there is a deodorization treatment for the air inside the building.

La Cartuja plant combines a high performance in the elimination of the pollution charge of waste water with high environmental quality due to the absence of disturbances in the surrounding environment.

Problems related to floods in the city of Zaragoza have two different components depending on their origin. They can be originated by big floods in watercourses and specially in the Ebro river, or by a storm with hard rain that produce floods of limited reach and duration in points where the sewer system has not enough capacity for evacuating rain water tops, forming low points without a natural drain.

The Ebro river can present very big floods, with more than 4,000 m³/s for return periods of 100 years. Forming part of the process for the recovery of its urban riverbanks for Expo 2008, the lowest areas of the city have been protected against floods corresponding to a return period of 500 years. Therefore, the city is now in an adequate situation.

Contrasting with localised floods produced by hard rain, summer storms with an intensity till 40 l/ m² in very short periods of time, the most adequate solution is being analysed. This can be to increase the capacity of the sewer system or the construction of laminated tanks for a temporary storage of an important volume of water to be later poured in a controlled way to the sewer system. A tank has been recently built, avoiding floods in the final stretch of Avda. de San Juan de la Peña.

Even though, as it has been presented here, the city of Zaragoza has a good sanitation and in particular a good waste treatment system, there are aspects that have to be improved.

An important part of this kind of actions is included in the Improvement Plan for the Hydraulic Infrastructures of the city of Zaragoza that is being implemented right now. The Plan is subsidised by European Funds through the Operative Programme of Cohesion Funds-Feder 2007-2013.

Sanitary actions of the Plan:

A. Actions to complete waste water treatment. As it has been indicated before, Zaragoza has six small rural districts without waste treatment service, with a population slightly under 20,000, representing around 2% of the pollution produced in the city.

Three of these districts (Casetas, Garrapinillos and Villarrapa, have signed an agreement with the Aragonese Institute of Water -depending on the Government of Aragon- for the treatment of its waste water in the plant to be built in Utebo. As compensation, this agreement includes also that the waste water of two small villages (la Puebla de Alfindén and Pastriz) will be treated in la Cartuja plant. This agreement shows the degree of collaboration existing between the different institutions to optimize infrastructures and reduce the necessary investment costs.

The Improvement Plan also includes works in the other three districts:

- ✓ Juslibol: it is being implemented a work to connect its dumping with the collector in avda. de Ranillas, allowing water to flow to la Cartuja plant. The budget is 881,000 Euro.
- ✓ Movera: the same as Juslibol, a collector is being built to send its waste water to Malpica industrial area. Water is treated in la Cartuja plant. Budget: 1.022,221 Euro.
- ✓ Peñaflor: in this case, as there is not a close sewer system to conduct waste water to the existing plants, the solution has been to build a small waste treatment plant for the district. The project has been drawn up and the budget is 2.072,940 Euro.

B. Improvement of management of rain water. The Plan includes the construction of two storm tanks in the collectors of the right and left banks of the Ebro, placed close to the main dumping points. Both collectors are unitary, therefore these tanks retain the first volume of mix of waste and rain water, the most polluting ones. Their projects have already been drawn up and the budget is 7.499,988 Euro for the left bank collector and 5.429,899 for the right one.

- a) Restoration of sanitation networks in city areas in which the existing collector network is in bad shape, have tightness problems and leakages of waste water in the freatic levels. The Plan includes two actions that affect the surrounding area, with a budget of 5.429,899 Euro.
- Actions to avoid flooding in areas with a sewer system without enough capacity and with low points without natural drain. When rain is very intense, water accumulates and affects particular belongings and road traffic. The Plan includes two actions combining the construction of a lamination tank to store in a provisional way a part of the rain water, with the improvement of the sewer system. It has also been implemented a first work affecting the final stretch at avda. S. Juan de la Peña (budget: 4.404,404 Euro), whereas the plan for the second one, a stretch at avda. Valle de Broto, is being prepared with a budget of around 4.000,000 Euro.

This package of actions will improve the sanitation services of the city producing a fast resolution of the main lacks of the city.

It can be highlighted the recent endorsement (28 January 2011) of a [new municipal by-law for ecoefficiency and quality in the integral management of water](#) for advancing in sustainability of water management. New urbanisations must have separated sewage systems and systems for making the most of rain water for the irrigation of green areas.

10. ECO INNOVATION AND SUSTAINABLE EMPLOYMENT

Question1

Present details of the original and/or most recent Action Plan, including any relevant disadvantages or constraints resulting from historical and/or geographical factors which may have influenced this indicator area negatively.

(max. 1,000 words):

Make reference to:

1. Innovations that address material security (substitution, minimisation of material use, closing loops, etc) and reduce environmental impacts;
2. Awareness raising and training to encourage the development and take-up of environmentally friendly technologies, particularly through training in industrial and business settings.
3. Social innovation, including for example community programmes, that shows entrepreneurship and new ways of organisation in order to promote sustainable development and protect the environment locally and globally.
4. Number of jobs created in green sectors such as renewable energy and waste recycling, in total and as share of total jobs in the city and total jobs created during a period of one year.
5. Share of energy provided in the city that is sourced from renewable energy sources. Renewable energy sources to be specified.
6. Share of hybrid or fully electric cars sold in total car sale.

Present details of the original and/or most recent Action Plan, including any relevant disadvantages or constraints resulting from historical and/or geographical factors which may have influenced this indicator area negatively.

(max. 1,000 words):

Make reference to:

1. Innovations that address material security (substitution, minimisation of material use, closing loops, etc) and reduce environmental impacts;
2. Awareness raising and training to encourage the development and take-up of environmentally friendly technologies, particularly through training in industrial and business settings.
3. Social innovation, including for example community programmes, that shows entrepreneurship and new ways of organisation in order to promote sustainable development and protect the environment locally and globally.
4. Number of jobs created in green sectors such as renewable energy and waste recycling, in total and as share of total jobs in the city and total jobs created during a period of one year.
5. Share of energy provided in the city that is sourced from renewable energy sources. Renewable energy sources to be specified.
6. Share of hybrid or fully electric cars sold in total car sale.

