

# INDICATORS 21

Local sustainability indicators  
in Barcelona (data from 2012)



[ AGENDA 21 BCN ]

Consell Municipal de Medi Ambient i Sostenibilitat

18

DOCUMENTS



# INDICATORS 21

Local sustainability indicators in Barcelona (data from 2012)

© Barcelona City Council  
Municipal Council of Environment and Sustainability  
Barcelona, December 2013

**Coordination and review**

Helena Barracó and Irma Ventayol  
Knowledge management. Urban Habitat. Barcelona City Council

**Technical support**

Antoni París - Socioambiental.cat

**Design and layout:** Estudi Jordi Salvany

**Printing:**

Estudi 6

The CO<sub>2</sub> emissions resulting from the publication of this document have been offset by the Cenol and Telha Forte Ceramics Fuel-Switching Project, which uses forest-waste biomass rather than native forest biomass as fuel for the local ceramics industry in the state of Pará, Brazil.

# PRESENTATION

Barcelona participated actively at the United Nations Conference on Sustainable Development, or Rio+20, held in Rio de Janeiro in June 2012, and together with thousands of cities around the globe renewed its pledge to lead the sustainability agenda at the local level.

One of the best examples of Barcelona's contribution is the renewal of its Citizen

Commitment to Sustainability. In December 2012, coinciding with the Rio+20

Conference and after ten years in force (2002-2012), Barcelona made a fresh commitment to sustainability for the next 10 years. This new commitment stays true to the inspirational and educational nature of this first, while incorporating new sensibilities and updating content in line with outstanding issues, emerging themes and new challenges.

In this report on Barcelona's sustainability indicators, we give an overview of the final year of the 2002-2012 commitment, closing one chapter and paving the way for a second.

Overall the performance of the indicators presented in this report is positive, and allows us look ahead safe in the knowledge that we are on the right track. At the same time it alerts us to the more critical issues and guides us in our efforts over the coming years.

We are confident that the lessons we have learnt will stand us in good stead for the 2012-2022 Citizen Commitment to Sustainability. In it we hope to build on the achievements of the first decade and set new, more ambitious goals for the second, to move towards an increasingly equal, prosperous and efficient city.

JOAN PUIGDOLLERS I FARGAS  
Councillor for Environment and Urban Services



# CONTENTS

<b>Presentation</b>	<b>3</b>
<b>Introduction ten years of indicators</b>	<b>7</b>
<b>Year-on-year evaluation 2011-2012</b>	<b>9</b>
<b>Indicator files: data and trends</b>	<b>11</b>
<b>Summary table</b>	<b>66</b>
<b>Acknowledgements</b>	<b>67</b>



## INTRODUCTION TEN YEARS OF INDICATORS

For the tenth consecutive year, this report presents the latest results for the indicators set out in Barcelona's Agenda 21 in line with the 2002-2012 Citizen Commitment to Sustainability's 10 goals.

These indicators, approved by the Municipal Council for the Environment and Sustainability, have allowed us to gather data on the city's different areas of activity, and identify the key facts and trends, to gain an overview of what progress has been made towards sustainable development in Barcelona. We have been able to analyse their performance over time in relation to the desired trends, though the data available has been different in each case.

When assessing performance, we should keep in mind that 6 of the 25 indicators (2: biodiversity of bird species; 7: level of noise pollution; 8: environmental quality of the beaches; 9: air quality; 13: use of renewable energies and solar energy generation; 19: housing accessibility) are made up of two or more sub-indicators, meaning that overall assessment is out of 32.

As in previous years, the performance of these indicators has been analysed under two variables: first, its progress relative to the previous year or evaluation period (not all indicators are updated annually) and second, the trends in performance since analysis began. The idea is that, by doing so, our interpretation of the results is not influenced one way or the other by anomalous results.

In general the quality of Barcelona as a city moving towards sustainable living has seen significant improvements over the past few years in the majority of the indicators and issues: public space, mobility, sound pollution (street space), quality of the beaches, life expectancy, water use and ground water resources, renewable energies, waste sorting and collection, level of education, housing and environmental education.

For some indicators, performance has remained stable, with the exception of some small year-on-year fluctuations up or down. This stability should be seen in a positive light since, in absolute values, the indicators are performing in the top bracket, as, for instance, in the cases of the visual appearance of the beaches, air quality and green space per resident. Only three indicators have presented less than optimal results: biodiversity of bird species, rate of urban renewal and organic waste collection.

This report we bring to a close 10 years' worth of monitoring against goals set in the 2002-2012 Citizen Commitment to Sustainability. In advance of the renewal of this commitment, the 2012-2022 Citizen Commitment to Sustainability, we must review the usefulness of each of the indicators being used to update goals, and set new ones in response to emerging challenges. With this in mind, we have included a short reflection on the future of each indicator at the end of its corresponding file.

**Protecting open spaces and biodiversity, and expanding urban green space (goal 1)**

- 1 - Green space per resident
- 2 - Biodiversity of bird species

**Championing the compact and diverse city, with a quality public space (goal 2)**

- 3 - Accessibility to public spaces and basic services
- 4 - Urban renewal index

**Improving mobility and turning streets into welcoming environments (goal 3)**

- 5 - Means of transport used by the population
- 6 - Proportion of street space giving pedestrians right of way

**Achieving optimal levels of environmental quality and becoming a healthy city (goal 4)**

- 7 - Level of noise pollution
- 8 - Environmental quality of the beaches
- 9 - Air quality
- 10 - Life expectancy at birth

**Conserving natural resources and promoting the use of renewable energies (goal 5)**

- 11 - Total water use per resident
- 12 - Use of ground water for municipal services
- 13 - Use of renewable energies

**Reducing the amount of waste generated and promoting the re-use and recycling of materials (goal 6)**

- 14 - Generation of solid urban waste
- 15 - Organic waste collection
- 16 - Waste sorting and collection

**Increasing social cohesion, strengthening equality and participation (goal 7)**

- 17 - Drop-out rates from compulsory secondary-school education
- 18 - Population with a university degree
- 19 - Housing accessibility
- 20 - Level of participation in associations

**Strengthening economic activity geared towards achieving sustainable development (goal 8)**

- 21 - Number of organisations with environmental certification

**Progressing through environmental education and communication (goal 9)**

- 22 - Number of schools participating in environmental education projects

**Reducing impact on the planet and promoting international cooperation (goal 10)**

- 23 - Annual CO<sub>2</sub> equivalent emissions
- 24 - Number of fair-trade sale or product-consumption points

**Indicator for each of the Commitment's goals**

- 25 - Level of citizen satisfaction

## YEAR-ON-YEAR EVALUATION 2011-2012

For 2012 data was collected from 27 of the 32 indicators/sub-indicators making up Barcelona's Agenda 21; we were unable to update the other 5 for various reasons.

- Indicator 3: Accessibility to public spaces and basic services: a change in methodology was introduced which does not allow comparisons with the data from the previous report.
- Indicator 6: Street space giving pedestrians right of way: as yet no data from last year.
- Sub-indicator 13.1: Use of renewable energies: no data as yet available for 2011.
- Indicator 20: Level of participation in associations: no data collected in 2012.
- Indicator 24: Free-trade sale points: there are no data later than 2010, owing to changes in this sector.

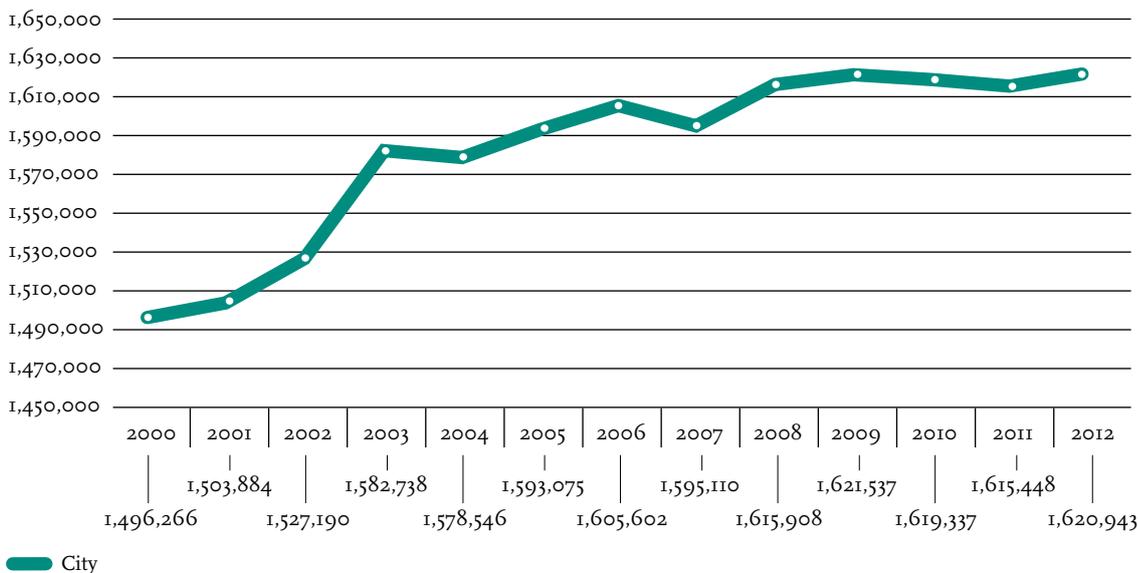
Data from another two sub-indicators, those under indicator 7 on level of noise pollution, have not been compared with the previous year, since the most recent data available are those found in the 2006 sound map.

So then, of the remaining 25 indicators/sub-indicators that were assessed in this reporting period, 15 have improved (60%), 7 remained stable (28%) and only 3 went down (12%).

We should further state that some indicators were calculated on the basis of number of residents, meaning that changing population levels can affect their outcome. Over the past few years, the population of Barcelona has grown significantly: since 2000 it has risen by

8% (from 1,496,266 to 1,620,943), peaking at a total of 1,621,572 residents in 2009. Another key factor is Barcelona's appeal as a place to spend extended periods of time (tourists, temporary students), and as a place to work or study without necessarily living there. These groups are not reflected in the population data but do, undoubtedly, have an impact on the performance of some indicators.

Evolution of the population of Barcelona (2000-2012)



## Summary of indicators 2012

Improved	Stable	Decreased
5 – Means of transport used by the population	1 – Green space per resident	2.1 – Biodiversity of native bird specie
7.1 – Level of noise pollution: street space	2.2 – Biodiversity of wild bird species	4 – Urban renewal index
7.2 – Level of noise pollution: organic population	9.1 – Air quality: ozone levels	15 – Organic waste collection
8.1 – Environmental quality of the beaches: Escherichia coli (E.	16 – Waste sorting and collection	
8.2 – Environmental quality of the beaches: visual appearance	22 – Schools participating in environmental projects	
9.2 – Air quality: nitrogen oxides	23 – Annual CO <sub>2</sub> equivalent emissions	
10 – Life expectancy at birth	25 – Level of citizen satisfaction	
11 – Total water use per resident		
12 – Use of ground water for municipal services		
13.2 – Solar energy		
14 – Municipal waste generation		
17 – Drop-out rates from compulsory secondary-school education		
18 – Population with a university degree		
19.1 – Housing accessibility: economic effort		
19.2 – Housing accessibility: rental contracts		
19.3 – Housing accessibility: average price of rental contract		
21 – Organisations with environmental certification		
8.2 – Environmental quality of the beaches: visual		

### Not updated

- 6 – Street space giving pedestrians right of way
- 13.1 – Use of renewable energy (% primary energy)
- 20 – Level of participation in associations
- 24 – Points of sale of free trade products

### Change in methodology

- 3 – Accessibility to public spaces and basic services

# INDICATOR FILES

**Data and trends**

## Indicator 1: Green space per resident

### Citizen Commitment to Sustainability no. 1

Protecting open spaces and biodiversity and expanding urban green spaces (action lines 1.3, 1.4 and 1.5).

### Indicator description

Indicates the total area of the city taken up by green spaces (in m<sup>2</sup> per resident). Green here includes all those categories of urban and woodland green space established by the Department of Green Spaces and Biodiversity at Barcelona City Council's Environment and Urban Services-Urban Habitat.

### Indicator parameters

Unit: square metres per resident  
(m<sup>2</sup>/resident) Reporting period: annual  
Population on 1 January 2012: 1,620,943 residents  
Source: Barcelona City Council. Environment and Urban Services.

### Data from 2012

Green space per resident: **17.87 m<sup>2</sup>/resident**

Total green space: **28.97 km<sup>2</sup>**

### Desired trend



### Evolution (1997-2012)

#### Green space per resident



### Year-on-year evaluation

Barcelona's total green space consists of all its urban parks and gardens and part of the Collserola forest area that lies within municipal borders. This total has risen progressively over recent years to 28.97 km<sup>2</sup> in 2012, and is now some 6.2% higher than in 1997 (27.28 km<sup>2</sup>). The increase relative to 2011 is 0.04 km<sup>2</sup>.

## Indicator 1: (cont.)

Meanwhile, green space per resident stood at 17.87 m<sup>2</sup>, which is 0.04 m<sup>2</sup>/resident less than the year before (17.91 m<sup>2</sup>/resident). This is primarily the result of the increase in number of residents, by around 5,000 people. A number of initiatives were carried out during this reporting period to create new green space within Barcelona's municipal borders in 2012. What follows is a list of those that account for upwards of 1,000 m<sup>2</sup>:

District	Green space (main initiatives > 1.000 m <sup>2</sup> )	Area (m <sup>2</sup> )
Eixample	Ermessenda de Carcassona	1,502
Eixample	Av. Roma (Viladomat - Calàbria)	1,061
Sants-M.	Montjuïc Park (Mirador del Port Gardens and Forestier's stairs)	6,500
Sants-M.	Can Mestres (Urban Allotment)	12,243
Les Corts	Gran Capità Gardens	1,17
Sarrià-SG.	Reis Catòlics 1-3 (Vallvidrera)	1,3172
Gràcia	Josefa Rosich	1,834
Gràcia	Nº. 65 Farigola	1,150
Horta-G.	Lledoner Gardens	1,426
Horta-G.	Pl. Lledoner	1,162
Horta-G.	Rda. Guinardó (Sardenya - Cartegena )	1,076
Horta-G.	Perera - Jordà - Pg. Vall d'Hebrón	1,804
Horta-G.	Salvador Alende, square	3,444
Horta-G.	Paulo Freire	3,421
Nou Barris	Canyelles (Ignasi Agustí - Federico G. Lorca - Miguel Hernández)	1,140
Sant Martí	Camp de la Bota, park (2nd phase)	12,324
Sant Martí	Josep Plà - Pallars - Agricultura	4,270
Sant Martí	Bac de Roda - Pallars	1,990

### Conclusions

- There has been a slight increase in Barcelona's total green space and a stabilisation in green space per resident over the past year.
- A significant increase in total green space since 1997 (1.7 km<sup>2</sup>).

