

ENVIRONMENTAL BEST PRACTICE & BENCHMARKING REPORT





European Green Capital Award 2012 & 2013

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RPS, an environmental and communications consultancy based in Ireland, is currently appointed as the European Green Capital Secretariat. The competition application process and the work of the evaluation panel and the jury are facilitated by the Green Capital Secretariat.

The secretariat also assists with PR activities related to the award scheme through the European Green Capital Award website, Facebook and Twitter pages, and through various communication channels such as brochures and press releases.

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1 INTRODUCTION

The European Green Capital Award (EGCA) is the result of a European Commission initiative inspired by 15 European cities and the Association of Estonian cities in May 2006 in Tallinn. The aim of the award is to promote urban sustainability and the sharing of best practices between cities.

The Award's objectives are threefold, namely to:

a) reward cities that have a well-established record of achieving high environmental objectives,

b) encourage cities to commit to ambitious goals for future environmental improvement and sustainable development, and

c) provide a role model to inspire other cities and promote best practices and experiences in all other European cities.

All cities from EU Member States, Candidate Countries and European Economic Area countries which have more than 200,000 inhabitants can apply for the award.

Read more at: <u>www.europeangreencapital.eu</u>.

1.1 THEORETICAL FRAMEWORK FOR THE AWARD

The title rewards a number of different elements of environmental achievements in a city. The evaluation criteria are based on the following 3 aspects:

1. The 'greenest' city

The Award rewards the 'greenest' city in Europe based on the city's state of the environment as defined by the performance levels relative to each of the proposed indicators. The city with the highest urban environment quality in Europe will be rewarded. It is important to note that achievement in relation to improving the current state of environment not only depends on initiatives implemented by the city itself but also on legal, economic and/or other initiatives stemming from the national government, initiatives from private enterprises or private funds and the level of awareness of the citizens.

2. Implementation of efficient and innovative measures & future commitment

The Award rewards the city that has implemented the most innovative and efficient environmental measures and which has shown that it is committed to do the same in the future. It does not look at the overall environmental state of the city which means that a city with low urban environment quality may receive the award if it has recently implemented innovative and efficient measures and aims to continue to do this in the future. This does not give preference to any specific type of city.

3. Communication and networking

The Award rewards a city which can act as a role model and inspire other cities to boost their efforts towards a greener urban environment by sharing experiences and promoting best practice among

European cities and beyond. Given that the award is intended to help European cities become more attractive and healthy places and also provide an excellent opportunity to learn from each other, the rewarded city should develop and implement an ambitious communications strategy and programme of actions and events. If awarded the title, the city will commit itself to implement the programme.

1.2 THE INDICATOR AREAS

Evaluation of the cities' "green" performance, in order to find the Award winners for 2012 and 2013, was based on the following 11 environmental indicator areas and 1 communication indicator:

- 1. Local contribution to global climate change
- 2. Local transport
- 3. Green urban areas
- 4. Sustainable land use
- 5. Nature and biodiversity
- 6. Quality of local ambient air
- 7. Noise pollution
- 8. Waste production and management
- 9. Water consumption
- 10. Waste water management
- 11. Environmental management of the local authority
- 12. Communication strategy



1.3 THE 17 APPLICANT CITIES FOR 2012 & 2013

- 1. Antwerp, Belgium
- 2. Barcelona, Spain
- 3. Bologna, Italy
- 4. Budapest, Hungary
- 5. Espoo, Finland
- 6. Glasgow, UK
- 7. Ljubljana, Slovenia
- 8. Lodz, Poland
- 9. Malmö, Sweden
- 10. Murcia, Spain
- 11. Nantes, France

- 12. Nuremburg, Germany
- 13. Reykjavík, Iceland
- 14. Rome, Italy
- 15. Seville, Spain
- 16. Torun, Poland
- 17. Vitoria-Gasteiz, Spain

1.4 EVALUATION OF THE 2012 & 2013 APPLICATIONS

In 2010, the second award cycle took place in order to select Europe's Green Capitals for 2012 and 2013.

Seventeen cities, covering 12 European countries, applied for the 2012 and 2013 European Green Capital Awards.

The applicant cities submitted applications describing results achieved, measures taken and short and long term commitments for each indicator area, as well as their proposed programs of actions and events to disseminate experiences and best practices.

1.5 THE SHORTLISTED CITIES

The data submitted by the 17 applicant cities was assessed by the Evaluation Panel with the purpose of selecting a shortlist to proceed to the second round of the award process.

Evaluation of each indicator was conducted by the expert evaluator plus "peer review" by the second evaluator of each indicator. Final round table discussions took place to complete the shortlisting in a fair and transparent manner.

The six finalists were:

- 1. Barcelona, Spain
- 2. Malmö, Sweden
- 3. Nantes, France
- 4. Nuremburg, Germany
- 5. Reykjavík, Iceland
- 6. Vitoria-Gasteiz, Spain



Following the submission of further information each city made a personal presentation to the Evaluation Panel. The Evaluation Panel presented their recommendations including "order of merit" to the European Green Capital Award Jury. The Jury then reviewed the Evaluation Panel Report and announced their final decision naming Vitoria-Gasteiz as the European Green Capital for 2012 and Nantes as the award winner for 2013.