A. Aragon has 1,345.000 people from which 701,090 live in Zaragoza, 800,000 with its metropolitan area (a 60% of the total). There are no individual data on employment by cities.

In Aragon, the survey “Green Employment in a Sustainable Economy” made by the Spanish Observatory of Sustainability (OSE), quantifies in around 20,000 the number of people working in activities related to the environment. The most numerous are management and waste treatment activities with more than 4,000. In 10 years, green employment has increased a 235%. In Zaragoza, 12,000 people are working in green employments.

Several examples can be given of Zaragoza projects that ratify that this city is between the firsts in creation of green employment.

a) Sustainable construction: Ecociudad Valdespartera, and “Cero Emisiones” building (CIEM)

The Municipality of Zaragoza, in collaboration with other institutions, has developed a new urban zone called Ecociudad Valdespartera, a new district with approximately 10,000 subsidised dwellings. Its first planning parameter has been sustainability (building guidelines, use of solar energy to boil water, automatised waste collection, etc. In the middle of the district it has been built the CUS (Sustainable Urban Centre) where the whole process is monitored. The CUS building has also been built with bioclimatic criteria. It is an area for applied research that collects, interprets and spread data on climate, energy and environment as well as a network consumption. Valdespartera has now 151 monitored dwellings, Picaral district 21 and the School Cándido Domingo 3.

Digital Mile Business Incubator (CIEM), placed in “Cero Emisiones” bioclimatic building is a project developed by the Municipality of Zaragoza. Its general objectives are boosting innovation, employment and development of environmental sustainability. It has been created to host companies, microfirms, foundations, and research institutions, both technologically based and those linked to environmental sustainability, R&D, innovation and creativity. The building has been built following bioclimatic parameters that allows it to reach a near zero net balance of emissions and a positive power balance, since it will generate around 84,000 kWh per year of green energy. 57,000 of them will be for consumption and more than 20,000kWh/year could be sent to the electric network.

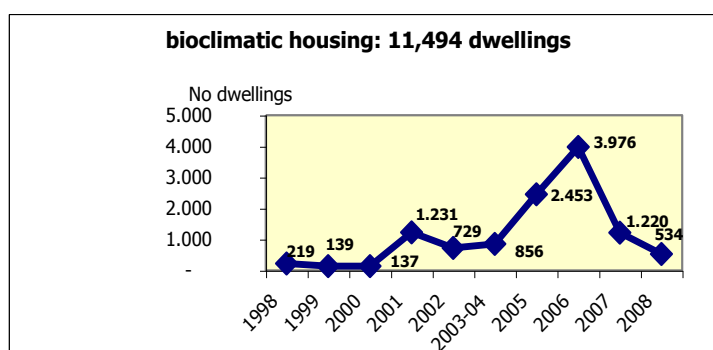


b) Electric vehicles:

In December 2010, Zaragoza opened 33 points for recharging electric vehicles, added to those installed by the private initiative are totalling about 50 (20 July 2011). The Municipality is also foreseen to create additional points placed at the posts of blue parking areas, being the first Spanish city undertake this measure for boosting green cars. This is done with the development of different initiatives, use and exploit of technology for electric vehicles, and an agreement signed by the Municipality and the Institute of Engineering Research of Aragon (I3A) of the University of Zaragoza. It is foreseen that, thanks to the participation of I3A in a European project linked to this field, in two years time electric vehicles are planned to be able to move in complicated surroundings for performing tasks such as street cleaning and waste collection. Adaptation of transport for tourist groups between 8 and 10 people is also being studied.

c) Zaragoza and renewable energies

Aragon, with 1,800 MW, has been in the last years the fourth Spanish region in wind power. The province of Zaragoza concentrates the majority of wind parks and power with at least a 80% of installed power. Iberdrola, Gamesa and Vestas are some of the companies that have rented land in rural areas with good wind conditions and operate Zaragoza wind parks.



d) Organisms working for the development of green employment in Zaragoza.

Several organisms of Zaragoza are working in sustainability industries: Fundación CIRCE, specialised in renewable energies and technology and with more than 250 researchers; the Research Group on Transport and Logistic (GITEL); Aragon Technological Institute and other research centres linked to the University of Zaragoza; the Carbon-chemical Institute; CITA; the Nanotechnology Institute; Aula Dei; and clusters related to sectors of power efficiency, sustainable technologies and renewable energies.

e) Zaragoza firms that are developing eco-innovation projects

Many important eco-Innovation projects are been implemented by companies such as:

- ✓ The Club of Excellency in Sustainability awarded in its last edition the electrical appliances company BSH, with factory and R&D&I centre in Zaragoza, for its best practice in energy efficiency due to the eco-design of their products, where environmental aspects are taken into account in its whole life cycle -design, manufacture, distribution, use and use ending- and in the last technologies developed by this company such as Zeolitas drying technology for washing-machines.
- ✓ The biggest factory around Zaragoza, General Motors Figueruelas has launched the [Solar Energy](#) Station with the biggest ceiling of the world a, with an annual production of 15.1 million kWh, enough to supply 4,600 homes. The massive solar system was planned in association with the Government of Aragon, Veolia Environment and Clairvoyant. With 85,000 light solar

modules and an active photovoltaic surface of 183,000 m², this power station can reduce CO₂ emissions in at least 7,000 tons/year.

- ✓ Zaragoza has an industrial area with more than 600 ha exclusively for recycling firms (tyres, electrical appliances..), the Recycling Technological Park, a 100% private owned facility.
- ✓ TATA HISPANO, that is right now developing an urban bus in Zaragoza, is the third biggest world manufacturer and its central factory of Zaragoza is committed to the development of new technologies respecting environment in collaboration with different leading entities such as the ITA (Aragon Technological Institute), Aragon Hydrogen Foundation, Aragon Automotive Cluster, Besel, Motorland, CADI Institute and AITIIP Foundation among other organisms.