	Green/resident	Green area
Evolution from previous year	Stable	Improved
Evolution from previous year	Stable	Improved

### Outlook

As it stands, there is a shortage of unoccupied space in Barcelona which means that relatively few opportunities remain for the creation of new green space within municipal borders. That said, some small corners remain that can be greened up and, like many other cities around the world, Barcelona has an active urban planning/regeneration sector to drive a continual rethinking and redesign of public space. This keeps the door open for the creation of new small to medium-sized green spaces in the future.

In any case, Barcelona would ideally continue to see its green space per resident within the urban setting increase, particularly since a large part of total green space at present corresponds to the woodland of Collserola Park (some 17.5 km<sup>2</sup>).

Looking to the future, given that it is increasingly difficult to achieve quantitative improvements against this indicator, we might consider adding a qualitative dimension to the information collected. For instance, we could evaluate connectivity (green corridors), the uniqueness of Barcelona's green spaces (façades, rooftops etc.), along with other characteristics typical of urban green spaces.

## Indicator 2: Biodiversity of bird species

### Citizen Commitment to Sustainability no. 1

Protecting open spaces and biodiversity and expanding urban green spaces (action line 1.5).

### Indicator parameters

Birds are a good indicator of an urban space's levels of environmental quality. To have up-to-date and continuous data on Barcelona's diversity of bird species as well as the capacity to make comparisons with the results of other studies conducted in Spain, the TRIM's methodology has been updated and amended on the basis of species and numbers identified along eleven 3-km routes. The general index fluctuates up or down according to population trends among the various bird species being monitored (all of which are given the same weighting).

The system used is the same as that used in the Common Birds of Catalonia Monitoring (SOCC) scheme. The graph below presents the findings of a joint analysis of nesting and wintering birds for each of the groups being monitored: native and wild bird species.

### Indicator parameters

Unit: differences with respect to the reference level for 2002 (=1)

Reporting period: annual

Source: University of Barcelona. Catalan Ornithology Institute

### Data from 2012

2.1 - Native species: 0.84

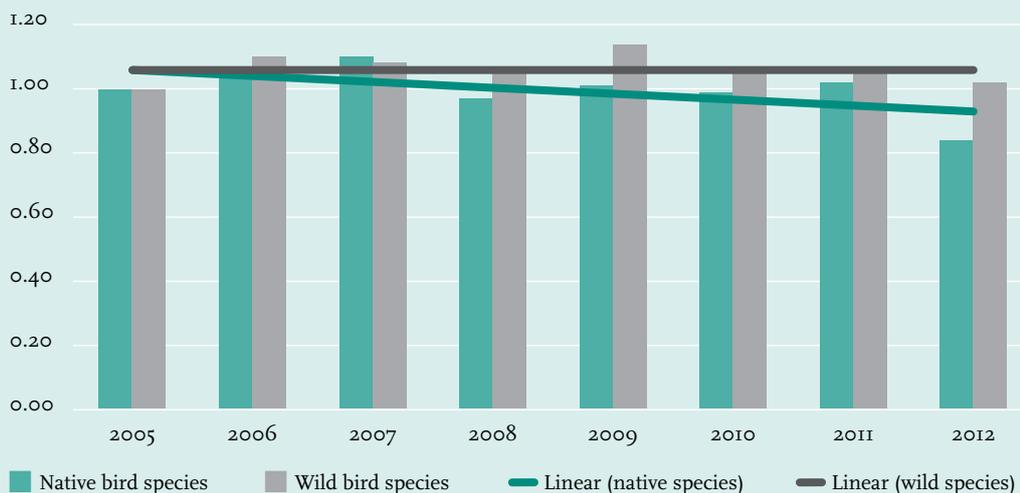
2.2 - Wild species: 1.02

### Desired trend



### Evolution (2005-2012)

#### Native and wild bird species in Barcelona



It should be mentioned here that the findings from the first three years of the study (2002-2004) have been disregarded:

the SOCC scheme was not established until 2005, and very few routes were initially monitored, so the results for these early years were heavily compromised by a lack of data.

### Year-on-year evaluation

Four bird census campaigns were launched in the Barcelona municipality in 2012 - two in the winter and two in the spring - through bird sightings made along eleven routes. Indicators for native bird species performed slightly more negatively than in 2011, recording the lowest value of the set analysed. This trend was observed throughout the whole of Catalonia, and was very likely linked to the particularly adverse climate conditions caused by the extreme drought. Wild bird species indicators, meanwhile, have maintained very stable values. The change in the study period has allowed us to calculate trends for the following nesting native species for the first time: the kestrel (significant decline), the Alpine Swift (strong rise), and the Coal Tit and the Hoopoe (recording inconclusive data in both these cases).

The continued decline of the sparrow and the blackbird, two of the city's most common species during both nesting season and over the winter, should also be noted. Meanwhile, the Common Wood Pigeon and Eurasian Collared Dove populations have both increased spectacularly, the former over the nesting season in particular. Falling numbers (especially over winter) of the Fringillidae species used as caged singing birds - the goldfinch, greenfinch and the European Serin - are of some concern. The three species were in similar decline throughout Catalonia. Meanwhile, of the wild bird species, the Rose-ringed Parakeet population shot up, while that of the more common Monk Parakeet seems to be stabilising. A strong decline was observed in the city's wild pigeon species. These observations of the bird community in Barcelona must be considered provisional since we only had 8 years of solid data available, insufficient to be able to define robust trends.

### Conclusions

- Native bird indicators performed slightly more negatively, giving the lowest value of the set analysed.
- Wild bird indicators maintained very stable values.

Bird species	Native	Wild
Evolution from previous year	Decreased	Stable
Trend over recent years	Decreased	Stable

### Outlook

Using the TRIM methodology to calculate the biodiversity of bird species is a procedure adopted at the pan-European level for assessing the environmental stability of a given ecosystem. It is therefore an internationally agreed tool which can be updated with the latest figures and new species, and enables us to make easy comparisons between territories or countries.

As an indicator of the biodiversity of birds in Barcelona, then, it has potential, though some small changes could be made to the nature and number of the routes being monitored to track the various species. Bear in mind that the topography of the municipality is such that some of these routes run through an urban environment, while others cut a path through woodland or hinterland, with all the differences that this entails in terms of species. We might consider carrying out a strictly urban reading of the indicator, or creating a density map of some kind that allowed us to observe the peculiarities of each zone or district.

## Indicator 3: Accessibility in public spaces and basic services

### Citizen Commitment to Sustainability no. 2

Championing the compact and diverse city, with a quality public space (action line 2.2).

### Indicator description

Indicates the percentage of the population with access to one, two, three, four and five accumulated services of the public network within 300 metres of their homes: public or open spaces; public transport links; green points; nursery, primary or secondary schools; health care centres (primary health care centres and hospitals). Data for this indicator is updated every four years since changes are felt to be more perceptible over this period.

### Indicator parameters

Unit: %

Reporting period: every four years

Source: Barcelona City Council. Urban Ecology Agency, from various sources

### Data from 2012

Accessibility to one service: 100%

Accessibility to two services: 99.5%

Accessibility to three services: 96.0%

Accessibility to four services: 69.4%

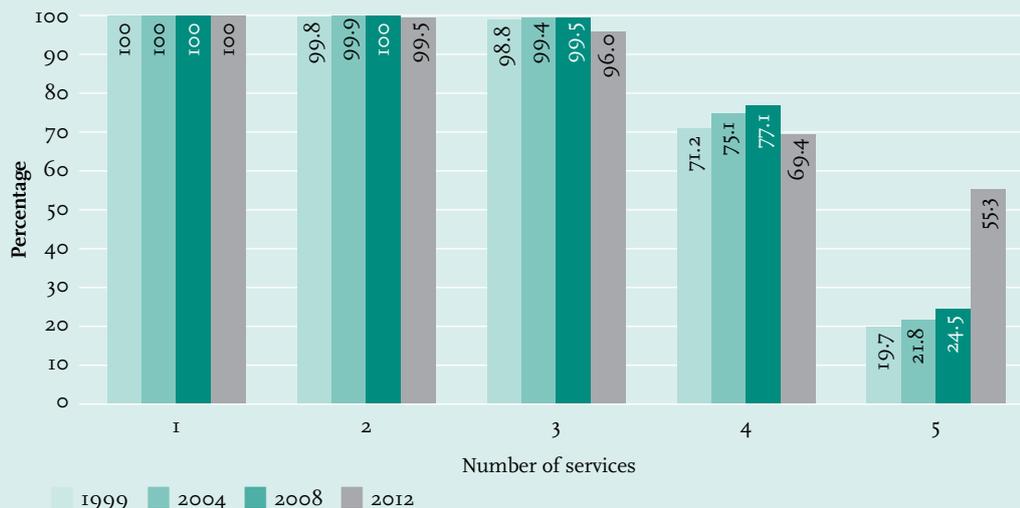
Accessibility to five services: 55.3%

### Desired trend



### Evolution (1999-2012)

#### Number of accumulated services closer than 300 m



Some minor methodological changes were introduced in 2012. This led to some slight changes to the data, especially on five service accessibility, as a result of which the data were somewhat distorted when compared to data from the previous years

### Indicator 3: (cont.)

#### Access to the various individual services (%)

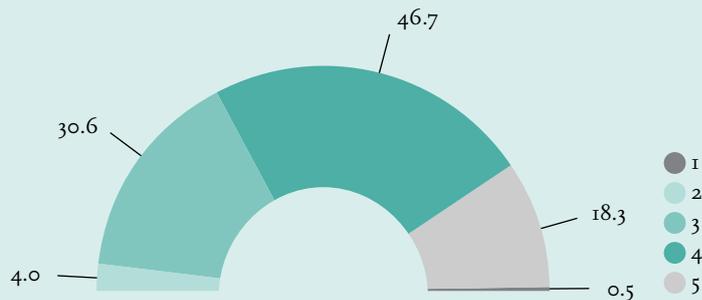
Services	1999	2004	2008	2012
Green spaces within 300 m	99.4	99.5	99.4	99.3
Urban transport links within 300 m	98.7	98.7	99.9	98.9
Recycling points within 300 m	99.9	99.2	99.2	58.4
Schools within 300 m	62.7	68.5	67.3	89.3
Health care centres within 300 m	28.8	28.1	34.2	32.5

#### Year-on-year evaluation

On the whole, Barcelona's residents have been enjoying increasingly improved access to basic services. In other words, they only have to cover short distances to reach public transport links, health care and schools, etc.

The data collected for 2012, for all the methodological changes introduced, show that nearly 100% of residents have access to three services within 300 metres of their homes; 70% have access to four and 55% to five. The development of this indicator is therefore positive.

#### Service-access mapping



#### Conclusions

- Residents' access to all basic services has remained stable.
- Nearly all residents have access to three basic services within 300 m of their homes.
- Accessibility has steadily increased since 1999 and today exceeds 99% for most services.

#### Accessibility to basic services

Development from previous year	Methodological change
Trend over in recent years	Stable

#### Outlook

This indicator provides information on how compact and mixed cities are. It is used in other countries too, though there are several variations according to the services assessed. Even so, and given the indicator's review every four years, it would perhaps be of use to have a sub-indicator or qualitative data to enable year-on-year assessments, while establishing a calculation process that avoids possible distortions and makes the indicator more comparable.

## Indicator 4: Urban renewal index

### Citizen Commitment to Sustainability no. 2

Championing the compact and diverse city, with a quality public space (action line 2.1).

### Indicator description

Indicates the number of redeveloped (major work) and newly constructed homes with respect to the public in a given year, represented as thousands of residents.

### Indicator parameters

Unit: homes/1,000 residents

Reporting period: annual

Population on 1 January 2012: 1,620,943 residents

Source: Barcelona City Council. Barcelona Economia

### Data from 2012

Urban renewal index: 1.24

Newly built homes: 1,492

Redeveloped and/or extended homes: 523

### Desired trend

Value between 2 and 3

### Evolution (1998-2012)

#### Urban renewal index (newly built and redeveloped homes)



### Year-on-year evaluation

The fact that the urban renewal index remained at around 2 to 3 is seen as a positive development, since this means that individual homes and buildings were being kept in a good state of repair. However, the steady drop seen in this indicator since 2006 highlights the city's ageing housing stock, with all of the disadvantages that this deterioration entails.

In 2012 the urban renewal index stood at 1.24; that's 0.34 points lower than in 2011 (1.58), and 3.63 points lower than in 2006 (4.87). In fact it is the lowest value recorded in the past thirteen years. This dip reflects the current stagnation of the construction sector, seen also in the continued drop in construction permits being issued and the decreasing square metres of

#### Indicator 4: (cont.)

Newly built homes. The priorities under the redevelopment programme for Barcelona's housing stock focus mainly on neighbourhoods and other areas requiring special attention, on urban redevelopments for structural flaws, urban remodelling for better urban planning, on housing redevelopments on consolidated urban land and on rental properties.

The stagnation of the sector in 2012 was felt as much in the newly built homes sector (from 1,492 in 2011 to 1,198 in 2012: -19.7%), as in the redevelopments and/or extensions sector (from 1,077 in 2011 to 523 in 2012: -51.4%).

In 2012 the distribution of newly built and redeveloped homes came to 74% and 26% respectively, quite different values from those recorded in 2011 (58% and 42%, respectively), though very similar to those of 2010 and 2009 (75% and 25%).

#### Conclusions

- The number of newly built homes continues to drop.
- The number of redeveloped and/or extended homes has dropped very significantly.
- The main consequence is the ageing of Barcelona's housing stock.