1.6 THE AIM OF THIS REPORT

The aim of this report is to showcase the best environmental practices currently undertaken in the shortlisted cities, while also benchmarking these cities environmental performance in order to provide quantitative data for use by other cities and showing how each winning city can be a "role model" for future entrant cities for the award.

It is anticipated this Report will be widely read throughout European cities. In this way all cities will be inspired to adopt some of the tried and tested best practices that already exist and also to learn of technologically advanced innovations that can greatly add to resource efficiency. This in turn will lead to greater economic prosperity and job creation in accordance with EU 2020 Strategy adopted in 2010 and which is now a key driver for all European Policy.

1.7 STRUCTURE AND APPROACH OF THIS REPORT

The report is presented in nine Chapters, as certain indicators are merged e.g. water and wastewater treatment, green urban areas and sustainable landuse. No comparison of the communications strategy is presented.

The report presents and in some cases elaborates on the data presented by cities in their application forms. In some cases, where data provided by cities was not comparable, (e.g. different years or units of measure, only qualitative answers available, etc.), other data sources (e.g. EEA or Eurostat) have been used, or the "benchmarking" approach has been avoided.

2 LOCAL CONTRIBUTION TO GLOBAL CLIMATE CHANGE

The EU's position on future emissions reduction is a 20% cut in emissions by 2020. This is almost equivalent to removing emissions from all transport across Europe. Imagine every truck, bus car, train boat and aeroplane disappearing — in terms of emissions. It's ambitious, but it must be because the challenge is serious.

Recent data shows that global emissions of CO_2 increased four times faster since 2000 than during the previous decade. This growth is above the worst case scenario reported by the Intergovernmental Panel on Climate Change (IPCC) in 2007. Less developed countries are now emitting more CO2 than developed countries. Natural sinks, such as the ocean, which soak up CO_2 , have decreased in efficiency over the past 50 years, meaning that our efforts to reduce emissions from human activities will have to be even more effective if we are to keep atmospheric levels of CO_2 stable.

'The costs of inaction on climate change are immense both financially and morally. Poorer people will suffer first but the knock on effects will be felt by us all,' said Professor Jacqueline McGlade, executive director of the European Environment Agency (EEA)¹.

The following table outlines the state of play regarding CO2 emissions per city. It also shows the decreasing trend in all but one of the cities.

CO ₂ emissions				
City	t/inh	% from transport	1990 - 2005	
Barcelona	3.35	81.3	-7.20%	
Malmo	3.4	52	-24%	
Nantes	4.77	28	-12%	
Nuremburg	7.4	26	-29%	
Reykjavik	3	69	n/a	
Vitoria-Gasteiz	7.26	15	8%	

Best practices in the light against climate change from a number of the shortlisted cities are presented.

<u>Barcelona</u>

Barcelona has in place a district heating and cooling network which serves a large area of the city, meeting some very large heat and cooling demands along the way e.g. hotels, offices etc. The figure below depicts the existing network, ongoing extensions and projected extension.

¹ Not just hot air — global diplomacy and the search for a successor to the Kyoto Protocol, 9th October 2009. http://www.eea.europa.eu/articles/not-just-hot-air



The following table compares all shortlisted cities in terms of their district heating network. Despite Barcelona's major work on the district heating network, most of this is targeted at industrial rather than household property, with only 0.05% of householders connected.



There is a significant downward trend in the carbon level of electrical energy consumed in the city of Barcelona as a result of the increase in the production of renewable energy sources, especially wind power, as of 2007.



The percentage of energy generated using renewable sources in Barcelona corresponds to the percentage of energy generated using renewable sources in the Spanish electricity mix, due to the peninsular electricity system which is in place.

Between 2002 and 2009, the percentage of energy consumed in Barcelona from renewable sources was irregular owing to the impact (2006 - 2008) and the consequent reduction in hydroelectric production. However, this fall was compensated by an increase in wind power production. In 2009, after the drought ended, the percentage of renewable energy consumed stood at around 26%, the highest value for the period under study. This confirms a notable increase in the consumption of renewable energy in the city of Barcelona.

<u>Malmö</u>

Malmö's Environment Programme (2009 - 2020) and the Renewed Energy Strategy 2009 are key documents steering current and future actions, as well as ensuring related budget feasibility to adopt short and long term measures.

Malmö's 2010 "Sustainable Future" includes as one significant goal, an ecologically-sound sustainable city and thus reducing emissions in various sectors, via a holistic approach to supporting a sustainable future in Malmö.

Sustainable City Development includes the following priorities: the reduction of GHG emissions, energy efficiency and renewable energy. This development has been one of the significant elements which has helped Malmö transition from a former industrial city to a knowledge-based city, well-regarded for its efforts to date. " Transportation and buildings account for the largest share of climate-changing impact. This means that we must mitigate climate change largely at the local level, that we must wor for the sustainable city. Municipalities must function as role-models on the climate issue."

lmar Reepalu, Mayor of Malmö.



The City of Malmö has recently renewed its Environmental Programme to include a new aim: to become Sweden's most climate friendly city. In order to achieve this Malmö has an overarching goal

that by 2020, the city of Malmö's activities will be climate neutral by 2030; the city will run 100% on renewable energy.



Malmö is currently the average of the 6 shortlisted cities in terms of CO2 emissions per capita. All cities are currently looking at initiatives to reduce their figure.