Question 2

Details of those targets achieved or not, to date (within the last 5 - 10 years). Provide a review of how both situations occurred and lessons learned.(max. 800 words):

Make reference to initiatives aimed at increasing eco-innovation and sustainable employment. E.g. projects under Cohesion Policy funds, LIFE, Environmental Technologies Action Plan (ETAP) etc

The City of Zaragoza has a Municipal Law on Energy Eco-efficiency and use of Renewable Energies in buildings and facilities.

Zaragoza Vivienda, with the participation of the University of Zaragoza, the Aragonese Institute of Employment, ECODES and private companies, is developing a LIFE European Project aiming at knowing the relations existing between efficiency in the use of water, energy saving and creation of employment, showing that there are initiatives linking the socio-economic and environmental realms of development. This project pretends to demonstrate that there are solutions to the economic crisis for resolving in an integral way environmental, economic and social problems.

The objectives established in Zaragoza Strategic Plan for the year 2020 on sustainability are these:

- ✓ Saving, efficiency and renewable energies
- ✓ 1,600 MW produced by renewable energies
 - ✓ Reduction of a 20% in the total consumption of energy in the city
 - ✓ Sustainable management of the cycle of water
- ✓ Reduction to 55 m³ the consumption of drinkable water in the city for 2020
 - ✓ Reduction of a 20% in water consumption for irrigation in the surroundings of Zaragoza
- ✓ Waste
 - ✓ Reuse of 70% of waste produced in Zaragoza and its surrounding area.

Aragón has 12 groups or clusters that produce the 48% of the GDP, with more than 470 companies with an average turnover of around 17,500 million and employing 86,187 workers. From the 12 clusters, 3 are directly linked to eco-innovation:

- ✓ Urban cluster for the efficient use of water, Zinnæ: 24 firms and organisations with the goal of turning Zaragoza into an international reference on an efficient and sustainable use of water. Nearly 5,600 companies are linked to this sector, with more than 38,500 workers (in the province of Zaragoza). The goals are:

- b) Boost efficiency and sustainability in the management and use of water and power consumption in the city of Zaragoza
- c) Contribute to the development and consolidation of a local sector connected, innovative and international
- d) Consolidate the city of Zaragoza as a national and international referent in efficiency and sustainability of water management, and in the use of water and energy
- e) Turn the sector for an efficient use of water in a booster for creating qualified employment in the city
 - ✓ Automobile industry cluster: 32 companies and organisms with goals such as the development of new sustainable technologies (hybrid and electric vehicles, biofuel, hydrogen, etc).
 - ✓ Cluster of biomass and energy: with 13 companies and organisms for forming a referential forum in the Ebro Valley, in order to promote, innovate and develop projects contributing to the development of ideas for the development of biomass renewable energies in every action field.

There is also the Foundation for the Development of New Technologies of Hydrogen in Aragon, private entity boosted by the Government of Aragon in 2004 that includes a board formed by 62 members. The Foundation works for the development of new hydrogen technologies in synergy with renewable energies, and for the promotion and incorporation of Aragon to economic activities linked to the use of hydrogen as a power vector. The new Master Plan of Hydrogen of Aragon 2011-2015 has been presented as well as an analysis for validating the strategic lined previously identified. 75 projects have already been implemented with the collaboration of 185 entities, and 7 patents have been applied for Aragon on hydrogen. In the field of researching, 13 groups have been formed and 70 doctoral theses on hydrogen and fuel batteries have been presented.

Another project with a big social spreading and a direct impact in the increase of sustainable employment is the initiative of Zaragoza Vivienda called "[estonoesunsolar](#)". As a result of the plan for long-term unemployed people, the initiative was launched with the goal of transforming low-cost and barren areas into municipal plots of land and private spaces. These new "temporary public areas" were equipped for sport and ludic uses, for children, recreational and educational activities, etc., with the use of recyclable materials. The programme, that has recovered 75 empty plots of land and has employed more than 170 persons, has been a pioneer activity in Europe, being awarded different international prizes.

Question 3

Plans to meet or revise key targets for the future and proposed approach to achieve these. (max. 800 words)

Strategy of Ebrópolis and the Agenda 21 Local with the Conference of Zaragoza Businessmen

EBRÓPOLIS was founded in 1994 with the fundamental goal to draw up the strategic plan of Zaragoza and its surrounding area. This is what it has been doing during all these years, keeping its associative form as a meeting forum for all kind of entities in the private and public fields (the Municipality of Zaragoza is its main partner and the Mayor its President).

The first Strategic Plan was presented in 1998 and revised in 2006. In 2011 has been issued the new Strategic Framework with the main lines that should mark the future of the city until the year 2020. This document is issued after holding the International Exhibition 2008 and the expiry of the Strategic Plan of 2006.

The framework document endorsed by the General Assembly of members in April 2011, presents the new vision for the city and establishes different transversal axes and dimensions issued from the four basic documents drawn up from four working fields: territorial, economic, sustainability and social, and educational and relational. This Strategic Framework Zaragoza 2020 is an open document that allows specialists to establish more concrete points and work by projects in the development of the strategy. This is, therefore, a programme framework that forms the ground for continuing with the strategic work of the city.

This new strategic framework is based on the Vision Zaragoza 2020 where a balanced area with the environment is presented, supported by its own values and backed up by creativity, capacity of attraction and connectivity. The document is articulated in several strategic axes that consider Zaragoza as City of Citizens, of Alliances, Innovative, Global Territory and City, and Sustainable and Communicative place.

Zaragoza, as sustainable city, is working in 5 lines of action:

a) The consolidated city

Zaragoza bets on an urban growth focusing on the consolidated city, under a double criteria of revitalisation and development of the districts, and completion of the still pending urban areas.

b) Zaragoza, city of water.