Urban renewal	
Evolution from previous year	Decreased
Trend over recent years	Decreased

#### Outlook

The current economic context of Spain is clearly reflected in the performance of this indicator over recent years. The construction sector in particular, one of the main motors of the economy, is one of the worst hit by the economic crisis, which began in 2007. Forecasts suggest that it is likely that the urban renewal index will continue to fall over the coming years, though social, economic and demographic factors, not to mention the development of the housing stock itself, will play a role. However, even if the property market were to experience an upturn, the reality is that there will not be a return to the values recorded a few years ago. The value of the urban renewal index will more likely level out at around 2 rather than 4.

In any case, the use of this indicator as a reflection of the socio-economic context of the city is conditioned by a number of factors. On the one hand, the exact statistical data used for its calculation: the concept of restoration also includes small improvements to accessibility or the facade, for instance. There are very few complete restoration projects taking place. Another factor would be any future changes to town planning and housing policies, given such impact on activities in the construction sector, and the rehabilitation of the city and its housing stock. Bear in mind too that the effect of the regulations being launched in the area of energy renovation under EU directives.

## Indicator 5: Means of transport used by the population

### Citizen Commitment to Sustainability no. 3

Improving mobility and turning streets into welcoming environments (action lines 3.3, 3.5, 3.6 and 3.10).

### Indicator description

Indicates the form of transport used by residents to move about the city for everyday travel, having regard to inner-city journeys of five minutes or longer. The term 'stage' is understood as the means (transport means) part of the journey that includes one or more connections or transport links (only stages of five minutes or longer have been included). The public transport category includes travel by metro, bus, train and taxi. The private transport category includes travel by car, van and truck. The values given are a calculation of the number of journeys made on a daily basis in Barcelona.

### Indicator parameters

Unit: % Reporting

period: annual

Source: Barcelona City Council. Department of Mobility Services

### Data from 2012

On foot and by bicycle: 49.23%

Public transport: 32.93%

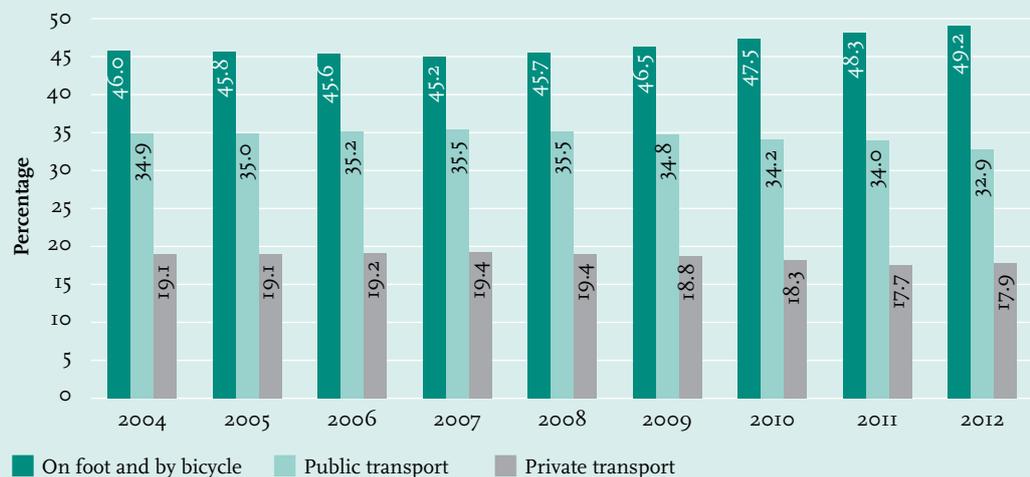
Private transport: 17.84%

### Desired trend



### Development (2004-2012)

#### Means of transport used by the population



\*Data for 2011 has been revised.

### Year-on-year evaluation

According to the Study on Mobility for 2012 conducted by Barcelona City Council's Mobility Services Department, some 4,944,299 million inner-city journeys were made each day, down 1.1% on 2011. This decrease can be explained for the most part by the sharp drop in the use of public transport (-4.21%). The number of journeys made using private transport also decreased compared to 2011 (-0.64%). Meanwhile, journeys made on foot and by bicycle increased by nearly 1%. One of the

## Indicator 5: (cont.)

main reasons for this redistribution was the economic crisis, which made people think twice before spending money on petrol or public transport.

The modal distribution of these internal journeys -that is, the percentage share of each means of transport used in the city- was as follows: 49.23% on foot and by bicycle (48.24% in 2011), 32.93% by public transport (34% in 2011), and 17.84% by private motor vehicle (17.76% in 2011). This means Barcelona's residents made a full 82.24% of their daily journeys on the most sustainable means of transport.

It should be pointed out, on a comprehensive level, values fell for all forms of inner-city transport, with the exception of foot and bicycle, the latter of which achieved a sizeable percentage gain of 5.6%. Although significant, it should be borne in mind that, in absolute terms, this increase was relatively minor when compared to figures for other means of transport. Sharp drops were observed in journeys made by metro, bus and occasional coaches (see table).

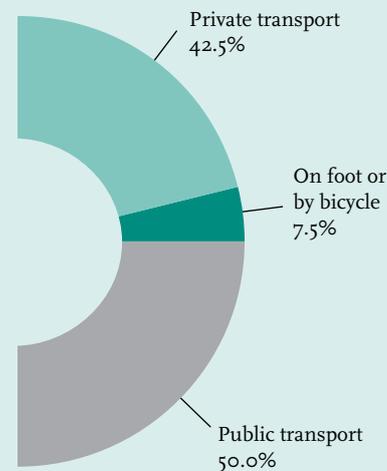
As for journeys made each day involving connections or transport links, or journeys across municipal borders (inter-municipal), some 2,765,290 million such trips were made in 2012, down 2.93% on 2011 (2.83 million). Mobility on foot and by bike increased from 7.29% to 7.52%. The ratio of stages made using public transport dropped slightly, from 50.36% to 50.01%, while figures for private transport in this regard have remained more or less stable (from 42.36% to 42.47%). Qualitatively, then, given the increase in both absolute values and modal distribution of non-motorised journeys, and the decrease in absolute terms of journeys made using private vehicles, we can say that eco-mobility continued on the rise.

### Total internal journeys by means of transport (2012)

#### Evolution of stages in internal journey

Etapes	2012	%	%12/11
On foot	2,318,687	46.90	0.70
Bus	559,619	11.32	-4.50
Metro	716,546	14.49	-4.00
FGC Metro	87,430	1.77	-6.80
Renfe (Rodalies local- Tram i )	18,784	0.38	-0.20
Occasional coach	38,891	0.79	-2.20
Taxis	79,545	1.61	-4.90
Taxis	127,180	2.57	-3.00
Car, driver	337,387	6.82	-0.20
Car, passenger	118,794	2.40	-0.20
Motorcycle, driver	282,878	5.72	-0.20
Motorcycle,	16,946	0.34	-0.20
Bicycle	115,402	2.33	5.60
Van/truck	126,208	2.55	-3.22
<b>Total</b>	<b>4,944,299</b>	<b>100</b>	<b>-1.10</b>

### Inter-municipal connections (2012)



## Conclusions

- The use of public transport for inner-city journeys in 2012 dropped considerably in relation to 2011 (-4.2%).
- Eco-mobility (public transport plus journeys made on foot and by bicycle) accounted for 82% of all journeys, with a particular increase in the use of the bicycle (+5.6%).

#### Means of transport

Development from previous year	Improved
Trend over recent years	Improved

### Outlook

The changes in urban planning and mobility policies instigated over recent years have led to the more efficient and sustainable means of transport (foot, bicycle and public transport) gaining momentum in the urban setting.

In Barcelona this trend can be seen in the significant rise in journeys made on foot and by bicycle. This comes at the expense of journeys made by private transport, and is also the consequence of initiatives to reduce the space devoted to the private vehicles, to expand spaces devoted to getting around on foot and to promote the bicycle as a means of urban transport.

The current socio-economic crisis, and the forecasts for a future in which energy prices will surely continue to rise (especially petrol-based fuels) along with, necessarily, the cost of using both private and public transport, all point to eco-mobility becoming more and more prevalent for internal journeys. The development of these three means of transport over time is, therefore, a valid indicator for observing the changing habits of Barcelona residents in terms of their day-to-day mobility choices. That said, it might be worth adding data regarding inter-municipal connections, since these have a large influence on the workings of the city and the different mobility networks.

## Indicator 6: Proportion of street space giving pedestrians right of way

### Citizen Commitment to Sustainability no. 3

Improving mobility and turning streets into welcoming environments (action line 3.2).

### Indicator description

Indicates the proportion of street space giving pedestrians right of way, as a ratio of the city's entire street space.

### Indicator parameters

Unit: %

Reporting period: annual

Source: Barcelona City Council. Environment and Urban Services. Urban Habitat

### Data from 2012

Proportion of street space giving pedestrians right of way: Not updated

### Desired trend



### Development (1998-2011)

#### Street space giving pedestrians right of way



### Year-on-year evaluation

In Barcelona there are two kinds of pedestrian zones: those devoted exclusively to people travelling on foot, where motor vehicles are restricted, and those where the two means of transport co-exist or “inverted priority” zones, where pedestrians always have right of way and the maximum speed for motor vehicles is 30 km/h.

The proportion of street space giving pedestrians right of way in Barcelona remained stable relative to the previous year, at 46.30%. It has increased 12 points since 1998.

Over the past few years, cities in developed countries have found themselves in a process of change in terms of the distribution of their street space among the different means of transport. The goal is to progressively cut down on the space devoted to motor vehicles –in particular, private vehicles– in favour of foot travel, expanding the pavements and spaces giving pedestrians right of way. Barcelona is no exception.

### Conclusions

- The street space giving pedestrians right of way remained stable relative to 2010.
- Between 1998 and 2011 total street space giving pedestrians right of way increased by 12 percentage points.

Proportion of street space giving pedestrians right of way	
Evolution from previous year	Not updated
Trend over recent years	Improved

### Outlook

We might consider rethinking this indicator and establishing others that better reflect the public space available for pedestrians.

## Indicator 7: Level of noise pollution

### Citizen Commitment to Sustainability no. 4

Achieving optimal levels of environmental quality and becoming a healthy city (action lines 4.6 and 4.7).

### Indicator description

Charts noise levels across two parameters: street space and population.

7.1 - Indicates the proportion of street space (including squares) exposed during the weighted day-evening-night period ( $L_{den}$ ) to the following decibel ranges: < 60 dB(A); 60-65 dB(A); 65-70 dB(A); > 70 dB(A).

7.2 - Distribution of exposed population during the weighted day-evening-night period ( $L_{den}$ ) to the following decibel ranges: < 60 dB(A); 60-65 dB(A); 65-70 dB(A); > 70 dB(A).

[ $L_{den}$ : day, from 7 am to 9 pm; evening, from 9 pm to 11 pm weighted at +5 dB(A); night, from 11 pm to 7 am weighted at +10 dB(A)].

### Indicator parameters

Units: % of dB(A)

Reporting period: the next review of the strategic noise map will take place in 2014

Source: Barcelona City Council. Environment and Urban Services. Urban Habitat

### Data from 2012

7.1 - Street space exposed > 65 dB: **48.7%**  
(53.8% in 2006)

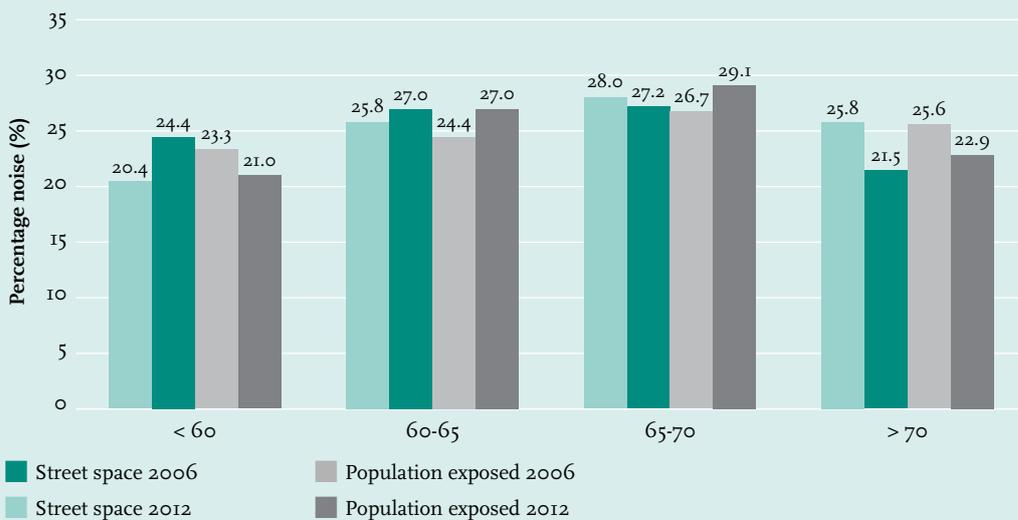
7.2 - Population exposed > 65 dB: **52%**  
(52.3% in 2006)

### Desired trend



### 2006 -2012 comparison

#### Noise levels – dB(A)



### Year-on-year evaluation

Barcelona City Council has been publishing a series of noise maps since 1990, under the current legislation. In 2009 the criteria used to create these maps were brought into line with European Union requirements, leading to the approval of the city's first strategic noise map (using acoustic data from 2006-2007). This is a tool established at European Union level which includes the identification of noise levels (noise maps) and data on the population exposed.

Meanwhile in 2010 Barcelona's plan for reducing noise pollution in the city was approved, and in 2011 the local environment regulation was updated (section 4 of which focuses on this matter). Together these make up the city's tools for environmental noise management.

The European Commission sets the standards that must be met by cities with regard to noise pollution, as well as the recommended noise thresholds. The trend, as with other indicators relating to air quality, is to set more and more restrictive standards.

Barcelona's noise map, among other data, serves to quantify the proportion of street space and proportion of the population affected by different levels of noise: <60 dB(A), 60-65, 65-70 and >70 dB(A). The proportion of street space exposed to levels higher than 65 dB(A) according to the 2012 map was 48.7%, which is an improvement of 5 points (53% in 2006). For the proportion of the population exposed to levels higher than 65 dB(A), the result was 52% (52.3% in 2006), which means it has remained practically the same (but slightly improved) since the previous period.

By way of summary we can say that noise levels in Barcelona, as in other European cities, are considerable and are due to its being used for so many purposes, the intensive use made of the street space and, of course, heavy motor vehicle traffic.