Nantes

"Post-carbon society can manifest itself most rapidly at both town and city level. It is here that accommodation, transport, consumer habits and choices of public and private investment can evolve the most quickly to produce a fundamental, communal change in our lifestyles." Jean-Marc Ayrault, President of Nantes Métropole, Mayor of Nantes².

On the operational level in Nantes, the development of renewable energy, such as wind energy, is constrained by a major urban area scattered in small units over bordering natural and agricultural areas. The presence of remarkable ecological areas within a hydrographic network of primary importance also limits the development of wind power. The presence of national meteorological equipment is also a factor limiting the installation of powerful generators.

<u>Reykjavík</u>

In recent years the City of Reykjavík has regularly issued news and tips on environmental issues in the city. In January 2010 the City distributed a brochure containing information, both for the public and for businesses, on easy measures against climate change. Since 2000, the City has sponsored six weeks courses on a greener lifestyle, Global Action Plan (GAP).

In 2009 an overall analysis of GHG emissions within the city was carried out, and a climate policy was formulated on the basis of this data. At the same time a forecast was made on a business-as-usual basis, and the main opportunities were pinpointed for reducing GHG emissions vis-à-vis the business-as-usual levels.

The finding of this analysis was that the main opportunities in Reykjavík are in the field of transport and waste management as such projects were outlined for the most reduction in waste management in as economically sensible of a manner as possible. The evaluation underlined the need to undertake systematic and effective measures in the fields of transport, planning and waste management in order

² Nantes Application

to achieve the City's ambitious targets for reducing GHG emissions. If the City objectives for total GHG emissions in Reykjavík are achieved, total emissions per capita will be about 1,7 tonnes CO2-eq in 2020 and 0,6 tonnes in 2050. Measures have been set up in the City's environmental action plan, Green Steps in Reykjavík to ensure this target is met.

Vitoria-Gasteiz

The city of Vitoria-Gasteiz is making a concerted effort to get its energy supply from renewable sources. Measures include:

- Production of renewable electrical power from the biogas obtained in the management of urban waste and waste water (2009: 11,000 MWh).
- Production of photovoltaic solar power on the roofs of public and private buildings (power installed 2009: 2.679 MWp).
- Production of solar thermal energy on the roofs of houses, commercial buildings and public buildings. (power installed 2009: 16.885 m2, 11.820 kWt)



- Production of low-temperature geothermal energy for air conditioning and SHW in public buildings. (power 2009: 410 kW (18,400 m of drilling)
- Co-generation units (NG) with installed power of 57.8 MW (production 2008: 380,479 MWhe and 271,235 MWht).
- Production of wind energy: Placed outside the municipal boundary there are three wind farms with an installed power of 106.2 MW.

On the whole, the electricity carbon content is comparable between cities. Malmö is considerably lower than all other cities currently.



3 LOCAL TRANSPORT

Efficient urban transport is fundamental to citizens' quality of life and to economic development. Yet our current reliance on the internal combustion engine is a major source of air and noise pollution and negative impacts on health and the environment.

The EU's Thematic Strategy on the Urban Environment strongly urges cities to develop Sustainable Urban Transport Plans. These plans aim to improve traffic flows in and around cities, by factoring in economic interests and promoting the use of public transport, cycling and walking in cities and towns, as well as to balance environmental impacts.

Cites must encourage its citizens to change their travel behaviour and try alternatives to the car such as cycling, walking, and public transport. The following graph depicts modal share of trips under 5km in each of the shortlisted cities. Car and motorbike is the clear majority, with public transport lagging considerably in certain cities.



<u>Barcelona</u>

Currently in Barcelona 22.9% of the bus fleet runs on natural gas, with NOx emissions that are 85% lower than the Euro IV standard. Furthermore, various bus routes have been replaced with tramways (41 convoys), which account for an additional 11.4% (each tram replaces 3 buses, in accordance with their capacity). Overall, 34.3% of the bus and tram fleet is made up of low-emission vehicles (50% lower than the Euro IV standard).

Barcelona has taken a number of measures in order to reduce the number of private cars in use, these include:

- Traffic management: In 2008 an 80 kph (50 mph) speed limit was introduced on fast roads leading into the city. This reduced NOx emissions in the city of Barcelona by 1.6%, a 0.3% reduction in particles and a 1.3% reduction in accident rates (figures for 2008-2009).
- Vehicle parking: The Green Area was introduced in 2005 to relieve congestion in the city centre, provide parking spaces for residents and improving the organisation of public spaces. This led to a 13% reduction in traffic in the regulated zones. Barcelona has 43,497 regulated green parking spaces and 9,791 blue spaces. Furthermore, since 1999 more than 6,000 loading and unloading spaces have been created, an increase of 91%.

• Car sharing: Barcelona pioneered car sharing in Spain, which has been operating in the city since 2005. It currently has 3,220 customers, 118 vehicles and 38 parking areas.

And has resulted in:

- The use of private vehicles fell by 5% between 2001 and 2005
- The presence of vehicles per kilometre in the streets was reduced by 3%.
- Traffic intensity improved by 4%.
- The number of cars per 1000 inhabitants fell by 9.4% between 2000 and 2008.