After Expo 2008, Zaragoza became “the city of water” and its goal is to materialize that vision in an economic reality through a collaboration between different organisms of research, business and university, both national and international, in order to consolidate a large sector focusing on water and industries that optimize this resource to get a sustainable use.

c) Sustainable mobility

Zaragoza will deepen into a strategy focusing on a sustainable management of mobility, with the goal of contributing to the reduction of pollution, creating new urban areas for the citizens, and promoting equal access for every social group. As a result, the implementation of sustainable measures with actions linked to traffic, public transport, design of new vehicles, commuter train as interconnection system with the surrounding area, intermodality, etc will be adopted.

d) Sustainable management of resources

Zaragoza will deepen in its management of natural resources for sustainability and its fight against climate change. This will produce strategies on energy saving and consumption of resources, reduction of CO₂ emissions, improvement of air quality, waste recycling, efficient water management and boosting of renewable energies.

e) Boosting of not-developed surroundings

Zaragoza will introduce a strategy for sustainable management in not-developed surroundings and linked to agricultural lands that will produce a commitment to establish a strategy for the protection of its agricultural

land (orchards) and the boost of its sustainable management linked to innovation and creativity. This will involve the development of the potential of its power use (generation of power through renewable energies, technology, sustainability), social uses, sports, leisure, etc

Agenda 21 Local. The Agenda counts with relevant facts for establishing a quality system (UNE 14001) in companies for saving water, paper and energy. The City of Zaragoza is developing actions for the implementation of the European Common Indicator B7, with the Confederation of Business People of Zaragoza (CEZ), the Confederation of Small and Medium Size Businesses of Zaragoza (Cepyme) and the Chamber of Commerce.

11. ENVIRONMENTAL MANAGEMENT OF LOCAL AUTHORITIES

Question 1

Present details of the original and/or most recent Action Plan, including any relevant disadvantages or constraints resulting from historical and/or geographical factors which may have influenced this indicator area negatively.

(max. 1,000 words):

Make reference to:

- 1. Number of municipal departments with certified environmental management systems (ISO 14001/EMAS);**
- 2. Percentage of consumed eco-labelled and organic products by municipalities, measured as a share of the total product consumption within similar category.**

a) ZARAGOZA AGENDA 21 LOCAL

The foundation document of the Agenda 21 Local, the issuing of the sustainability indicator and the process of citizens' participation was signed on 27 June 2001. This Plan of Local Action of Zaragoza was launched with the political decision of the local authorities to launch a strategy for the sustainable development of the city adopted on 24 March 2000 by Agreement of the Municipal Plenary. The Plan included four essential points:

- ✓ Ratify the support to Aalborg Charter on Sustainable Cities
- ✓ Ratify the support to Hannover Declaration on February 2000
- ✓ Ratify the establishment in Zaragoza of the 10 Indicators of Sustainability presented by the European Agency of Environment
- ✓ Plan a Programme for Establishing the Agenda 21.

The Agenda 21 Local of Zaragoza is based on the principles of the Rio Summit of 1992 and the Aalborg Charter of 1994, and has been prepared taking into account the advices of ICLEI. As a result, four stages framed within the process of integration and citizen participation have been taken into account:

STAGE	ACTION	DATE
General auditory of the city	Diagnosis of the city and its surroundings. Zaragoza Strategic Plan and its Influence Area	1994-1996
Definition of objectives	4 objectives	1996-1998
Action plan	17 auditories and 25 specific actions	2000-2010
Sustainability indicators	10 European common indicators and 24 Local specific indicators	2000-2010

The organ responsible of the technical control and monitoring of the action plan, the Agency of Environment and Sustainability (before Office of Agenda 21 Local), coordinates the different actions implemented by the Municipality, establishes indicators on sustainability and elaborates programmes for increasing its public awareness and spreading.

The Agency of Environment and Sustainability has the following participation organs: the Sectorial Council of the Agenda 21 Local, passed by the Municipal Plenary on 30 July 1998 and formed now for 96 members and 21 commissions; technical groups specialised in every topic for debate: noise group, bicycle group, Commission 21 on climate change, biodiversity, efficient use of water, etc (annex: organization chart).

The action planned and passed initially for the establishment of the Agenda 21 Local (2000-2010) included several actions framed in four general objectives with global strategies that collect and interrelate all the actions implemented.

OBJECTIVES OF THE AGENDA 21 LOCAL
Integrate nature in the city and its area of influence
Improve air quality
Boost the development of clean technologies and adopt systems for an operative waste treatment
Improve water quality, reduce inadequate uses and boost research

This process is not static but is constantly changing and the topics and agents implied are transversal. No action is isolated but all of them can affect one or several objectives.

The implementation of systems of environmental management in the municipal departments has been progressive since the approval of the Agenda 21 Local:

- ✓ Sport centres in rural districts. The centres obtained the certification ISO 14.000:2004 in 2007 through AENOR, being the starting point for establishing systems of environmental management in other municipal services.
- ✓ Luis Buñuel Park has been the first Spanish park that has obtained AENOR certificate for the management of sustainable parks and gardens, and the Metropolitan Water Park the certificate RP B16.01 of AENOR
- ✓ Torrero Mount established in 2005 the system of sustainable forest management and has FSC certificate
- ✓ Public service companies specialized in mobility, waste collection, reforestation, park caring, etc, are environmentally certified.
- ✓ Society Expoagua Zaragoza 2008 was certified since its foundation in order to hold the International Exhibition 2008. It continues to be certified due to its work on fitting-out its installations for different uses and services that are developed or will be developed in the future.

Other municipal services have obtained the most suitable degrees of certification of quality and sustainability for its different working areas, ISO 9001:2000, ENAC, Q of quality (first Spanish city), AENOR official certificate of ICT accessibility, or they have introduced service letters to formulate commitments with its citizens and improve quality standards. Social work is favoured as a learning method for the integration of handicapped people through different municipal contracts.