### Conclusions

- The main source of noise in Barcelona is still its traffic.
- The percentage of street space exposed to high noise levels has decreased since 2006, with those street spaces with the worst acoustic quality becoming fewer and those with the better acoustic quality on the rise. The proportion of the population exposed has remained stable.

	Street space exposed	Population exposed
Evolution from previous year	Not applicable	Not applicable
Trend over recent years	Improved	Stable

### Outlook

Noise maps require great technical effort and, in accordance with current European Union legislation, must be carried out every 5 years. They produce good, rigorous data, but have the downside that they are not able to show the development of this indicator at shorter intervals. For this reason, it would be worth complementing this indicator with other available information of a more qualitative or subjective nature that can be collected more often, such as the number of complaints/suggestions received, or data that demonstrates the efforts being invested to reduce noise pollution.

## Indicator 8: Environmental quality of the beaches

### Citizen Commitment to Sustainability no. 4

Achieving optimal levels of environmental quality and becoming a healthy city (action lines 4.3).

### Indicator description

Indicates the environmental quality of the beaches under two parameters: concentration of bacteria indicative of faecal contamination, and the visual appearances of the sand and the sea.

### Indicator parameters

Unit 8.1: UFC/100 ml (concentration of *Escherichia coli*)

Value set by current legislation (Royal Decree 1341/2007): 90th percentile = <500 UFC/100 ml (RD 1341/2007)

Unit 8.2: percentage of visual inspections with absence or negligible presence of floating solids, oils/foams, waste left by bathers, sea waste (index evaluated during bathing season)

Reporting period: annual

Source: Barcelona City Council. Barcelona Public Health Agency

### Data from 2012

8.1 - Concentration of *Escherichia coli*:  
values lower and greater than 90th percentile = 13-62 UFC/100 ml

8.2 - Índex d'aspecte visual de la sorra i del mar:  
94% d'inspeccions visuals bones

### Desired trend



### Development (2008-2012)

#### 90th percentile of *Escherichia coli* concentrations (UCF/100 ml)



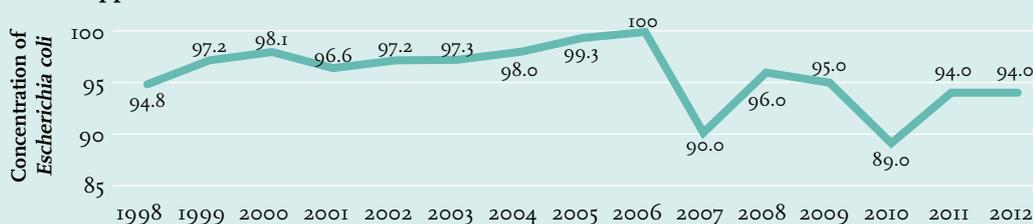
In 2008 changes were introduced to the methodology for determining bathing water quality, seeing as the bacteria used as the indicator changed from faecal coliforms to *Escherichia coli* under RD 1341/2007 on Bathing-Water Quality Management.

## Indicator 8: (cont.)

### Concentration of Escherichia Coli (2012)

Beach	95th Percentile (p95 EC)	90th Percentile (p90 EC)	Quality
Fòrum	21	16	Excellent
Llevant	49	35	Excellent
Nova Mar Bella	106	62	Excellent
Mar Bella	46	31	Excellent
Bogatell	76	44	Excellent
Nova Icària	60	38	Excellent
Somorrostro	67	42	Excellent
Sany Miquel	50	33	Excellent
Banyes Sant Sebastià	17	13	Excellent

### Visual appearance of the beaches



### Year-on-year evaluation

*Escherichia coli* concentrations, used as an indicator of faecal contamination of coastal bathing water, present a general downward trend in relation to 2011. The lower value of the 90th percentile was the lowest it has been in recent years.

Under current legislation, all the beaches inspected achieved an excellent score, both in 90th percentile *Escherichia coli* concentration and in intestinal enterococci concentrations (95th percentile under 100 ufc/100ml.).

Meanwhile, the lack of specific regulatory guidelines, and repeated results below the detection levels of the analytical procedures used to determine the presence of heavy metals, toxins and pesticides, the decision has been made to stop sampling and analysis of water off the immediate coastline.

As for the visual appearance of the sea and sand, this was evaluated at 94%, identical to the previous season.

### Conclusions

- Es mantenen els nivells de qualitat microbiològica de l'aigua de bany (nivell excel·lent a totes les platges).
- La valoració de l'aspecte visual de la platja es manté estable respecte l'any anterior.

	Water quality	Quality of the beaches
Evolution from previous year	Improved	Improved
Trend over recent years	Improved	Stable

### Outlook

No medium-term changes are expected in European Union legislation in the area of coastal bathing-water quality, since *Escherichia coli* concentrations are the best generic indicator of faecal contamination. Regarding the visual appearance of the sand and sea, we need to reiterate the fact that this is a wholly subjective indicator. No scientific scale is used in this assessment and no regular sampling takes place; rather it depends entirely on the subjective perception of the inspector at the time of grading the beach in question. If we wanted to keep this indicator active, it would perhaps be worth considering the incorporation of variables such as the volume of waste collected in relation to visitor traffic, for example.

## Indicator 9: Air quality

### Citizen Commitment to Sustainability no. 4

Achieving optimal levels of environmental quality and become a healthy city (action lines 4.1).

### Indicator description

Indicates air quality under two parameters: maximum hourly ozone concentrations ( $O_3$ ) and the annual average hourly maximum concentrations of  $NO_2$  in the city.

### Indicator parameters

Unit 9.1: micrograms of ozone per  $m^3$  ( $\mu g/m^3$ )

The information threshold above which the public must be informed is  $180 \mu g/m^3$  (average hourly concentration).

Unit 9.2: micrograms per  $m^3$  ( $\mu g/m^3$ ) of  $NO_2$

Reporting period: annual

Source: Barcelona City Council. Barcelona Public Health Agency

### Data from 2012

9.1 - Maximum hourly ozone concentration:  $148 \mu g/m^3$

9.2 - Annual average hourly concentrations of  $NO_2$ :  $44,3 \mu g/m^3$

### Desired trend



### Evolution (1998-2012 / 1999-2012)

#### Ozone air concentrations ( $O_3$ )



The average hourly information threshold above which the public must be informed, under Directive 2008/50/CE is  $180 \mu g/m^3$ , while the hourly alert threshold is  $240 \mu g/m^3$ .

The target maximum eight-hour ozone concentrations to protect human health is  $120 \mu g/m^3$

Indicator 9: (cont.)

**NO<sub>2</sub> air concentrations**



	1999	2000	2001	2002	2004	2003	2005	2006	2007	2008	2009	2010	2011	2012
--- Average	65.0	60.5	52.0	53.5	54.3	49.4	58.2	53.4	52.8	49.7	48.0	46.6	45.6	44.3
— Ciutadella						43	48	47	46	42	46	46	40	42
— Palau Reial													32	36
— Eixample	68	69	55	55	54	60	68	68	66	65			65	61
— Gràcia-Sant Gervasi	62	66	64	65	69	67	83	74	63	63	63	64	66	61
— Poblenou		59	42	53	57	40	43	47	42	47	50	45	43	42
— Sants		48	47	41	37	37	49	31	47	45	41	41	40	37
— Vall d'Hebron										36	40	37	33	31

**Year-on-year evaluation**

In 2012 a general decline was observed in annual levels of NO<sub>2</sub> in the city, with the exception of the moderate traffic measurement station at Palau Reial and the inner city station at Ciutadella, which both exceeded the upper annual threshold (40 µg/m<sup>3</sup>). Even given this drop in overall levels, the upper annual threshold was also exceeded, as in previous years, at the city's high intensity traffic measurement stations (Eixample and Gràcia-Sant Gervasi) and at the moderate traffic measurement station at Poblenou. Following the trend for annual levels, a fall in the number of times the upper threshold exceeded in the city was also observed (200 µg/m<sup>3</sup>).

In terms of ozone concentrations, the maximum hourly value recorded at the city's urban measurement stations remained stable relative to the previous year. Since 2003 the information threshold above which the population must be informed (180 µg/m<sup>3</sup>) has not been reached at any of the measurement stations across the city.

**Conclusions**

- Maximum hourly ozone remained stable relative to the year before.
- General improvement of NO<sub>2</sub> levels in the city, both at traffic and inner city (Parc de la Ciutadella) measurement stations, despite exceeding the annual threshold limit value (40 µg/m<sup>3</sup>) at 4 of the 7 stations.

	O <sub>3</sub>	NO <sub>2</sub>
Evolution from previous year	Stable	Improved
Trend over recent years	Stable	Improved

### Outlook

#### NO<sub>2</sub>

Although the city's overall average is not the indicator used to assess air quality against regulatory limits, it does allow us to gauge the general direction levels of this pollutant are moving in. It is also a data set that has been kept since 1999.

#### O<sub>3</sub>

Maximum hourly ozone is recorded at the inner city measurement stations and downwind of the dominant winds. As a secondary pollutant, ozone levels will depend on changes in emissions of precursors such as nitrogen oxides and volatile organic compounds. Regulations on the assessment and management of environmental air quality only establish information and/or alert thresholds for 3 contaminants: nitrogen dioxide, sulphur dioxide and ozone. Of these, it is the ozone information threshold (180 µg/m<sup>3</sup>) that is most likely to be exceeded in Barcelona.

#### PM<sub>10</sub> i PM<sub>2,5</sub>

Annual daily concentration averages for PM<sub>10</sub> and PM<sub>2,5</sub> could be added as sub- indicators, as critical pollutants, alongside NO<sub>2</sub> of air pollution levels in the city. The historical data set for these indicators would start from 2002 for PM<sub>10</sub>, and from 2005 for PM<sub>2,5</sub>.

## Indicator 10: Life expectancy at birth

### Citizen Commitment to Sustainability no. 4

Achieving optimal levels of environmental quality and becoming a healthy city (action line 4.9).

### Indicator description

Indicates the average number of years that people born in a given year can expect to live.

### Indicator parameters

Unit: years

Reporting period: annual

Source: Barcelona City Council, Barcelona Public Health Agency

### Data from 2011

Total: 83.3 years

Men: 80.0 years

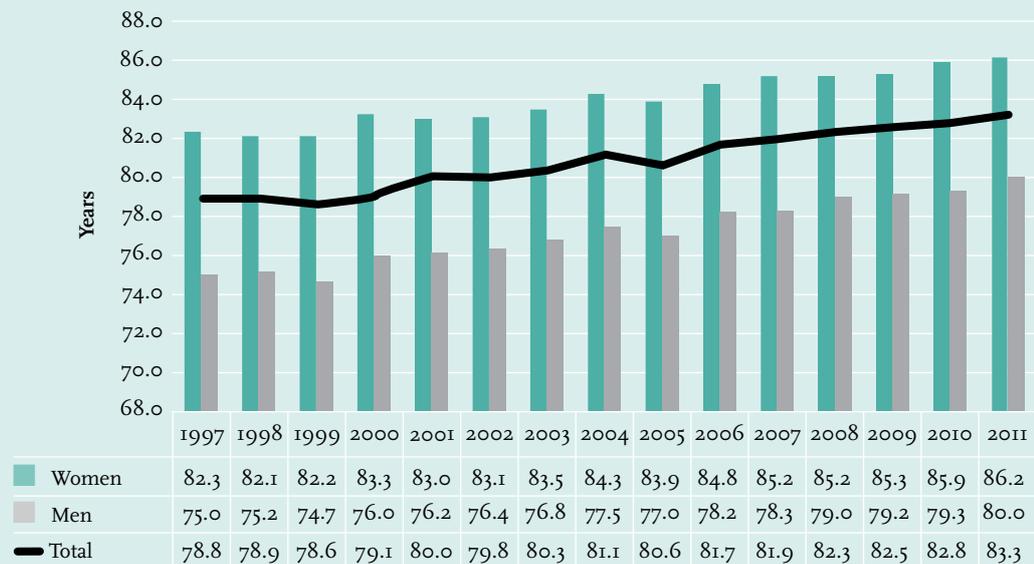
Women: 86.2 years

### Desired trend



### Evolution (1997-2011)

#### Life expectancy at birth



### Year-on-year evaluation

In 2011 life expectancy in Barcelona rose once again compared to the previous year; this time by 0.5 years, from 82.8 to 83.3. By gender, life expectancy rose by 0.7 years for men, from 79.3 to 80.0, and by 0.1 years, from 85.9 to 86.0, for women.

Life expectancy in Barcelona was slightly above that for Catalonia as a whole (82.5 years in 2011), which in turn was above that of the average for Spain and the European Union. This indicator has increased steadily over the past couple of decades: in 1990 Barcelona's population had a life expectancy of 76.8 years, in 2000 this went up to 80 years, and by 2011 it had reached 83.3. Bear in mind, in any case, life expectancy is an indicator that can be calculated using any number of methods and, since the same one has not been used each year, year-on-year results are not wholly comparable. Overall, though, life expectancy of Barcelona residents shows an upward trend, having risen some four and a half years since 1997, from 78.8 to 83.3.

### Conclusions

- Life expectancy of Barcelona residents continues to rise.
- Since 1997 life expectancy has increased by four and a half years.

	Life expectancy
Development from previous year	Improved
Trend over recent years	Improved

### Outlook

Life expectancy is a good indicator, as a summary of mortality. However, other factors can have a bearing upon values recorded against this indicator such as premature mortality, whose causes are highly complex. This is why there are other indicators like health-adjusted life expectancy, which more accurately reflects the quality of life of a population and the inequalities found between demographic segments. The only problem here is that this indicator depends on subjective data on personal health, like that collected through the Barcelona Health Survey (conducted every 5 to 6 years). Furthermore, no systematic method exists for calculating this indicator, although one is planned for the near future.

## Indicator 11: Total water use per resident

### Citizen Commitment to Sustainability no. 5

Conserving natural resources and promoting the use of renewable energies (action line 5.2).

### Indicator description

Indicates annual drinking water use by all sectors in the city (domestic, commercial, industrial and municipal services) per resident per day, plus trends over the past ten years.