Much emphasis has also been placed on the improvement of the cycle lane network in the city. Measures initiated include:

- Between 2004 and 2009, Barcelona extended its cycle lane network by 18%, which increased from 124.4 km in 2004 to 146.8 km in 2009. In terms of the population, this represents 0.0788 m of cycle lane/inhabitant in 2004 and 0.0905 m of cycle lane/inhabitant in 2009.
- The number of bicycle parks in the city rose by 363.8% between 2005 and 2008. In 2008 there were 16,450 bicycle parking spaces.
- The year 2007 saw the start of the *Bicing* service, a municipal bike-sharing system, which currently has 181,962 members who make 800,000 journeys a month. Between 2007 and 2008, the number of journeys made using the Bicing service rose by 225.4%; the number of bicycles increased by 100% and the number of stations by 101%.

And results obtained:

- There has been a reduction of 16.26% in the number of inhabitants per kilometre of cycle lane between 1999 and 2009, which means an increased availability of cycle lane per inhabitant.
- The number of journeys made with the *Bicing* system has increased by 225.4% since it came into operation.

From the graphic below it can be seen that Barcelona is making progress but can still keep improving in order to be in line with its counterpart cities. Malmö is defiantly a cycling city with just under 1.5km of cycle paths and lanes per inhabitant.



<u>Malmö</u>

The **Traffic Environment Programme** aims to foresee Malmö to become quieter, more efficient, cleaner, as well as to reduce its impact on the health of Malmö inhabitants. Measures aim to: reduce fossil fuels; improve air quality; reduce noise; and increase cycling, walking and public transport. To address the traffic environment, Malmö incorporates many simultaneous strategies – large and small; using **Mobility Management** (MM), a demand-oriented approach which attempts to address both passengers and freight by:

- Encouraging environmentally-friendly transport methods (public transport, bicycling and walking) and emphasising behaviour-change;
- Improving access for people and organizations;
- Increasing transport efficiency, as well as land use patterns;
- Reducing traffic by limiting the number, length and need for motorized travel;



Important to ensure a functioning transport network and transition in travel choices, is an increased focus on city planning and densification which aims to create a combination of a functioning and frequent public transport network, together with cycle paths and footpaths that make the city more accessible. Malmö's aim is to ensure mobility and access – whilst reducing the travel needs of individual vehicles.

For example, in Malmö's large-scale new development area, the **Western Harbour** (or Västra Hamnen), since initial planning stages, transport strategies were incorporated to prioritise collective transport, cycles and pedestrians ahead of cars to reduce the environmental impact. Similar development strategies are being pursued in other building developments in Malmö – for example Hyllie, which is another large scale development currently in construction, built adjacent to Malmö's southern train station.



Through a strategy of **green public procurement**, all new vehicles purchased by the City of Malmö represent some of the best environmental models available. As the city replaces older vehicles, it aims to build a fleet comprised 100% of clean vehicles (of which 75% biogas/hydrogen/plug-in hybrid/ electric in 2015).

Amongst Malmö's green car fleet is Sweden's first hydrogen car, running on stored wind energy, driven by employees of Malmö's Environment Department. Malmö and the energy provider, E.ON, are working to advance biogas made from food waste, incorporated as a transport fuel.

Today, some 50% of Malmö city buses run on a mixture of biogas. Sjölunda Waste and Sewage Treatment Plant was renovated in 2008 to produce biogas from collected waste; then upgraded at E.ON's upgrading facility. E.ON, together with Malmö, plans to establish a large biogas plant in Malmö's harbour, producing 300 GWh of energy. The plant, which will be one of the world's largest, has received support from the Swedish Climate Investment Fund. As driving can sometimes be a necessity, Malmö aims to improve fuel-efficiency in the types of vehicles driven, but also in driving tactics. City employees were given the opportunity to attend *Ecodriving*, a technique to reduce fuel consumption, improving the economical and environmental viability of car travel.



Nuremburg

Cyclists' City Map:

From the table below, Nuremburg is in the top half of the shortlisted cities regarding cycling infrastructure. Nuremburg published the fifth amended edition of the Cyclists' City Map in 2008, the

number of copies printed was increased from 6,000 to 20,000 copies. The new Cyclists' Map is intended to give strong support to the trend towards more and more citizens using their bicycle for everyday journeys. After all, apart from walking, cycling is the mode of transport which is most conducive to protecting the environment and the city.

Cycling infrastructure					
City	Seperated tracks (km)	Signed with lanes (km)	Routes, pathways (km)	Street easy to bike (km)	
Barcelona	112.6	34.2			
Malmo 425					
Nantes	376				
Nuremburg	300				
Reykjavik	74				
Vitoria-Gasteiz	97 91				

In 2009, around 97 per cent of the city area, 99 per cent of the inhabitants and 97 per cent of all jobs in Nuremberg were accessible by public transport; this is achieved with a close network of three underground lines (overall track length of 34 km), 6 tram lines (36 km) and 70 bus lines as well as 20 night bus lines (457 km during the day, and 382 km in night operation). In 2003, the European Conference of Ministers of Transport honoured Nuremburg's three decades of commitment to the needs of people with disabilities with the first prize, the "Access and Inclusion Award for Transport Services and Infrastructure".

<u>Reykjavík</u>

The city has undertaken a major campaign to develop an intensive network of paths for pedestrian and bicyclists, both by extension and improvement. Currently pavements and paths available to these groups in the city amount to 800km.

In recent years the emphasis has moved to improving and augmenting designated bicycle paths to encourage greater use of bicycles in the city. The main cycle routes have the same level of maintenance as the road network.