The Municipality has been introducing during these years different criteria on environment and social responsibility referring to every relevant activities.

- ✓ Use of recycled paper without chlorine for nearly all municipal uses (excepting a small quantity of certain kind of institutional paper). Recommendations are made for saving paper such as printing on both sides, etc.
- ✓ 100 % of food of automatic vendor machines fulfil the criteria on sustainability and fair trade
- ✓ All the office machines are bought following criteria of the ecological label
- ✓ All the street-lights of the city have LED lighting
- ✓ Contracts for external cleaning companies are awarded taking into account that the products used by them follow the criteria of the ecological label
- ✓ According to the Agreement of 28/9/2005 for awarding outsourcing for public works, companies have to give information on its development conditions, materials used and

management of waste as well on the suitability of the possible subcontracting businesses. It can also be demanded that all the timber used must be certified by the systems FSC or PEFC, and regulates the suitability of the machinery and the use of electrical or hybrid vehicles with low noise levels.

- ✓ An agroecological market is being organised in different public areas of the city from 2009.

Question 2

Details of those targets achieved or not, to date (within the last 5 - 10 years). Provide a review of how both situations occurred and lessons learned.

(max. 800 words):

Make reference to:

- 1. Developing an overall policy for environmental management of municipal activities;**
- 2. Increasing the share of the total consumption of eco-labelled, organic and energy-efficient products.**

2. GLOBAL POLICY FOR THE ENVIRONMENTAL MANAGEMENT OF MUNICIPAL ACTIVITIES

a) Compliance of the objectives of the Agenda 21 Local

The sustainability indicators give us a first assessment of the global efficiency of the actions planned for reaching the expected goals. Its last updating, *Updating of the Sustainability Indicators 2010*, presents the achievement of the four objectives with very positive results:

OBJECTIVE	SUB-OBJECTIVES	ACHIEVEMENT 2010
1. Integrate nature in the city and its area of influence	a) Turn the Ebro into the central park of the city with extensions to the north and south by its tributaries	YES
	b) Establish a network of big open spaces	YES
	c) Establish a system of green corridors	YES
2. Improve the quality of air	Reduce dependence on fossil fuels	YES
	Reduce atmosphere emissions produced by construction works, planning and urban mobility	YES
	Actions in industrial sectors	YES
	Reach commitment of public administrations	YES
3. Boost the development of clean technologies and adopt operative waste management systems	Promote clean technologies	
	Boost action for the recovery of waste	YES
4. Improve water quality, reduce inadequate uses and boost research	Promote public actions for water saving in supply and waste	YES
	Preventive and research actions	YES

1. Integrate nature in the city and its area of influence.

Recovery of the river banks for creating ecological corridors on the three rivers Ebro, Gállego and Huerva that flow into the city, and link them with their natural environment:

- ✓ constitution of the network of biological corridors linked to biodiversity rich areas

- ✓ consolidation of referential and identity elements of the natural environment: Galacho de Juslibol, Torrero Mounts, Peñaflores Reserve, and Water Park.
- ✓ Green areas have been multiplied by 2.5 between 2000 and 2010.

2. Improve air quality

The objective of producing 400 wind MW in Zaragoza for 2010 has been widely overcome with 712 MW coming from renewable energy.

A reduction of 7.56 % in CO₂ emissions (ECAZ goal 2010: 10 %) was reached in 2010. During the period 2008-2010, the quantity reached 11.32 %, overcame the target goal showing a clear positive trend that indicates the suitability and effectiveness of the actions planned in the ECAZ to reach the general objective for 2014: a 10 % reduction.

Air quality parameters are adapted to the demands of the EU.

Voluntary agreements in the industrial sector (100 million Euro) to reduce bad smells, CO₂, particles and NO_x.

3. Boost the development of clean technologies and adopt operative systems for waste management

- ✓ Introduction of systems of environmental management in the city and in its business-industrial fabric.
- ✓ Meetings Club with Agenda 21 Local.
- ✓ Innovation and specialisation in waste and recycling: creation and implementation of the Municipal Centre for Waste Management (transformation in energy (biogas) and compost), and Recycling Technological Area. System of Pneumatic Waste Collection in Valdespartera with a subterranean piping for transporting organic waste and containers.
- ✓ Approval of Zaragoza's Strategic Map of Noise and its Action Plan for Fighting against Noise (17.2.2011).

4. Improve the quality of water, reduce its inadequate use and boost research.

Two guidelines with different actions are established based on the improvement of the services, the distribution network and the exploitation and control of quality.

The general objective of the Plan for Improving Management on the Quality of Water (2002-2009), to reduce a 19 % in consumption, from 79.3 hm³ in 2000 to a top of 65 hm³, was overcome in 2006 (64.1 hm³), and a reduction of 25.2 % was reached in 2009. On the other hand, consumption by person and day in 2010 was 104.04 litres (the average in Spain was 154 l/person/day in 2008).

1. Environmental management of municipal activities

The actions directly related to the environmental management of municipal activities are included in the action line called MUNICIPAL SERVICES, focusing on different topics among them:

- ✓ Procurement of resources and award of outsourcing using sustainability criteria with environmental and social characteristics
- ✓ Installation of systems for saving water and energy
- ✓ Exploitation of waste management systems to obtain energy and composting
- ✓ Installation of renewable energies in buildings and municipal installations (photovoltaic solar power in covers is over 3 MW)
- ✓ It is made compulsory the use of biofuel and other systems to reduce emissions (hybrid, electric, etc) in municipal vehicles and municipal outsourcing.