### Indicator parameters

Unit: litres per resident per day (l/resident · day)

Reporting period: annual

Population on 1 January 2012: 1,620,943 residents

Source: Societat General d'Aigües de Barcelona, SA (AGBAR)

Evaluation: Barcelona City Council. Environment and Urban Services. Urban Habitat

### Data from 2012

Total water use per resident per day: 163.2 l/resident/day

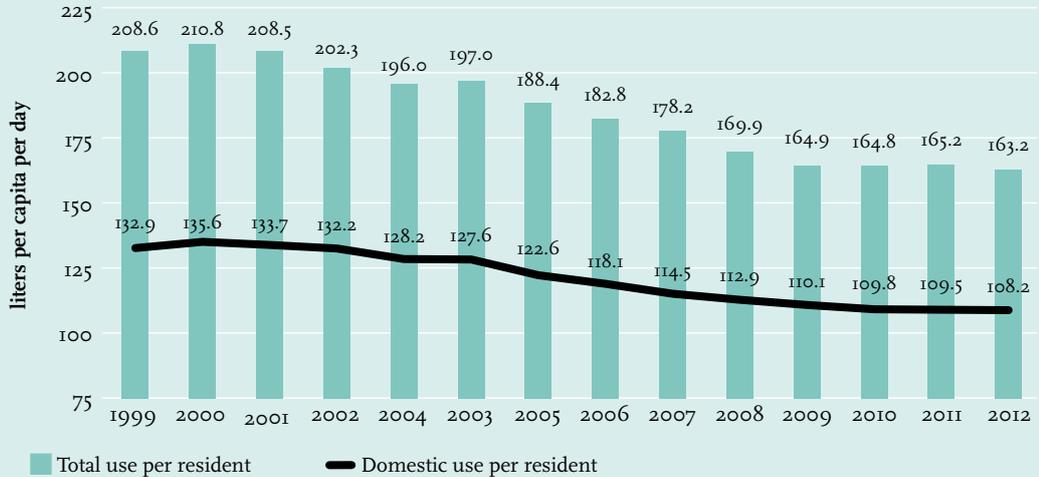
Domestic use per resident per day: 108.2 l/resident/day

### Desired trend



### Evolution (1999-2012)

Use of drinking water from the public water supply per resident



### Year-on-year evaluation

Following a slight increase in 2011, total per-resident use of drinking water from the municipal water supply in Barcelona went down in 2012, dropping below 164 l/resident/day for the first time to 163.2 l/resident/day.

In total some 96.54 million m<sup>3</sup> (97.47 million m<sup>3</sup> in 2010) of water were consumed which, dropping below the 97 million m<sup>3</sup> mark, is the lowest volume on record. By sector, the figures collected for 2012 are very similar to the year before: domestic use accounted for 66.3% (64.0 million m<sup>3</sup>), commerce and industry for 28.1% (27.1 million m<sup>3</sup>), and municipal services for 5.6% (5.3 million m<sup>3</sup>).

Use per resident has followed a general downward trend since 2000, fluctuating only slightly in response to annual variations in city population levels. From the year 2000 onwards total use per resident has gone down by 47.6 litres (22.6%) and domestic by 27.4 litres (20.2%).

### Water use in Barcelona by sector (2012)



### Conclusions

- Total annual use of drinking water from the public water supply has fallen below 97 million m<sup>3</sup> for the first time, while total use per resident has dropped to 163.2 l/resident/day.
- Between 2000 and 2012, total water use per resident dropped by more than 47.8 litres, while domestic use per resident decreased by 27.4 litres.

	Total water use per resident	Domestic water use per resident
Evolution from previous	Improved	Improved
Trend over recent years	Improved	Improved

### Outlook

According to the technical department at Barcelona City Council's Water Cycle Services, progress against this indicator can still be made, despite the fact that use per resident appears to be levelling out. That said, whether or not this optimistic forecast will be realised depends on the development of several factors. First among them is the ongoing improvement of consumer habits and of the water-saving systems installed in homes and other premises around the city. Switching to water from alternative water sources rather than the drinking water supply, especially for municipal services, should also have an impact.

## Indicator 12: Use of ground water for municipal services

### Citizen Commitment to Sustainability no. 5

Conserve natural resources and promote the use of renewable energies (action line 5.3)

### Indicator description

Express the percentage of ground water that municipal services use in relation to the total volume of water consumed by these services (ground water plus water from the municipal water supply). Municipal uses include the irrigation of parks and gardens, street cleaning, drains cleaning, decorative fountains, sports installations and other uses.

### Indicator parameters

Unit: %

Reporting period: annual

Source: Barcelona City Council. Environment and Urban Services. Urban Habitat

### Data from 2012

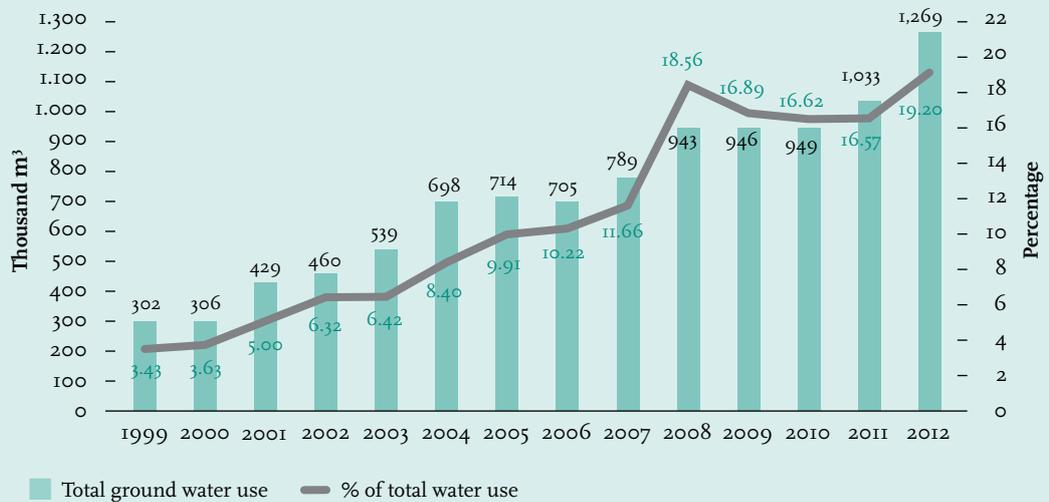
- Use of ground water relative to total water use: **19.20%**
- Total use of ground water: **1,269,752 m<sup>3</sup>**

### Desired trend



### Evolution (1999-2012)

Use of ground water for municipal services



### Year-on-year evaluation

Barcelona has a long history of exploiting its ground water reserves. Especially abundant in the area around the Besòs delta (Sant Andreu, Poble Nou, Barceloneta), industry used to get through large volumes of ground water, also consuming water from various wells in the Plain region and drilling mines in the higher regions of the city. Over the years it has gradually moved away from using these reserves, meaning that ground water levels in both Pla and Besòs, once abnormally low through overexploitation, have slowly risen. This water initially drained directly into the sewer system. Since 1998 Barcelona City Council has fostered a more sustainable use of municipal ground water reserves, through its Alternative Water Resources Plan. It advocates use of these reserves for all uses that do not involve human consumption and therefore do not require the water to undergo any kind of treatment to make it safe for drinking. By doing so less water is taken from other natural ecosystems such as Llobregat, Ter and Ebre, and ground water levels in certain areas of the city are kept under control.

In 2012 ground water accounted for 19.20% (1,269,752 m<sup>3</sup>) of all water used by municipal services (ground water + drinking water, 6,614,500 m<sup>3</sup>). In absolute terms, the use of ground water rose 320% between 1999 and 2012, and by 22.9% (236,000 m<sup>3</sup>) since 2011. By uses, the irrigation of parks and gardens accounts for approximately 39% of ground water use; street cleaning, for 23%; decorative fountains, 30%; sewer cleaning, 7%; and other uses (sports facilities and fire installations, 1%.

The use of ground water in Barcelona has increased over recent years, with small fluctuations. This is due, on the one hand, to various municipal services incorporating this resource into its water uses and, on the other, the implementation and improvement of extraction and distribution services that have enabled its use for these services.

### Conclusions

- Use of ground water for municipal services has increased significantly from last year, reaching 1.27 million m<sup>3</sup>.
- This volume accounts for 19.20% of total water used by municipal services (ground water + drinking water supply).
- Use of ground water between 1999 and 2012 has gone from 302,000 m<sup>3</sup> to 1,269,000 m<sup>3</sup> (967,000 m<sup>3</sup>).

Ground water use	
Evolution from previous years	Improved
Trend over recent years	Improved

### Outlook

The total volume of ground water available in Barcelona means we will be able to significantly increase its use over the coming years; the 2012 figure might even be doubled (considering municipal uses only). However, for this to be possible we would need to invest in new infrastructures and facilities to extend its use to other areas and spaces of the city, both public and private.

## Indicator 13: Use of renewable energies

### Citizen Commitment to Sustainability no. 5

Conserving natural resources and promoting the use of renewable energies (action line 5.5).

### Indicator description

Indicates the use of renewable energy sources across two parameters: percentage of renewable primary energy sources (photovoltaic, wind, biomass and small hydro, according to Catalonia's energy mix), and energy generated at solar installations (thermal and photovoltaic) in the city of Barcelona. Both those in the planning stages and those already up-and-running and generating energy have been counted as solar installations for the purposes of this indicator. The reason for this is that this is the information collected by the Barcelona Energy Agency, and is more reliable than that used in previous years based on estimates.

### Indicator parameters

Unit 13.1: % (use of primary energy from renewable sources as a proportion of total energy use)

Unit 13.2: MWh/year (energy production at solar installations)

Reporting period: annual

Source: Barcelona City Council. Environment and Urban Services

### Data from 2010/2011

13.1 - Use of primary energy from renewable sources as a proportion of the total (2010): No up-to-date figures

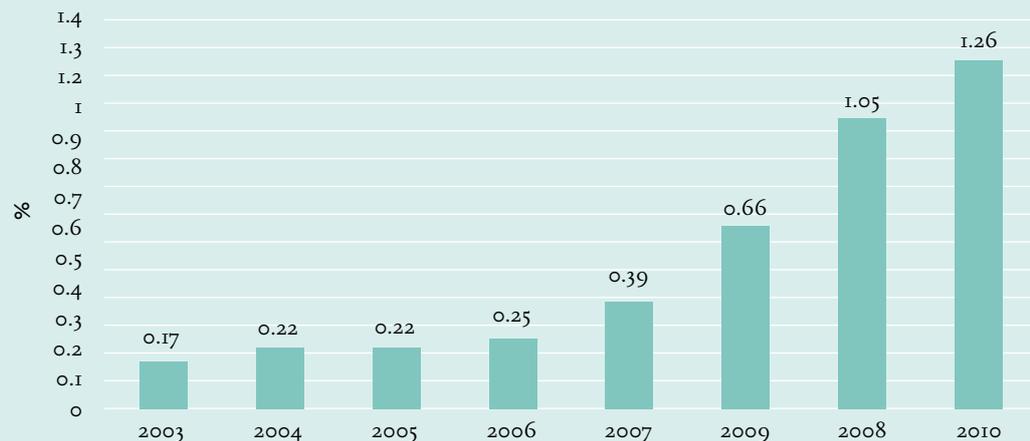
13.2 - Solar energy: **86,533 MWh/year**  
68,787 MWh/year (thermal) + 17,746 MWh/year (photovoltaic)

### Desired trend

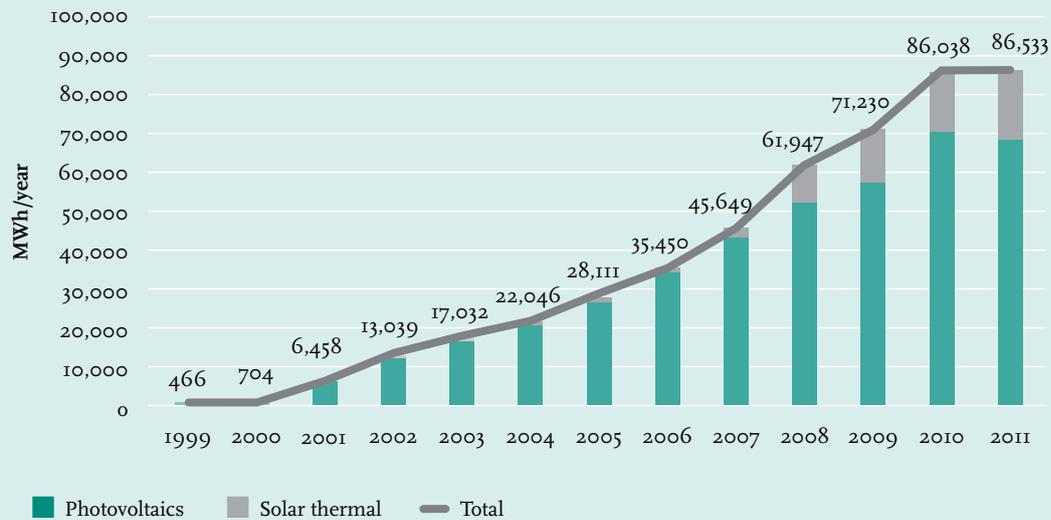


### Evolution (2003-2010/1999-2011)

#### Use of renewable primary energies



### Equivalent energy generated at solar installations



### Year-on-year evaluation

Overall energy use in Barcelona has increased over the years at an average annual growth rate of 1.02% (1999-2010): a total of 17,319.36 GWh were consumed in 2010 (including electricity, natural gas, LPG and petroleum), while in 1999 this total was 15,664.78 GWh<sup>1</sup>. We should point out here though that the proportion of total energy use attributable to renewable energies has increased. Similarly, the current economic crisis is having an effect on use, though the exact impact has not been quantified. This is particularly true in the domestic sector where, unlike industry, annual weather conditions also have a significant bearing.

In 2010 the percentage of use of energy from renewable sources in relation to total use increased to 1.26%, while in 1999 it accounted for just 0.06%. This increase in relation to previous years, especially 2009 and 2010, is due to changes in Catalonia's electricity mix, which has essentially seen wind and photovoltaic generation double, somewhat at the expense of fossil fuel production. Despite these spectacular leaps, the presence of renewable energy sources in overall energy production is still very slight.

In 2011 energy generated at solar installations reached 86,533 MWh, which breaks down as follows: 68,787 MWh/year from solar thermal energy (estimate of production associated within the area covered the Barcelona Energy Agency – Infrastructures and Urban Coordination – Urban Habitat) and 17,746 MWh/year from solar photovoltaic.