The first Icelandic bike plan was introduced for Reykjavík in January 2010, focusing on new standards and routes to be carried out in the near future. According to the plan, bike paths will be quintupled in the next 5 years and increased by tenfold in the next 10 years. A bicycle route map has been published annually since 2005 and distributed free of charge and in cooperation with local bicycle associations. A 15 minute map, right, shows the distance an average bicyclist can travel in Reykjavík city in 15 minutes.



There has been active collaboration with the city's most prominent cycling organisations on the development of the Reykjavík city bike plan as well as on measures to increase the profile of cycling as a mode of transport. The City puts emphasis on involving users of the proposed or actual infrastructures in the design process to obtain the best possible results. Members of local cyclist

federations have provided constructive criticism to city officials at meetings as well as via email and telephone.

The current Reykjavík Municipal Plan aims for densification and mixed-use development of built-up areas as part of the Eurocities Green Digital Charter (signed 2009). The strategy of densifying built-up areas and enhancing services in suburban areas will shorten people's routes to and from work and encourage eco-friendly modes of transport such as walking and biking.

In the City's Local Agenda 21 and in Reykjavík's Transport Policy the objectives are to reduce the number of private car journeys, provide a better and healthier city for the inhabitants and improve the environment. Transport Policy is 20 years and its objectives include:

- Securing efficient transport while preserving precious assets such as the environment, health and city character.
- Providing for diverse travel needs for all without discrimination.
- Promoting full use of the city's transport systems.

The City's environmental policies also form the basis for future vision in transportation, and target a reduction in private car use. Larger businesses are collaborating in pursuit of this target. The City has accepted a green travel plan for its administration and institutions and is leading by example and encouraging local companies to do the same. Pool bikes are available for City employees as well as showers and changing rooms at City offices.

Vitoria-Gasteiz

Virtually half the population of the city reside in areas with an average access time, by bicycle, to the rest of the city of less than 10 minutes and virtually the whole of the population at less than 15 minutes. Even the recent urban developments are within cyclable distance from the centre of the city.

In order to increase the use of bicycles, almost 10 years ago, the City Council implemented a publicbike system. Today, this scheme has 17 pick-up points throughout the City in strategic locations such as civic centers, leisure centers and shopping malls, offering a total of 350 bicycles free of charge. The service also focuses on the provision of transport for people with disabilities, such as tandems for the sight impaired or tricycles for people with reduced mobility. Registered users of this service amounted to more than 54,000 in 2009, and there were more than 154,000 loans in 2009, instead of the 85,239 registered in 2006.

The city actively promotes the use of bicycles and is currently engaged in passing the Bicycle Master Plan to improve the use of bicycles in the city.

The **Bicycle** Master Plan proposes:

• The creation during the period 2010-2011 of about 16km of cycle paths and another 30.7km by 2015. This year, 3.5km of new cycle paths will be built.



- The creation of 1,105 new parking places for 8,588 bicycles, for which the fitting of 1,000 new clamps has been approved (2010). The total offer will reach a figure of 13,565 places. In other words, the current offer of bicycle parks will increase by 142.
- A total investment of €900,000 up to 2015 in bike promotion, €125.000 was consumed in 2010.
- To develop the current public-bike system of 17 stations towards a fourth generation system, fully integrated with the public transport network, and to increase the number of lending points to a total of 35, placing these at no more than 5 minutes walking from anywhere in the city. The investment for this amounts to €500,000.

<u>Nantes</u>

Nantes won the CIVITAS "City of the Year 2009" award, overcoming competition from fifty-eight cities for this award. Nantes won on four factors: the development of a fleet of clean buses (over 80% of the fleet is powered by natural gas); the scheme to develop the "Chronobus" line, a high-performance bus service covering the major routes within the agglomeration; the advances made in bicycle policy, via the construction of secured bicycle parking areas, the extension of the self-service bicycle system, trial schemes, and the conversion of roads in the city centre to accommodate public transport and green transport methods and to exclude cars;

In order to reduce the percentage taken up by individual modes of motorised transport, Nantes Métropole is developing its public transport network, encouraging car pooling and testing tools that will enable it to shift public practices extensively towards the use of bicycles and multimodal transport. The project to connect Lines 1 and 2 of the tram is intended to create high-performance public transport links between the east, north-east and north-west parts of the Nantes agglomeration without going via the centre of Nantes every time, particularly in terms of covering the university sector, and to even out the use of tram Lines 1 and 2 by lightening the load on the Commerce/SCNF Station branch of Line 1.

4 GREEN URBAN AREAS & SUSTAINABLE LAND USE

Green spaces, quiet streets and recreational parks are important for relaxation, health and sport, nature watching and social activities. Open areas and green parks are important building blocks for promoting quality of life in urban environments.

<u>Barcelona</u>

The city of Barcelona is the most built up of the shortlisted cities. As such it is probably of greater importance to promote green areas and sustainable land use as both are at a premium in the city.



Barcelona City Council is currently applying environmental criteria to the design of buildings and new urban developments in order to define more sustainable districts (eco-districts) and the creation of more efficient urban structures. Work on the city's first eco-district is already underway in the Strategic Residential Area (Área Residencial Estratégica – SRA) of Vallbona in Nou Barris (pictured below).