Question 3

Plans to meet or revise key targets for the future and proposed approach to achieve these.
(max. 800 words)

3. AGENDA 21 LOCAL AND SYSTEMS OF ENVIRONMENTAL MANAGEMENT

In the ten years of existence of the Agenda 21 Local, the actions foreseen in the initial action plan and other new ideas produced in a continuous process for improving sustainability in Zaragoza have been implemented. As these projects advance, different strategies and rules for future actions have been approved:

- ✓ Strategy for the conservation of biodiversity in Zaragoza
- ✓ Municipal by-law for Ecoefficiency and Quality of Water Management
- ✓ Strategy for mitigation of climate change and improvement of quality of air in Zaragoza
- ✓ Zaragoza's adaptation strategy to climate change and integration of nature in the city by the biodiversity strategy
- ✓ Municipal by-law on energy ecoefficiency and use of renewable energies in buildings and its installations
- ✓ Order in Council of 12 April 2007 on the use of ecological fuel in municipal vehicles and outsourcing
- ✓ Zaragoza strategic map on noise and action plan against noise.

It is important to take into account that many of the measures adopted in the last year to promote sustainable actions have become compulsory by the legislative measures adopted (criteria on saving energy and water at home, waste management in construction works, etc).

As an essential support for all these measures, the City of Zaragoza has been developing for more than 25 years programmes of environmental education intensified from the establishment of the Agenda 21 Local. The municipal programme of environmental education "From my classroom to my city, an education commitment with the environment" contains three main working lines: biodiversity, climate change and water. The programmes on climate change and quality of air are included under the motto "Stop CO₂" and are addressed both to students and citizens in general.

A project of environmental education on energy saving and fight against climate change in three referential districts of the city in relation to sustainability will be developed from 2010 to 2015. These districts are referents in their lines of action: Valdespartera ecocity for its plan; el Picarral district for introducing

restoration elements (both form part of European project Renaissance); or for its bioclimatic buildings such as Parque Goya. The project will be also implemented later on in the whole city.

The programme “Green Homes” for boosting energy and water saving at home as well as favouring sustainable mobility and consumption has been implemented between 2008 and 2010.

Another participation forum has had its starting point in the boosting of systems of environmental management in service firms and the industrial and business fabric of the city. The Meetings Club organised with the Agenda 21 Local is a pioneering initiative of the Municipality of Zaragoza issued from the participatory spirit of Rio Summit and with a marked innovative character.

Programme 21, Earth Summit - ‘Rio 92, art.28’.... Every local authority should start a dialogue with the citizens, local organizations and private companies, and approve a programme 21 local. Through consults and boosting a consensus, local authorities should receive the ideas of the citizens and the civic, business and industrial local organizations, and should obtain the necessary information to plan the best strategies....”

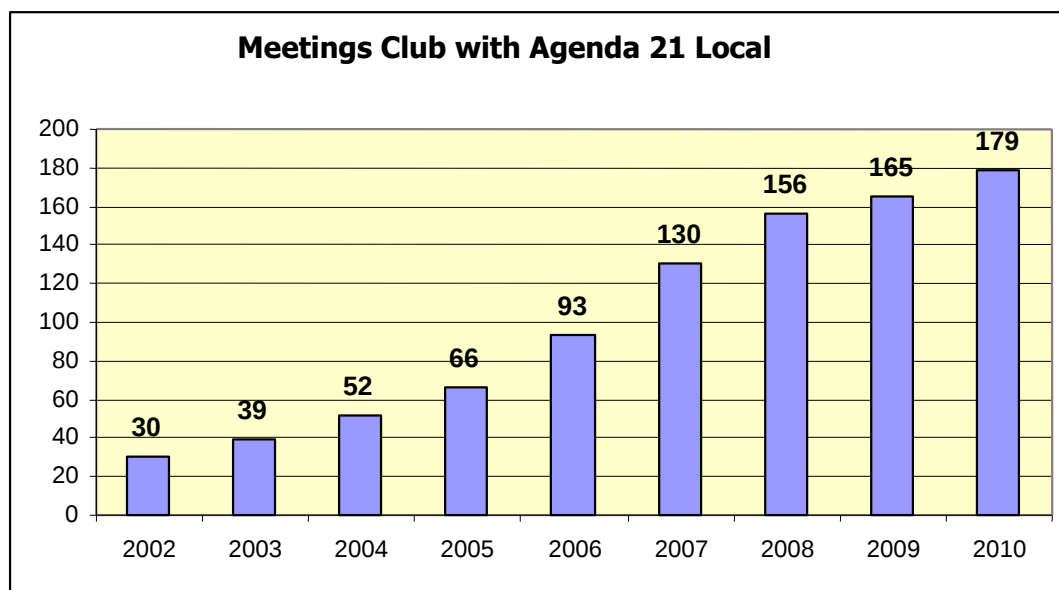
The Confederation of Business people of Zaragoza, CEZ and the Confederation of Small and Medium Size Firms of Zaragoza, CEPYME ZARAGOZA, signed in 2001 a collaboration agreement with the Municipality to implement the European Common Indicator B7.

This indicator is one of the ten presented in Hannover Summit forming part in 2000 of the initiative *Towards a Profile of Local Sustainability: European Common Indicators*. Zaragoza has fully developed all of them.

The indicator B7, *Sustainable Management of Local Authorities and Local Companies* has been articulated in Zaragoza by this club formed by a group of firms with certificates of environmental management ((ISO 14001 o EMAS).

The Meetings Club of the Agenda 21 local was launched in September 2011 with 22 companies and now the number of partners is 187, with the aim of contributing to spread the culture of environmental certifications in the city and working with the Municipality to improve sustainability in Zaragoza through its own actions and training activities organised with other institutions. The role of the club goes even beyond that , since these firms have forced satellite companies to adopt their systems of environmental management, serving at the same time as an example.

All the big firms by number of workers form part of the club and belong to the most representative sectors of this activity.