The increase in solar thermal energy is due to the considerable expansion of the area covered by the Agency as a result of new European regulatory frameworks that paved the way for Barcelona's Thermal Solar Regulations and, at the state level, Spain's Technical Building Code. Despite this upward trend, the effect of the economic crisis of recent years can be felt: solar thermal installations tend to directly relate to the newly built homes and property restoration sector, affecting the rate of implementation of this kind of system.

1. Total energy use in 1999 stood at 15,902.9 GWh, though changes made to the calculation method in 2008 mean these values have been recalculated in order to be coherent. Specifically, these changes relate to the difference observed between the registered vehicle stock and the actual stock of vehicles on the road in Barcelona. Figures for historic petrol consumption has therefore been revised to reflect this difference.

### Indicator 13: (cont.)

The increase in photovoltaic electricity generation is due to a large extent to installations developed by both private investors and the City Council, as well as the growth of this technology over the past two years to a large extent due to the now –non-existent– favourable “buy back” prices (excess energy bought back by the energy companies at a higher rate than energy sold). The current lack of such a policy has halted deployment of this technology across the city.

#### Conclusions

- Use of renewable energies has grown significantly over the past year, both at city and state level, though the effects of the economic crisis are being felt.
- Photovoltaic electricity generation has increased mainly through installations developed years ago.

	Renewable primary energy	Solar energy
Evolution from previous year	Not updated	Improved
Trend over recent years	Improved	Improved

#### Outlook

This indicator has a clear usefulness for the future, given that the use of renewable sources to generate energy is a challenge faced by cities around the world with a view to reducing their external energy dependence. However, it would be interesting to include sources beyond solar energy in the indicator, as well as other factors such as the self-sufficiency index, building energy certification, residual energies, etc.

We should also keep in mind that the instability of the current regulatory framework, with new legislation abolishing favourable conditions for electrical energy generation, has created a climate of distrust within the sector, meaning that investment is not going ahead as planned. Only initiatives at the public level are being carried out, or private initiatives where obliged by law.

## Indicator 14: Municipal waste generation

### Citizen Commitment to Sustainability no. 6

Reduce the amount of waste generated and foster a culture of reuse and recycling (action line 6.1)

### Indicator description

Indicates the amount of municipal waste generated per resident per day in Barcelona; it includes household waste collection, waste from street cleaning and litter bins, and recyclable waste.

### Indicator parameters

Unit: kilograms per resident per day (kg/resident/day)

Reporting period:

annual Population on 1 January 2012: 1,620,943 residents

Source: Barcelona City Council. Environment and Urban Services

### Data from 2012

Municipal waste generation: 1.27 kg/resident/day

### Desired trend



### Evolution (1999-2012)

#### Municipal waste generation per resident



## Indicator 14: (cont.)

### Year-on-year evaluation

In absolute terms, total municipal waste generation in 2012 in Barcelona was 753,737 tonnes, down 6.3% on 2011 (804,921 tonnes).

Unlike in previous years, waste generation since 2007 has experienced a drop that is also reflected in per resident generation, allowing us to achieve the goals set for this indicator. Specifically, it has gone from 1.54kg/resident/day in 2007 –the year when levels of waste generation peaked– to 1.27 kg/resident/day in 2012, a figure which is significantly lower even than that recorded in 1999 (1.33 kg/resident/day). The economic crisis, which is affecting demand for products and consumption levels of Barcelona residents, appears to be the main driving force behind this positive trend.

Largely speaking, waste generation in Barcelona over the past few years can be split into three phases. The first, between 1999 and 2003, presents a sharp increase in waste generation by over 100,000 tonnes. In the second, between 2004 and 2007, levels continue to rise slightly though appear to be showing signs of stabilising. And the third, from 2008 onwards, sees levels of waste generation begin to drop significantly to below those recorded in 2000.

### Evolution of total municipal waste generation (2001-2012)



### Conclusions

- The downward trend in municipal waste generation since 2007 continued during this reporting period, both for total and per resident waste.
- Per resident waste generation is below levels recorded in 2000.

	Waste generation
Development from previous year	Improved
Trend over recent years	Improved

### Outlook

This indicator is useful for monitoring the levels of municipal waste generated by Barcelona residents since, not only does it indicate absolute values (to some extent dependent on the number of residents) but also the amount produced per resident per day. Besides population levels, the generation of waste is directly linked to consumption.

The current socio-economic context and trends in consumer habits will therefore have a direct influence on the volume of municipal waste generated. It might be worth considering this indicator in relation to GDP or shopping trolley contents, to distinguish the impact of the current economic climate.

## Indicator 15: Organic waste collection

### Citizen Commitment to Sustainability no. 6

Reducing the amount of waste generated and fostering a culture of reuse and recycling (action line 6.4).

### Indicator description

Indicates the number of tonnes of organic waste collected via waste sorting each year in Barcelona. It includes waste from various sources: domestic, commercial, markets, parks and gardens, and Mercabarna.

### Indicator parameters

Unit: annual tonnes (tonnes/year)

Reporting period: annual

Population on 1 January 2012: 1,620,943 residents

Source: Barcelona City Council. Environment and Urban Services

### Data from 2012

Organic matter: 122,508 tonnes

### Desired trend



### Evolution (1998-2012)

#### Quantity of organic waste collection



### Year-on-year evaluation

Organic waste accounts for a significant proportion of municipal waste; approximately 36% of total weight. The total amount of organic waste collected in Barcelona in 2012 was 122,508 tonnes. This is 8% less than the year before (133,344) and translates into an annual per resident collection of 75.6 kg (82.5 kg in 2011). Domestic waste collection accounts for 69% of this total; commercial, for 20%; and markets, 4%.

For the most part, the drop since 2011 has to do with the overall reduction in waste generated. However, we should recall that organic waste collection increased by 66% between 2009 and 2010 (from 84,552 tonnes to 140,427 tonnes) thanks to the increased provision of organic waste collection services throughout the city. In 2012, impurity levels of domestic organic waste (non-organic matter that should have been sorted into a different bin) stood at 20.2%.

The target set in Catalonia's Municipal Waste Management Programme is to reach 55% organic waste collection, a percentage which in 2012 stood at 45.2%. However, we should point out that this value is already 13 points higher than the average over the Metropolitan Area.

### Conclusions

- Collection of organic waste has gone down by 8% since 2011, due to the considerable decrease in total waste generation and the non-stabilisation of the collection system.
- However, levels remain high at above 75 kg/resident/year thanks to the deployment of organic waste collection services to the whole of the city in 2009.

Organic waste collection	
Evolution from previous year	Decreased
Trend over recent years	Improved

### Outlook

Levels of organic waste collection in Barcelona still have a way to go, since the collection system has not yet become as established as much as we would have liked. This is due, in part, to the fact that a proportion of the population has yet to be won over to the concept of waste sorting in general (the same phenomenon is observed with other kinds of waste: glass, packaging, and paper). It is also a reflection of changing consumer habits (fewer food purchases), and to the overall decrease in waste generation.

So there is room for improvement against this indicator, both in terms of encouraging more residents to convert to waste sorting, and of improving the purity of the domestic organic waste collected whose current impurity levels make it substantially harder to process.

## Indicator 16: Waste sorting

### Citizen Commitment to Sustainability no. 6

Reducing the amount of waste generated and fostering the reuse and recycling of materials (action line 6.5).

### Indicator description

Indicates the amount of recyclable waste collected in Barcelona as a proportion of total annual waste generation. It includes waste in the following categories: paper and cardboard, packaging, glass, clothes, organic waste, bulky waste, and other green point waste fraction.

### Indicator parameters

Unit: % Reporting

period: annual

Source: Barcelona City Council. Environment and Urban Services

### Data from 2012

Recyclable waste collected: 37.1%

### Desired trend



### Evolution (1998-2012)

#### Recyclable waste collection



### Year-on-year evaluation

In this reporting period, recyclable waste as a proportion of total waste collected went down by 0.8 % compared to 2011, and by 2.4% compared to 2010, when collection of recyclable waste peaked (39.5% of total waste) following the city-wide deployment of organic waste collection services and the newly increased number of green points. Nevertheless the percentage for 2011 is still nearly 5 points higher than in 2009, and constitutes an increase of nearly 30 points relative to 1998, when recyclable waste in tonnes accounted for just 0.8% of total waste.

In absolute terms, some 279,433 tonnes were collected in 2012, down 8.3% on the previous year (304,727 tonnes) and equivalent to 172.4 kg of recyclable waste per resident per year (14 kg less than the year before). This decrease can be attributed to the overall reduction in waste generation in Barcelona.

### Evolution of recyclable waste collected per resident (2001-2012)



### Conclusions

- In 2012, as in the previous period, the percentage of recycled waste collected went down slightly, though the current figure is still nearly 5 points higher than in 2009.
- Recycled waste collection per resident stood at around 172.4 kg/resident/year, 14 kg less than in 2011

Recycled waste collection	
Evolution from previous year	Stable
Trend over recent years	Improved

### Outlook

In relative terms, the trend observed in recyclable waste collection is indicative of the levels of participation of residents in separating their waste for recycling. Over the past few years, however, coinciding with the economic crisis, certain other factors have had a bearing on the total weight collected, such as cardboard theft and the fact that the separation of organic waste has not yet become a habit. Meanwhile, the practice of separating glass and packaging has been consolidated for some years now and, again in relative terms, is recording the same levels as always.

As for future indicators that might be considered, it would be interesting to compare Barcelona's figures against the goals set for recycling by Europe and Catalonia, as well as collecting data regarding the end destination of all waste generated (material assessment, energy assessment, end use...).

## Indicator 17: Drop-out rates from compulsory secondary-school education

### Citizen Commitment to Sustainability no. 7

Increase social cohesion by strengthening mechanisms for equality and participation (line action 7.1)

### Indicator description

Indicates the percentage of drop-outs from compulsory secondary-school education out of the total number of students assessed during a given school year.

### Indicator parameters

Unit: % Reporting

period: annual

Source: Generalitat of Catalonia Department of Education

### Data from 2012

- Compulsory secondary-school education drop-out rate 12.3%

### Desired trend



### Evolution (1998-1999/2011-2012)

#### Compulsory secondary-school education drop-out rates



### Year-on-year evaluation

The percentage of students who drop out of compulsory secondary-school education is a good indicator of an education system's failure rate. In Barcelona the drop-out rate has gradually dropped over the past few years, despite some fluctuations. That is, the number of students who graduate from secondary-school education has increased.

In absolute terms, 10,792 students out of a total of 12,300 graduated from compulsory secondary-school education in the 2010/11 school year (87.74%). The drop-out rate for this period, then, is 12.26%.

### Conclusions

- Compulsory secondary-school education drop-out rate dropped 2.3 points on the previous year (from 14.6% to 12.3%).
- In ten years the Drop-out rates from compulsory secondary-school education in Barcelona has gone down by nearly a third (from 31.0% to 12.3%).

#### Drop-out rates from compulsory secondary-school education

Evolution from previous years	Improved
Trend over recent years	Improved

### Outlook

We propose a rethinking of this and the next one (indicator 18) to find new benchmarks that better reflect the diversity and wealth of the current education system, so that we do not base our evaluation solely on the increased number of successful graduates and the rate of school failure.

## Indicator 18: Population with a university degree

### Citizen Commitment to Sustainability no. 7

Increase social cohesion by strengthening mechanisms for equality and participation (line action 7.1)

### Indicator description

Indicates the percentage of Barcelona's population with a university degree, as a proportion of total population aged 18 and over.

### Indicator parameters

Unit: % Reporting

period: annual

Source: Barcelona City Council. Department of Studies and Evaluation.

Municipal Services Survey

### Data from 2012

- Percentage of the population: 34.0%
- Men: 34.8%
- Women: 33.2%

### Tendència desitjada



### Evolution (1997-2012)

#### Population with a university degree



### Year-on-year evaluation

Since 1997 a progressive increase has been observed in the number of university graduation, rising 14.5% to account for 34.0% of the population. This means that more than a third of the population of Barcelona holds a university degree.

This Data are very useful not only from a quantitative point of view, but also because the increase in the population's level of education has a positive impact on its capacity to enter the labour market. It is also positive that the female population with a university degree, previously very small in number, now almost matches the corresponding male population (33.2% and 34.8%, respectively).

### Conclusions

- Since 1997 the percentage of the population with a university degree in Barcelona has increased by 14.5 percentage points.
- The percentage of the female population with a university degree (33.2%) is getting ever closer to that of the male population (34.8%).

Population with a university degree	
Evolution from previous years	Improved
Trend over recent years	Improved

### Outlook

The development of the percentage of the population with a university degree has followed an upward trend over the past few years, practically doubling in just fifteen years. The trend seems like it might continue upwards in the future, based on the natural renewal of the population and the rise in the number of residents taking higher education. This indicator will therefore continue to be useful for monitoring this particular statistic.

However, it would be worth supplementing the information provided by indicators like this one (level of education of the population) with statistics on alternative training routes, since the diversity of the current education system also has a strong bearing on the dynamics of the labour market.

## Indicator 19: Housing accessibility

### Citizen Commitment to Sustainability no. 7

Increasing social cohesion by strengthening mechanisms for equality and participation (line action 7.8)

### Indicator description

Indicates the accessibility of housing to a population across three parameters: the economic effort required to access new housing, expressed as a percentage of family income per resident (including tax breaks); the number of annual rental contracts; and average price per m<sup>2</sup> of rented accommodation.