This project has reorganised the area's urban layout, preserving two hectares for growing fruit and vegetables which will be partly irrigated by a restored mediaeval canal (Rec Comptal). There are plans

to build 2,000 new homes in this area, 60% of which will be subsidised. Further eco-districts are planned for Marina del Prat Vermell (Free Trade Zone), Les Corts and Trinitat Nova (on the site of a former prison). A total of 11,000 new homes will be built in the new space in Marina de Prat Vermell, which covers an area of 750,339 m2



<u>Malmö</u>

The world's first botanical roof garden was launched in 1999 in conjunction with a seminar about green roofs in Malmö. The roof garden, covering almost one hectare, was opened to the public in April 2001 and is a unique attraction for Malmö and Sweden.



The initiative and enthusiasm of the Service Department in Malmö and the housing company, MKB, made the project possible. The Swedish Department of the Environment and **EU-LIFE programme** provided 10 million SEK (about one million euro) for the creation of the roof garden. The aim of the project is to promote the use of vegetation on roofs for the long-term sustainable development of our cities. Researchers meet at Augustenborg's Roof Gardens to advance the state of the art for green roofs. People from the construction industry can find information about the benefits for new developments. Anyone with an interest in gardening can be inspired by the beautiful gardens, for which Malmö has become famous.

<u>Nantes</u>

Soil sealing, the covering of land for housing, road or other construction works, is a growing concern related to urban sprawl. Agriculture, forestry and nature conservation play a crucial role in maintaining soil quality and revitalising the soil. These are lost where land is "sealed" by new roads, buildings and factories. The demands of urban development need to be balanced by considering the effects of soil sealing, and the rehabilitation of "brownfield" sites such as former industrial areas needs to be considered as an alternative to building on open land.

The city of Nantes has a higher proportion of soil sealing when benchmarked against the other five cities, with Barcelona at the other end of the spectrum.



The hedgerows of the communes of Nantes Métropole include 20,000 hedgerow trees with an additional to 21,000 more trees, bringing the number of hedgerow trees to 41,000. These trees are found particularly in the many green public and private spaces, the parks and green belts. There are an estimated 100,000 trees in the Commune of Nantes alone, which gives an idea of the size of this veritable "urban forest". The Tree Charter provides the tools for protecting and developing trees in the city.

These trees constitute a canopy, a biodiversity delivery system in the city, the planting around the bases of trees contributing to the creation of parcels of nature.

Differentiated environmental management is practised on all of the sites maintained, making it possible to improve biodiversity. To varying degrees, all of the vegetation can potentially host diversified flora and fauna.

<u>Nuremburg</u>

Nuremburg have since 2004 mapped all street trees and tree root zones and their vegetation and included this information in the new tree land register. It is hoped that gradually, all spatially distributed trees will also be registered.

In 2007, 24,193 street trees were listed in the register. In addition, 226 trees were newly planted in 2006. For reasons of traffic safety, 132 trees were felled in 2006 (89 in 2005). Thus with an overall number 24,377 street trees (on 28.02.2007) the number of street trees increased by 94, compared to the previous year (24,283 trees in 2006). In 2005, there was private sponsorship (an "adopt a tree"

programme) for 484 trees, as compared to 460 in 2006. This demonstrates the great commitment Nuremberg citizens show for their city trees. In the future, the spectrum of tree species will need to be adapted to urban and climate changes.

<u>Reykjavík</u>

Reykjavík has a huge amount of public open areas in comparison to the other shortlisted cities, with 270m2 per inhabitant. When coupled with 91.7% of the population living within 300m from a public open area it is clear to see why the citizens of Reykjavík enjoy their city.

Public green areas				
City Public open areas		pop living <300m from public open area		
	m2/inh			
Barcelona	17.9	99.4		
Malmo	33	97		
Nantes	37			
Nuremburg	20.3	100		
Reykjavik	270	91.7		
Vitoria-				
Gasteiz	20.2	100		

The city has ca. 250 recreational areas and the planning scheme outlines that recreational areas be located within 300 m of residential areas. The areas are for play and recreation and represent breathing spaces within the city. Increased emphasis is placed on the areas being a meeting place for local inhabitants, as well as being recreational areas. This applies both for new areas and older renovated areas, with there having been a concerted effort to renovate older areas in the older city districts. This will also have a positive impact on soil sealing in the city.

Vitoria-Gasteiz

One of the main peculiarities of the Green Belt in Vitoria-Gastiez is its origin. Some of the urban fringe parks were originally degraded areas: gravel pits, burned areas, drained wetlands, etc. The recovery of these spaces, initiated in the mid-90's, was a major challenge and at the present time the Green Belt forms a continuous and unified network, formed by several parks that will add 613 hectares altogether (25.91m2 per inhabitant of **new** green zone approximately). Over the next few years, it is planned that this will be extended to 787 ha. The figure below shows the Green Belt of Vitoria-Gasteiz (2010), both current and planned areas.



5 NATURE AND BIODIVERSITY

Biodiversity makes our cities green, habitable and pleasant places, it also offers valuable services to city dwellers. Yet biodiversity is extremely delicate and frequently threatened by urban development.

This section provides an overview of initiatives in relation to Nature and Biodiversity from each of the shortlisted cities. It must be noted, Nature and biodiversity are not directly comparable between cities, due to geographics etc, however, comparison is made on the cities dissemination of information relating to this important aspect of urban living.