European Common Indicators. Hannover 2000. Booklet 18. Updating of the Sustainability Indicators of Zaragoza 2010. Agencia de Medio Ambiente y Sostenibilidad

As for the products with ecological label and environmentally friendly -sustainable food products and fair trade- it is consolidated the idea of maintaining these criteria in the municipal activities to be developed through the assessment of its advisability in the different tender dossiers or directly in the municipal procurement. The goal is to spread this initiative of agroecological markets to the restaurants of the city for favouring ecological products. Purchase of computers and printers has to comply with the programme Energy Star on energy saving, betting on efficiency in every municipal sector.

Right now Ebropolis forum, responsible of the Strategic Plan of Zaragoza1998, is considering the idea of creating a general strategic framework for orienting and structuring the strategic projects to be developed from 2011 and 2020, maintaining the general principles of participation, consensus, public-private collaboration and sustainability.

The Strategy 2020 is based on a vision of Zaragoza as a space balanced with its surrounding area and backed on its own values such as creativity, charm and connectivity, and articulated in a series of strategic axes.

12. ENERGY EFFICIENCY

Question 1

Present details of the original and/or most recent Action Plan, including any relevant disadvantages or constraints resulting from historical and/or geographical factors which may have influenced this indicator area negatively.

(max. 1,000 words):

Make reference to:

1. Energy consumption & performance of municipal buildings per square meter;
2. The development and goals for renewable energy share of all energy (heat and electricity).
3. The strategy of renewable vs non-renewable mix as well as the renewable energy mix (different renewable energy sources) dynamics for the coming two decades.
4. Integration and performance of renewable energy technology in municipal buildings and homes;
3. Development of compatible and integrated district systems and the facilitation of more sophisticated city-wide control.

Zaragoza has been a pioneering city in the implementation of the Agenda 21 Local and its work for sustainability in the municipal management. One of the strategic lines of work is the fight against climate change and the improvement of the quality of air. The city already has a Strategy to Fight against Climate Change and Improvement of the Quality of Air with actions in every sector including the institutional and services.

The actions implemented in the municipal facilities contribute to reduce CO₂ emissions and improve air quality, serving also as example.

In relation to the municipal buildings, the emission register 2005 determined that the emissions produced by services and municipal buildings represent around 2% of the whole CO₂. The Municipality drew up in 2007 a survey for a power analysis of municipal buildings for revising power consumption produced and relate this consumption with the constructive and maintaining system. The goal of the survey was to improve information on the power consumed by the municipal facilities, which will allow the city to reduce consumption without reducing neither comfort nor services for the users. Construction criteria for the new centres will be established from the results obtained as well as restoration work in the already existing ones. The survey has into account environmental accountability.

From a total 482 municipal buildings, 303 were characterised by their uses, surface and gas consumption, gasoil and electricity:

Results of the survey:

Maximum average power consumption of the buildings: 43.58 kWh/m²

Maximum average power consumption according to uses:

Social	Sport	School	Administrative	Municipal teacher	Other
93.47 kWh/m ²	26.69 kWh/m ²	30.85 kWh/m ²	81.30 kWh/m ²	45.73 kWh/m ²	4.38 kWh/m ²

The goal is to reach a reduction of a 20% of consumption in the city for 2020 through the implementation of an Action Plan for Sustainable Energy that will include different aspects such as transport, lighting, etc. It is important to get saving and power efficiency in the municipal facilities.

Related to this, it is been prepared a Tender Document with Technical Conditions and Administrative Clauses for contracting services of integral maintenance and energy efficiency to put to public tender the management of energy in the municipal buildings. The document includes five services: power management, preventive maintenance, corrective maintenance, study, development and implementation of the investment and establishment of renewable energies.

A basic survey has also been made in 2009 on the potential of the photovoltaic installations of the municipal buildings, being selected 100 places of big power consumers. The survey allows us to add 6 MW produced by photovoltaic panels on the cover of the municipal buildings, adding up to the 3 MW already installed. The competition for the management of those megawatts is being prepared right now. The goal is to save approximately 6,810.41 kW with an annual production of 7.225.882.67 kWh, and avoid the spreading of 2.818.48 tons of de CO₂. In other words, a decrease of CO₂ in 2,409 dwellings. Budget: 175 million Euro.

Question 2

Details of those targets achieved or not, to date (within the last 5 - 10 years). Provide a review of how both situations occurred and lessons learned.

(max. 800 words):

Make reference to:

- 1. Increasing the energy performance of municipal buildings.**
- 2. Maximising and prioritising the use of renewable energy technology in municipal buildings and homes.**
- 3. Measures to improve the Cities overall energy demand performance.**

Saving and power efficiency have been the top priorities in the new municipal equipments with these aspects. Passive aspects: orientation, configuration, insulation, vegetable covers, etc. Active aspects: solar collectors for hot water, photovoltaic panels for the Seminar Building. In Europa Building (awarded in the 11th Spanish Biennial of Architecture and Planning, and this year with the Gold Medal "Giancarlo Lus" of the International Biennial of Architecture of Italy for the most innovative project on energy saving and technologies of renewable energies; the business incubator; the CeroEmisiones building planned to reach a net figure of emissions close to zero; geothermal energy of underground water for climatisation, geothermal energy of air circulation (shooting galleries, Torrero Local Police, Business Incubator).

A basic research on the potential of the photovoltaic systems of the municipal buildings has been made. 100 places have been established and divided in three groups according to the power. The total useful surface is 118.614.55 m², with a total annual production of 7.226.882.67 kWh, avoiding the emission of 2.818.48 tons of CO₂. The Municipality has placed photovoltaic panels in the public school Cándido Domingo, 19 kW of power (Renaissance project within Concerto programme of the European Union), 2 MW in the tanks of Casablanca waste treatment plant, and 45 MW in the Seminario building. It can be pointed out that, from 2000 Zaragoza Vivienda, a municipal society that develops activities of promotion, restoration, sell and rent of social dwellings, has introduced criteria on environmental sustainability in its actions. With reference to new buildings, it can be mentioned 4 blocks with 616 dwellings plus shops and car parks placed in Valdespartera district, implemented under the European project Renaissance with the application of sustainability criteria. As far restoration is concerned, it is being promoted a comprehensive restoration with sustainable criteria and the implantation of renewable energies in buildings older 40 years in the whole city included in the Municipal By-Law for Promoting Restoration and also in urban groups built in the 50s and 60s placed at Picarral district (360 dwellings, Renaissance project), Delicias, Las Fuentes and San José as well in the Old Town where actions are been taken place since 1989. It is important to mention the possibility to

repeat the restoration works made at el Picarral in other areas of the city. 41,169 dwelling have been restored in the period 2000-2010, with a budget of 168.016.983,10 €

The objective of Renaissance project is energy saving, bioclimatic buildings and the use of renewable energies. The goal of Zaragoza is to avoid the emission of 5,000 tons/year of CO₂.