### Indicator parameters

Unit 19.1: %

Unit 19.2: absolute number

Unit 19.3: euros per m<sup>2</sup> per month (€/m<sup>2</sup>/mon)

Reporting period: annual

Population on 1 January 2012: 1,620,943 residents

Source: Barcelona City Council. Barcelona Economia

### Data from 2012

19.1 - Economic effort required to access new housing: 46%

19.2 - Number of annual rental contracts: 41,047

19.3 - Average price of rented accommodation: €10.06/m<sup>2</sup>/mon

### Desired trend



### Evolution (1999-2012)

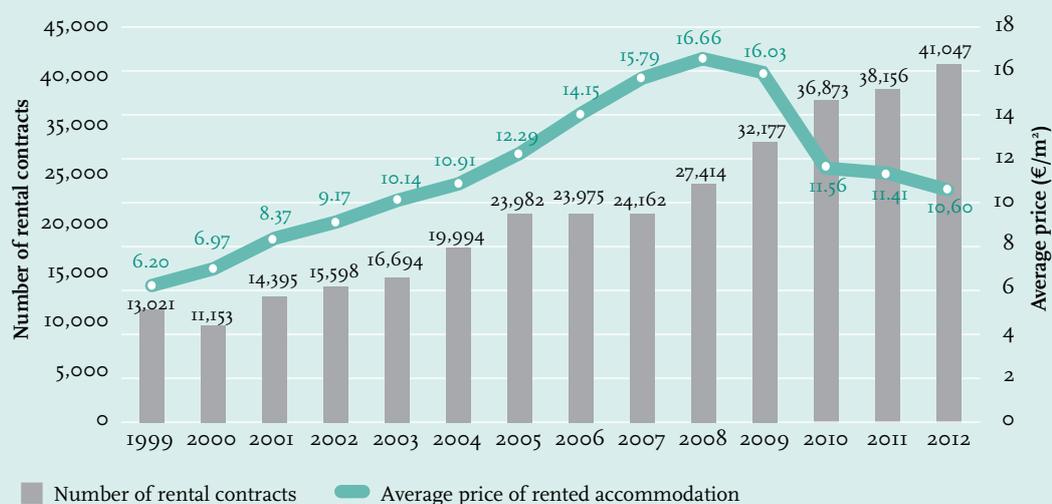
#### Theoretical economic effort required to access new housing



Some data from previous years have been changed; figures from the past four years are always provisional.

## Indicator 19: (cont.)

### Number of rental contracts and average rent price



### Year-on-year evaluation

**Financial effort:** the percentage calculated for 2012 (46.0%) reaffirms the downward trend being observed against this indicator, dropping nearly 34 points in total since 2007. This means that -at the theoretical level, at least- the financial efforts families must make to buy a house are less than they previously were, thanks to the mitigating effect of falling prices and interest rates. Meanwhile average personal income has not gone down. All this said, we must recall that this is a theoretical indicator combining several factors -house prices, interest rates and a families' disposable income- to get a standard average.

**Rental contracts:** the values recorded for this indicator have grown steadily since the year 2000, driven by a growing population and the increasing number of people who are financially unable to buy a house. In 2012 there were 41,047 rental contracts, which is 2,900 more than in 2011 and three times as many as in 1999.

**Rental price:** the average price of rental contracts in 2012 was €10.60/m<sup>2</sup>/month (€718.03/m/mon, on average). This is € 0.81/m<sup>2</sup>/month less than in 2011, and € 6.06/m<sup>2</sup>/month less than in 2008, when prices peaked. Since then, rent price has dropped sharply. The recovery of prices observed over the past few years, the result of a shift in the market from buying to renting, came to a halt during this period. We would need to wait for next year's figure in order to know if this trend has been broken.

### Conclusions

- The economic effort required by families to access new housing rose by 2 points compared to 2011; in fact it was the lowest value on record since 1999.
- The number of rental contracts has gone up steadily since 2001.
- Average rent price has gone down relative to 2011.

	Economic effort	Contracts	Rent price
Evolution from previous	Improved	Improved	Improved
Trend over recent years	Stable	Improved	Improved

### Outlook

As with other indicators, the development of this indicator clearly reflects Spain's current economic climate. The economic crisis is taking its toll on the property market, strongly influencing the behaviour of residents when choosing where to live. Personal disposable income, flat prices, interest rates, etc. all point to a significant change in future trends in access to housing, as do the rise in the number of rental contracts and the fall in average rent prices, for example.

In any case, it would be worth reviewing this indicator to assess whether the data it provides is a real reflection of what is actually happening. It could be that we ought to give it a rethink and create new indicators, better adapted to the changing socio-economic reality. In particular, economic effort is a concept based on a set of pre-defined assumptions -widely accepted when they were first defined- and which are calculated using average values.

## Indicator 20: Level of participation in associations

### Citizen Commitment to Sustainability no. 7

Increasing social cohesion by strengthening mechanisms for equality and participation (action line 7.9).

### Indicator description

Indicates the percentage of the population who, when asked the question “Are you currently a member of or volunteer for an association or other group?”, answered in the affirmative. Given as a proportion of Barcelona’s total population.

### Indicator parameters

Unit: %

Reporting period: every four years

Source: Barcelona City Council. Department of Study and Evaluation Services (Survey on the Values and Attitudes of Barcelona Residents)

### Data from 2010 (to be updated in 2014)

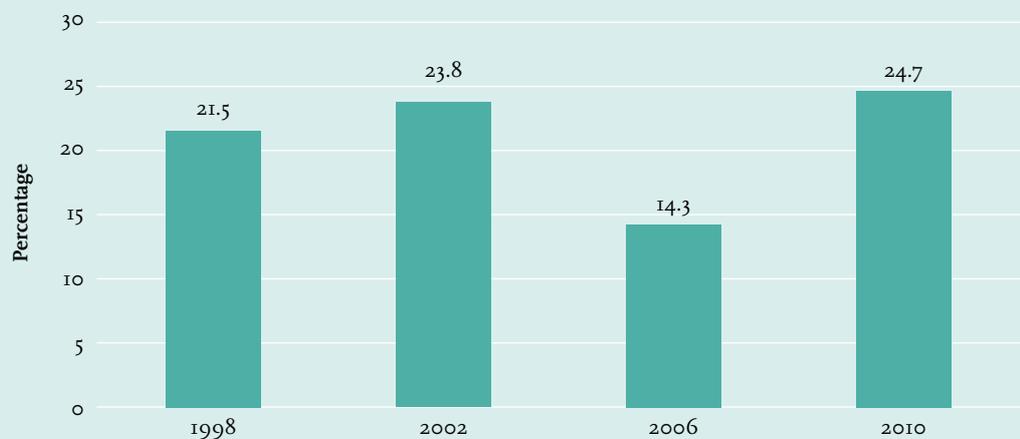
Population participating in associations: 24,7%

### Desired trend



### Evolution (1998-2010)

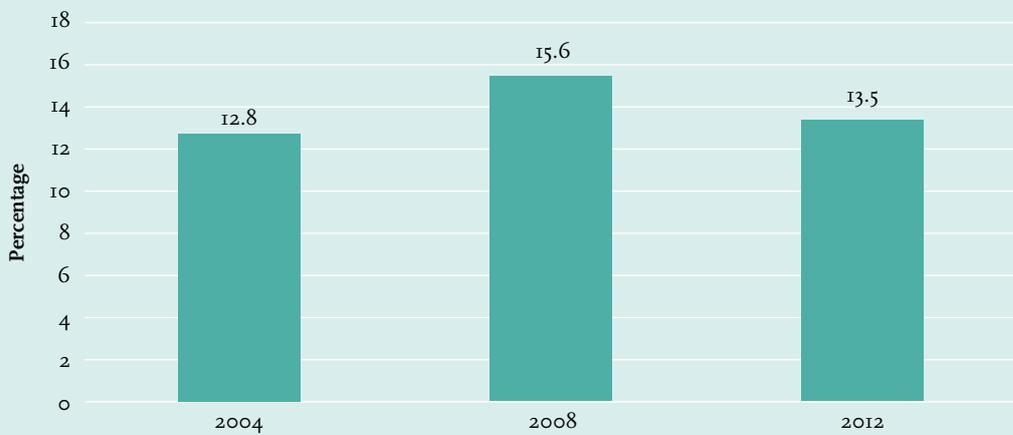
#### Population participating in associations



**Year-on-year evaluation (to be updated in 2014)**

According to the aforementioned values and attitudes survey, the level of participation in associations of Barcelona residents has regained lost ground over recent years. In 2006 just 14.3% said they were members of or volunteers for an association; by 2010 this percentage had increased to 24.7%. Barcelona has always had an active and diverse range of associations, and participation among its residents has always been relatively high. The shifting values of today’s society, the new make-up of the social fabric and the persistence of the economic crisis might very well lead people to interact with associations in new ways, bringing about a greater interest in groups focused on cooperation for development, ecology, health, etc. Every four years Barcelona City Council conducts the Quality of the City Survey which includes a similar question: “Do you participate actively in a public association?” The responses from the past three surveys are as follows:

**Active participation in associations**



**Conclusions**

- According to the latest survey, the level of participation in Barcelona has recovered some of the percentage points lost 2006.
- In 2010 there was a drop in the number of residents engaging with sports or cultural associations and an increase in participation in those focusing on cooperation, solidarity and peace.

**Participation in associations**

Evolution from previous year	Not updated
Trend over recent years	Improved

**Outlook**

The level of participation in associations expresses the percentage of people who belong to a group, without specifying whether they participate actively or just pay the corresponding dues. Monitoring active participation in associations, meanwhile, provides more precise data. Responses to this survey question allow us to better quantify residents’ levels of participation in not-for-profit organisations.

## Indicator 21: Number of organisations with environmental certification

### Citizen Commitment to Sustainability no. 8

Strengthening economic activity geared towards achieving sustainable development (action line 8.2).

### Indicator description

Indicates the number of public and private organisations in Barcelona that have obtained one of the following environmental certifications: EMAS or Catalonia's seal of environmental quality.

### Indicator parameters

Unit: absolute number

Reporting period: annual

Source: Generalitat of Catalunya Department of Territory and Sustainability

### Data from 2012

- Total number of organisations: **81**
- Number of seals of environmental quality: **14**
- EMAS: **67**

### Desired trend



### Evolution (2007-2012)

#### Valid environmental certifications



\* Some data from previous years has been revised by the Department of Territory and Sustainability.

### Year-on-year evaluation

Environmental certifications are a resource that businesses and organisations can use to prove they operate responsibly. Over recent years, the number of ISO and EMAS certifications awarded has gone up, to a large extent because the Spanish government values them when contracting services or purchasing products.

Catalonia's seal of environmental quality provides proof that an organisation or business operates responsibly, conscious of the impact it has on the environment at all stages in the product life cycle or duration of the service it offers. EMAS is another environmental management system that organisations can adopt voluntarily to evaluate and improve its environmental performance, and communicate its achievements to the public and other interested parties.

For the purposes of this indicator, we considered Catalonia's seal of environmental quality, EMAS and ISO 14000 through to 2008. Given the near impossibility of collecting data on the number of businesses with ISO certification, we have been obliged to change the focus of this indicator, gathering data related only to the EMAS certification and Catalonia's seal of environmental quality. The number of valid environmental certifications (Catalonia's seal of environmental quality and EMAS) increased slightly in 2012 compared to the previous year. The number of organisations with the seal of environmental quality was 14, while EMAS accounted for 67. More recently there has been a significant drop in the number of seals awarded, owing primarily to the economic crisis.

### Conclusions

- In 2012 the total number of organisations with valid environmental certifications rose slightly compared to the previous year: EMAS and Catalonia's seal of environmental quality.

Number of organisations with environmental quality	
Evolution from previous years	Improved
Trend over in recent years	Stable

### Outlook

Looking to the future, we should analyse the current certifications scene and have a rethink as to which indicators are most suitable for monitoring progress on the city's path towards an environmentally sound business and finance sector.

## Indicator 22: Number of schools participating in environmental education project

### Citizen Commitment to Sustainability no. 9

Progressing towards a culture of sustainability through environmental education and communication (action lines 9.4 and 9.7).

### Indicator description

Quantifies the number of schools in Barcelona that develop environmental education projects; includes all schools at nursery (0-3 and 3-6), primary, compulsory secondary, post-compulsory secondary level, and other training courses and adult education. It takes into consideration all those projects carried out as part of Barcelona Schools Agenda 21, a programme which urges the education community to take part in a citizen movement to diagnose, provide solutions and make commitments for a more sustainable city, beginning with its immediate environment: the school. Since the 2009/10 school year, through the creation of the Catalan Schools for Sustainability Network enabled by the agreement between Barcelona City Council and the Generalitat of Catalonia, all schools in Barcelona planning to carry out an environmental education project are signed up to a single project, the Schools Agenda 21.

### Indicator parameters

Unit: absolute number

Reporting period: annual

Source: Barcelona City Council. Environment and Urban Services

### Data from 2012-2013

Number of schools: 320

### Desired trend



### Evolution (1998-1999/2012-2013)

#### Environmental education projects in schools



### Year-on-year evaluation

During the 2012/13 school year, 320 centres carried out environmental education projects within the scope of the Barcelona Schools Agenda 21. In absolute terms, this was 5 more than the previous year. Of these 320, 206 were annual projects.

To strengthen and expand the environmental programme, all those centres that carried out annual projects over five school years were asked to perform an evaluation of the previous five years and subscribe to a new three-year format. The evaluation was carried out by on-going assessment throughout the course, using an instrument (with a set of evaluation criteria and a qualitative scale and description of indicators of success) arising from the working team and prepared jointly with specialists. This new phase brings with it new challenges, new lines of work, new commitments, and a renewed vigour. Upon completion of a three-year project, assessments are carried out using the same tool and the three-year commitment is renewed.

Regarding the quality and depth of the projects, the number of centres that are carrying out three-year projects is still 114.

### Conclusions

- In 2012/13 the number of schools participating in environmental education projects in Barcelona went up slightly.
- The number of centres that moved to the three-year project model remained the same.

#### Number of school participating in environmental education projects

Evolution from previous year	Stable
Trend over recent years	Improved

### Outlook

Forecasts for the number of schools participating in annual and three-year environmental education projects indicate that numbers will continue to rise over the coming years. Schools are being very proactive on this front and the projects developed are becoming more and more diverse. The Schools Agenda 21 programme's presence is being increasingly felt, both in terms of the different group that are getting involved and its penetration across school curricula. That said, we could build upon this indicator, perhaps considering it as a percentage of the total number of schools in the city, or analysing figures by districts.

Other data that we might take into consideration would be the number of schools with a school allotment (map of school allotments), with a compost bin or with initiatives to cut down on the volume of packaging waste generated at morning break.

## Indicator 23: Annual CO<sub>2</sub> equivalent emissions

### Citizen Commitment to Sustainability no. 10

Reducing the impact of the city on the planet and promoting international cooperation (action line 10.4).

### Indicator description

Indicates the annual volume of CO<sub>2</sub> equivalent emissions per resident. The sources considered are the port, the airport, Garraf landfill, Sant Adrià de Besòs incinerator, electricity production, use of liquefied petroleum gas, natural gas, petrol and other (industry).