<u>Barcelona</u>

Several of the species to be found in Barcelona are particularly venerable and have given rise to a number of action projects. 1999 saw the start of a successful project to reintroduce the **peregrine falcon**. Actions are being taken to conserve the crow (vulnerable according to the UICN) and help is being given to the colony of grey herons and the hedgehogs that live in freedom in the zoo.

Barcelona has a building Urban Biodiversity Management Programme (2007-2009) for the conservation of the birdlife in walls that are being restored (kestrels, swallows, swifts, alpine swifts, crows). Work was carried out on 40 buildings in 2008. Between 2005 and 2008, 146 artificial nests were installed for swallows and other animals. During the same period, an annual census of swallows was also carried out which involved citizen participation: 39 nests of common swallows and 131 nests of house martins.

Work is also being done for the protection of amphibians (the common midwife toad and the European tree frog are in need of a strict protection regime and the common frog requires management processes that comply with the Habitats Directive). A project has been set up that includes the following actions: completion of censuses, reintroduction of individual animals, rescue of tadpoles, improvement of habitats, extraction of fish and



other exotic animals, provision of action protocols for the maintenance staff of the parks and gardens and dissemination of the project to raise awareness among the population and ensure their involvement. A total number of 158 midwife toads have been freed, together with 146 European tree frogs and 85 common frogs. Furthermore, 450 tadpoles have been rescued.

In order to communicate with its citizens, Barcelona uses park guides and environmental awareness monitors, information brochures, technical manuals, posters, books and stories. Various dissemination, scientific and technical aspects are addresses. The bimonthly magazine Bverda has also been published since 1992.

65% of the schools that carry out School Agenda 21 projects (244) focus on biodiversity, and the Visit Your Local Park (Acércate al parque) programme fosters the adoption of public spaces by schools.



The Plan for the Improvement of Street Lighting in Barcelona, which is currently in place and has a budget of €62 million, is divided into four main areas:

- 1. The modernisation and improvement of facilities, with an investment of €49.6 million.
- 2. Light decontamination, with an investment of €12.1 million.
- 3. Decorative lighting.
- 4. Park lighting.

The legislation regulating these policies includes the Light Contamination Act (Law 6/2001) of the Generalitat and the corresponding consolidating regulation 82/2005, the first of their kind at state level. The aim is to achieve a correctly lit city with sufficient lighting that is both efficient and appropriately directed. Accordingly, the presence of light in places where it is not necessary or where its presence is not appropriate will be reduced, avoiding dispersion towards the sky (by direct emission or reflection on walls and streets), light intrusion and illumination.

<u>Malmö</u>

The protection of natural areas is an important issue for both the City of Malmö, but is also supported by Sweden's 16 Environmental Objectives, which include: 1) Reduced Climate Impact, 2) Clean Air, 3) Natural Acidification Only, 4) A Non-Toxic Environment, 5) A Protective Ozone Layer, 6) A Safe Radiation Environment, 7) Zero Eutrophication, 8) Flourishing Lakes and Streams, 9) Good- Quality Groundwater, 10) A Balanced Marine Environment, Flourishing Coastal Areas and Archipelagos, 11) Thriving Wetlands, 12) Sustainable Forests, 13) A Varied Agricultural Landscape, 14) A Magnificent Mountain Landscape, 15) A Good Built Environment and 16) A Rich Diversity of Plant and Animal Life. Most of these national environmental objectives consequently incorporate protection of natural areas and biodiversity, many of them directly, and others indirectly, via the reference to ecosystem services or serve as holistic goals which require a stable natural environment.

All of the various programmes and plans are available for curious citizens, both on the internet and in printed form. The City Planning Office and the Swedish Society for Nature Conservation in Malmö have produced a guide for interested citizens wanting to know more about the area's nature, as well as tips and potential visits. This book presents 50 possible activities to enjoy nature areas by bus or by bicycle. In addition to availability of information, the City of Malmö also works actively to engage young people in creative learning environments. Malmö also hosts a '**Nature School'**, which engages outdoor learning in the surrounding environment, as well as **SEA-U** (Malmö's Aquatic Education Centre which links the city to its aquatic surrounding and teaches children about the area's aquatic species and landscapes). Both the Nature School and SEA-U utilise parts of the city, in particular

natural areas, as an outdoor classroom – building knowledge and respect, by engaging young people in active learning.



The City of Malmö has a **Light Plan** (2008) (in the figure above, the Areas in Gold signify the main lighted areas in Malmö) which attempts to balance several goals simultaneously. These include:

- a) ensuring enough lighting for safety of primary biking and walking paths in the city,
- b) improving energy efficiency via the incorporation of LED street-lighting,
- c) switching to so-called flat lighting to prevent unwanted light scattering,
- d) utilising artistic lighting strategies in central locations of the city for safety and aesthetic value, and concerning nature protection,
- e) the reduction of lighting in bio-sensitive areas.

<u>Nantes</u>

Tackling light pollution, central to public lighting policy since 2001, initiatives include:

- An annual plan for the renewal of public lighting stock (€4.5 m per annum)
- Producing a guide to the design of external lighting installations, (first edition published in 2005), setting out the main objectives to be followed in order to reduce emissions in the sky.
- There is a blanket ban on 'globe' lights.
- Photometric requirements have been set at the minimum possible level.