Works implemented in Zaragoza:

- ✓ Construction of 616 bioclimatic dwellings in Valdespartera. The whole district has 10,000 units with those characteristics.
- ✓ Restoration of 360 dwellings in el Picarral
- ✓ Restoration of the public school Cándido Domingo and installation of a photovoltaic system
- ✓ Centre of Sustainable Urbanism of Valdesparta

Dwellings	Consumption, kWh/m ²
Valdespartera	20 - 25
Restored	50 – 60
Conventional	80 - 110

Consumption is slightly bigger in restored dwelling compared to new homes since orientation cannot be modified.

All these actions are framed by the Ecaz and the Action Plan for sustainable energy with the goal of reducing at least a 20 % of CO₂ emissions in 2020.

Work is being done right now on the Strategic Plan on Energy for 2020, in agreement with the Mayors Pact signed by Zaragoza.

Zaragoza has boosted the use of renewable energies such as solar and photovoltaic. Right now, if all the installations of renewable energies of Zaragoza and its metropolitan area were connected, domestic and commercial consumption could be assumed by them.

As far as public lighting is concerned, the Municipality has been developing different actions for its lighting system from two years, supposing 9.077,450 kWh /year and a fall of 2539.71 tons of CO₂.

- ✓ Photovoltaic street-lamps
- ✓ Regulating systems in the new control points, and double-level systems have been placed in the old ones. Regulators have been placed in 2010 in 22 centres feeding 2,200 light points. From the 72,000 light points of the city 40,000 have a regulation system
- ✓ Adjustment of on and off hours of public lighting. Turning on is delayed 10 minutes and turning off other 10 minutes with a reduction of 400 tons of CO₂ and a saving of 143,136 €.
- ✓ Advance of the entry for reducing an hour of light flux in control point with regulator-stabilizer. Saving of 79,840 € and reduction of 222 tons of CO₂. According to the results obtained, a new adjustment can be taken into account.
- ✓ New technologies on public lighting such as solar energy are been tested (90 points with a power per unity of 36 w and total saving of 2,580 €/year), and also with leds

Question 3

Plans to meet or revise key targets for the future and proposed approach to achieve these.
(max. 800 words)

The objective of the Ecáz is to reach a reduction of a 30% of CO₂ emissions for 2015. In reference to renewable energies, after the good results obtained, it is being considered for 2015 the production of 850 MW of wind and photovoltaic energy, from which 140 MW will belong to Zaragoza. On the other hand and forming part of the Strategic Plan of Ebropolis for 2020, it has been raised the objective to obtain 1,600 megawatts of installed power and also reduce a 20 % energy consumption with different improvement tools. Oil consumption is being reduced and gas and electricity is improving.

The Plan of Energy Efficiency in Municipal Equipments includes the possibility of a future development. It would mean the introduction of comprehensive contracts of saving-efficiency-maintenance as it is made in other cities such as Vitoria.

More concretely and for reducing energy consumption in municipal installations, the first thing would be its planning. Training courses can be made on minimization of energy consumption, addressed to all the people responsible of the implementation of municipal projects as well people in charge of maintenance.

It is also necessary to train and make people responsible, workers and users aware of the necessity and the way to minimize consumption in the municipal facilities, creating new habits and behaviours.

On the other hand and in agreement with the different uses in which the different municipal buildings analysed have been divided, it should be introduced protocols or action systems producing a reduction of energy consumption such as systems to turn on/off lighting, automation of the facilities, temperature sensors, heating systems, etc. These actions should form part of other with a bigger scope. The partial or comprehensive restoration of some municipal buildings is necessary to reach reductions of energy consumption and CO₂ sent to the atmosphere.

Insulation in covers and facades, replacement of simple glasses by double ones, and modernisation of other enclosures such as doorframes and windowframes, are the key for reducing drastically energy consumption in buildings. The global investment necessary for the restoration of the municipal buildings is around 350 million Euro, that besides the corresponding reduction in energy expenditure, could reach reductions in emissions between a 20% and a 30%.

It is also proposed to get an efficient saving and consumption, its introduction in new construction projects or restoration of municipal buildings, depending on the use, with a maximum consumption standard of kWh/m².

Finally, it is specially important to boost and facilitate the use and establishment of renewable energies, and even more of innovative actions such as boosting renting for covers of buildings and public soil. Therefore, private firms could install solar energy and promote energy saving in public lighting in order to cover energy necessities without using natural exhaustible resources, and contributing to the reduction of the ecological footprint of the city thanks to the reduction of polluting emissions to the atmosphere such as CO₂ and other greenhouse effect gases.

[Municipal By-Law on Energy Ecoefficiency and the Use of Renewable Energies in Buildings and their Installations.](#) In the framework of the municipal competencies it was endorsed in July 2009 this municipal by-law with the goal of regulating the construction of buildings with bioclimatic criteria and boosting the rational use of energy in any form, promoting energy efficiency to reach a bigger energy saving as well as the incorporation of renewable energies. This municipal by-law is going to establish the guidelines for sustainable construction in the city of Zaragoza. As an example, the good consumption rates at home in Valdespartera are the base, as the norm present, to fix the objectives to reach in the rest of dwellings of the city.