### Indicator parameters

Unit: tonnes of CO<sub>2</sub> equivalent per resident per year (tonnes CO<sub>2</sub>eq/resident/year)

Reporting period: annual

Source: Barcelona City Council. Urban Habitat

### Data from 2011

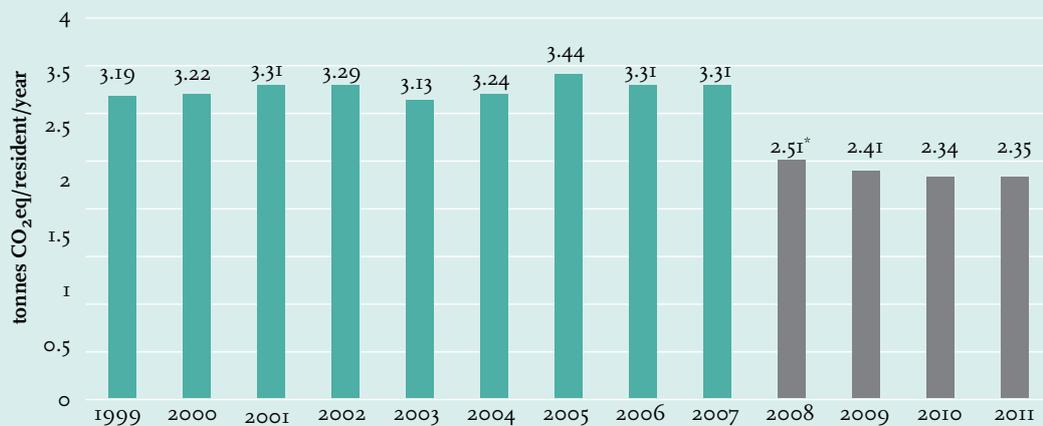
Emissions: 2.35 tonnes CO<sub>2</sub>eq/resident/year

### Tendència desitjada



### Evolution (1999-2011)

#### Annual CO<sub>2</sub> equivalent emissions



\* Change in methodology for calculating emissions.

Data are provisional and may be revised at a later date based on new information.

### Year-on-year evaluation

CO<sub>2</sub>-equivalent emissions have fluctuated considerably over the past few years, although the overall trend has been upwards, with the exception of this past reporting period when they dropped significantly, stabilising over the past two years. This drop is primarily the result of changes to the method used to calculate emissions, instigated as part of Barcelona's energy, climate change and air quality plan (consult the method used here: <http://bcn.cat/mediambient>) , as part of which updated internationally applicable emissions factors were introduced. The new method is responsible for the sharp drop the end figure, as can be seen in the values recorded for 1008-2011.

This adaptation involved the implementation of new factors of internationally approved emissions factors (implementation of the 2006 IPCC, improved calculations for port and airport, use of emissions factors provided by the European Commission for waste processing).

Adopting the new methodology, the behaviour of the indicator during 2009 and 2010 was strongly conditioned by the reduction in the value associated with Catalonia's electricity mix. For this reason, the whole of the electricity generation plants in Catalonia saw hydraulic energy increase and wind energy practically double, leading to a decrease in the emissions factors associated (g CO<sub>2</sub>/kWh) of 20% in just two years (Catalonia's electricity mix based on current published data in the Spanish Electricity Grid annual reports).

Another reason behind the reduction in associated emissions is the progressive increase in recyclable waste collection (included organic waste and a greater use of existing initiatives), which means less waste is sent off for processing high greenhouse gas emissions (Waste valorization for energy and landfills).

### Conclusions

- Emissions have gone down slightly since 2008, though data from 2011 is still provisional.
- The reduction in emissions in 2008 comes as a result of changes to the analytical method.

#### Annual CO<sub>2</sub> equivalent emissions

Evolution from previous year	Stable
Trend over recent years	Improved

### Outlook

CO<sub>2</sub> equivalent emissions are a good indicator of the carbon footprint left by the activities of a given area and is used, with slight variations, in many countries. However, looking to the future, we should also consider other factors such as how the various sectors contribute to these emissions levels over time.

## Indicator 24: Number of fair-trade sales or product- consumption points

### Citizen Commitment to Sustainability no. 10

Reducing the city's impact on the planet and promoting international cooperation (action line 10.8).

### Indicator description

Indicates Barcelona's number of large chains and retailer shops that sell fair-trade products, as well as the number of vending machines selling fair-trade coffee.

### Indicator parameters

Units: absolute number

Reporting period: annual

Source: SETEM

### Data from 2012

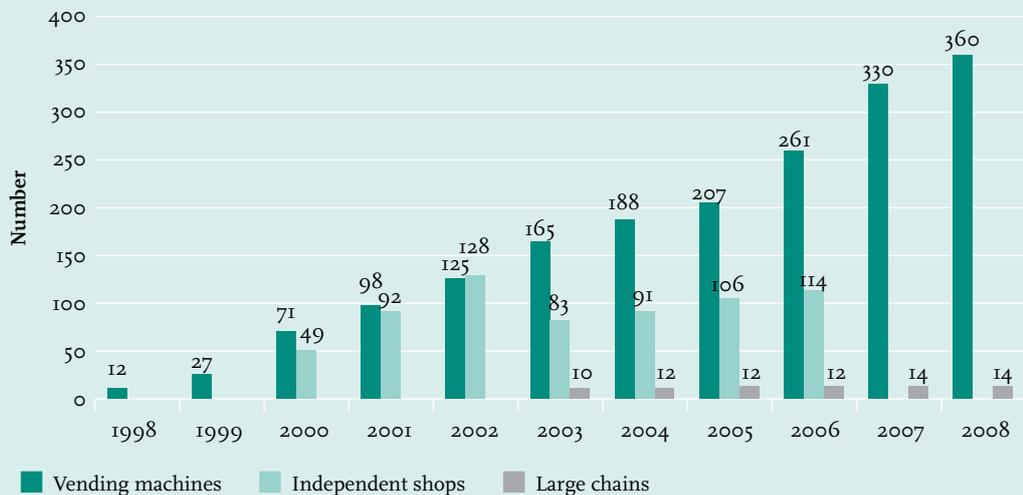
- 24.1 - Large chains: Not updated
- 24.2 - Independent shops: Not updated
- 24.3 - Vending machines: Not updated

### Desired trend



### Evolution (1998-2008)

#### Free-trade product sales points



## Indicator 24: (cont.)

### Year-on-year evaluation

Not updated in 2012.

Free-trade product sales have risen steadily over recent years, to the point where collecting data has become quite difficult. Although numbers for large chains appear to have reached their limit, the number of independent shops that stock free trade products has kept on increasing.

The commitment of public authorities in Catalonia to promoting more responsible consumer habits -more ethically, socially and environmentally conscious purchase decisions- has played a significant role in getting these small shops to sell certified free trade coffee.

### Conclusions

Over recent years, the number of free-trade product sales points has increased steadily, particularly among independent shops.

	Large chains	Independent shops	Vending machines
Evolution from previous	Not updated	Not updated	Not updated
Trend over recent years	Not updated	Not updated	Not updated

### Outlook

The free trade sector has undergone many changes over the past few years, which means it has not been possible to collect detailed information on the subject. It would therefore be worth considering what kind of indicator we might use in the future.

## Indicator 25: Public satisfaction level

### Citizen Commitment to Sustainability goal

Indicator for all the Commitment's goals.

### Indicator description

Indicates the average level of satisfaction of living in Barcelona, according to the findings of surveys conducted among the city's residents. The question posed to Barcelona residents each year is as follows: "How satisfied are you living in Barcelona?"

### Indicator parameters

Unit: absolute value on a scale of 0 to 10

Reporting period: biannual

Source: Barcelona City Council. Department of Studies and Evaluation Services (Survey on the City and Survey on Municipal Services)

### Data from 2012

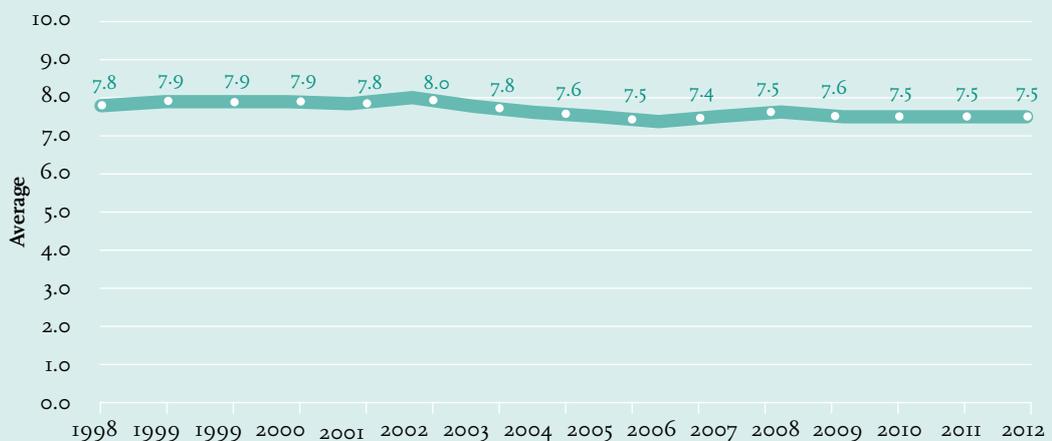
Mitjana de satisfacció: 7,5

### Desired trend



### Evolution (1998-2012)

#### Level of citizen satisfaction



Data from this set has been revised by the municipal department responsible for the Municipal Services Survey.

### Year-on-year evaluation

In the 2012 Municipal Services Survey, Barcelona residents rated their level of satisfaction with living in Barcelona at 7.5 out of 10. This is the same, or very similar, to the score it has been achieving since 2005. The data collected from surveys carried out since 1998 show that, on average, citizen satisfaction is high in Barcelona, though it has gone down half a point since 2003 (8.0).

In general, these surveys underline the fact that the Catalan population expects a lot from the services provided by the local authorities, while the newly arrived immigrant population expresses a higher level of satisfaction.

## Indicator 25: (cont.)

### Conclusions

- In the most recent surveys, citizen satisfaction has remained stable at around 7.5 out of 10.
- Citizen satisfaction has gone down half a point since 2003.

#### Level of citizen satisfaction

Evolution from previous year	Stable
Trend over in recent years	Stable

### Outlook

The Municipal Services Survey is part of the social plan drawn up by Barcelona City Council every four years to define which surveys will be carried out and how often during. Some 6,000 individuals from across the entire city are asked to take part in these surveys, allowing us to gather significant volumes of meaningful data at district and even at neighbourhood level. The survey itself consists of several questions, so we might consider an indicator that focuses on some specific issues that citizens feel most strongly about, or with which they are more, or less, satisfied.

## SUMMARY TABLE

What follows is a summary table outlining, for each indicator, the values achieved in 2012, their evolution from the previous year, and the overall trend since analysis began.

Indicator	Value	Previous year	Trend
1. Green space per resident	17.87 m <sup>2</sup> /resident		
2. Biodiversity of bird species	Native bird species: 0.84 Wild bird species: 1.02	 	 
3. Accessibility to public spaces and basic services (2012)	–	<i>Change in methodology</i>	
4. Urban renewal index	1,24		
5. Means of transport used by the population	49.23% on foot and by bike 32.93% Public Transport 17.84% by private		
6. Street space giving pedestrians right of way	–	<i>Not updated</i>	
7. Level of noise pollution	48.7% streets 50.0% population	<i>Not applicable</i> <i>Not applicable</i>	 
8. Environmental quality of the beaches	13.62 UCF/100 ml <i>E. coli</i> 94% rating for visual	 	 
9. Air quality	O <sub>3</sub> : 148 µg/m <sup>3</sup> NO <sub>2</sub> : 44.3 µg/m <sup>3</sup>	 	 
10. Life expectancy at birth	Total: 83.3 years Women: 86.2 years Men: 80.0 years		
11. Total water use per resident	163.2 l/resident/day		
12. Use of ground water for municipal services	19.20%		
13. Use of renewable energy and solar energy production	– 86,533 MWh/year (solar)	<i>Not updated</i> 	 
14. Municipal waste generation	kg/resident/day		
15. Organic waste collection	122,508 tonnes		
16. Waste sorting and collection	37.1%		
17. Drop-out rates from compulsory	12.3%		
18. Population with a university degree	34.0%		
19. Housing accessibility	46.0% economic effort 41.047 rental contracts 10.60 €/m <sup>2</sup> /month rent	  	  
20. Level of participation in associations	–	<i>Not updated</i>	
21. Organisations with environmental certification	81 (Catalonia's Seal + EMAS)		
22. Schools participating in environmental projects	320		
23. annual CO <sub>2</sub> equivalent emissions (2011)	2.35 tonnes CO <sub>2</sub> eq/residents/year		
24. Points of sale for free trade products	–	<i>Not updated</i>	<i>Not updated</i>
25. Level of citizen satisfaction	7.5		

-  The indicator has improved
-  It has remained stable
-  The indicator has decreased

# ACKNOWLEDGEMENTS

## **Barcelona City Council**

Mireia Abril (Schools Agenda 21)  
Ma. Jesús Calvo (Barcelona Economia)  
Ana Cardona (Department of Statistics)  
María José Chesa (Environment and Urban Services)  
Margarida Feliu (Schools Agenda 21)  
Santiago García (Prevention, Safety and Mobility Area)  
Xavier Güell (Barcelona Economia)  
Arantxa Millas (Environment and Urban Services)  
Anna Parés (Department of Studies and Evaluation Services)  
Juan Miguel Pérez (Environment and Urban Services)  
Marc Rico (Barcelona Public Health Agency)  
Maica Rodríguez (Barcelona Public Health Agency)  
Coloma Rull and Margarita Parés (Environment and Urban Services)  
Salvador Rueda (Barcelona Urban Ecology Agency)  
Irma Soldevilla (Environment and Urban Services)  
Carlos Vázquez (Environment and Urban Services)  
Laura Zapata (Environment and Urban Services)

## **Generalitat of Catalonia**

Mariona Alsius (Department of Education)  
Ma. José Sarrias (Department of Territory and Sustainability)  
Josep Ma. Masip (Department of Territory and Sustainability)

## **Other organisations**

Xavier Ferrer (University of Barcelona)  
Marc Anton (Catalan Ornithological Institute)  
Sergi Herrando (Catalan Ornithological Institute)



Ajuntament  
de Barcelona