- Adapting lighting times according to the needs of users and the period of the night.
- Programme for phasing out lights still equipped with sources containing mercury vapour

A 'green and blue' agglomeration

With over 250 km of main watercourses and 9,500 ha of wetland, Nantes Métropole is taking coherent, concerted action, with a water management policy, Neptune, incorporating the notion of the water cycle. The objective is to protect, restore and enhance these aquatic environments. This includes the restoration of watercourses in terms of hydro-ecology, fish resources and hydraulics, flood management, improvement of water quality (objective of good ecological water status water by 2015) and wetland preservation.

In addition to this 'blueprint', the territory of Nantes Métropole is characterised by 15,000 ha of agricultural areas and 15,500 ha of natural areas, including 9,500 ha of wetland. Nantes Métropole has ensured the perpetuity of these spaces through Local Urban Plans (PLUs), ensuring that urban sprawl is limited, and pursues a real policy of developing and supporting agriculture around the city.

Nantes Métropole has also developed an original project for future generations, with a new type of public space near urbanised areas: urban forests. This project involves maintaining and developing, over an area of 1,400 ha, three sites and 8 neighbourhoods, wooded areas and copses, contributing to the diversity of natural environments. These urban forests have several functions: environmental (biodiversity and carbon sinks), social (leisure and awareness-raising) and finally economic (forest-based industries/energy and forestry sites).

The purpose of the agglomeration of Nantes' network of walking routes and green routes piloted by the master 'by the waterside' walking route plan is to achieve synergy between preservation of the environment, development of permeability and connection between natural areas and public access.

<u>Nuremburg</u>

The 2008 biotope mapping for the City of Nuremberg (784 digitalised biotopes, a total of 2,455 individual areas) is used as a data basis for all management measures. Various species protection measures for the promotion of biodiversity have been implemented in Nuremberg.

Since 2005, Nuremberg has organised the local **European Bat Night** in cooperation with various associations and under the patronage of the Environmental Department, Nuremberg Zoo and the association AG Vogel- und Fledermausschutz im Nürnberger Tiergarten (working group for bird and bat protection in Nuremberg Zoo). The project "BATS WELCOME" is an initiative of the Bavarian Environmental Department (LfU) which actively promotes the creation and maintenance of bat quarters in residential areas.

<u>Reykjavík</u>

The City reacts to recommendations of the Institute of Freshwater Fisheries about possible consequences of light pollution from information on lit paths at Elliðaár and Úlfarsá. When viewing an aerial map of Reykjavík during the night, it is possible to see the light rays emanating from the city.

Analysis on light pollution shows street lamps caused about 30% of light pollution. As a means of offsetting this light pollution, lighting from streets and roads is designed to fulfill the minimum standards of IST CEN /TR 13201-1-4 2004. In 2009 the lighting time of the street lights was reduced, and the lights now go on when daylight has decreased to 20 lux, compared to 50 lux before.



Vitoria-Gasteiz

One of the most important projects being developed today, and to be finished in the short term (before 2012), is the Botanical Garden. This will occupy a surface of 48 hectares dedicated to agricultural uses, in the Olarizu environment park, in the south of the City. The budget approved for this project amounts to nearly €3,000,000. The aim is to reproduce a sample of forest vegetation representative of different European regions, in order to enable people to discover and to conserve the flora of the Old Continent (particularly that of the Iberian Peninsula). This project began in 2006 and it being developed in phases. Next year the last phase will be implemented. In this way, the entire botanical garden will be completed, including sub-Mediterranean temperate forests, temperate forests, boreal forests, and finally, sub-appenine and other Mediterranean forests.

In relation to illumination, the city is thoroughly involved in knowing the current status of the light pollution since this parameter indicates the status of its public lighting and to take appropriate measures to respond to the needs of the population but ensuring a sustainable and efficient use of natural resources. A pollution map of the city's illumination during the night has been obtained in order to work in the adequacy of their lighting systems to avoid adverse effects on its natural areas. According to this map, the Green Belt meets the requirements of the Regulation of Exterior Lighting Energy Efficiency, for zoning E1, which only allows a maximum of 1% of light pollution. Its magnitude in this area lying between the values 20 and 21 and that the plane is identified with blue shade



6 QUALITY OF LOCAL AMBIENT AIR

Air pollution seriously affects human health, damages our ecosystems and causes deterioration of buildings and monuments. Cleaning up our cities' air is another key priority for the EU. The EU's Clean Air for Europe strategy, which includes the Cleaner Air for Europe (CAFÉ) Directive (2008/50/EC), forms the overarching policy framework for achieving safe air quality levels for all citizens, notably those living in cities.

<u>Barcelona</u>

The strategy for reducing atmospheric pollution in the city has a transversal impact on vectors such as mobility, energy, waste, water, biodiversity and urban green spaces. Consequently, there is a clear commitment to the integral management of air quality. Atmospheric pollution is one of the main public health problems in Europe. Barcelona is aware of this and acts by adopting measures such as the promotion of cleaner vehicles (such as electric vehicles), a commitment to more efficient energy systems, the reduction of waste sources, low water consumption and the consideration of the social and environmental benefits of the green belt in its management, etc.

PM10 Annual Concentrations (average values)				
City	Days > limit value (traffic)	Annual mean (traffic)		
	number	ug/m3		
Barcelona	46	37.5		
Malmo	3	18		
Nantes	0	0		
Nuremburg	22	21		
Reykjavik	25	22.9		
Vitoria- Gasteiz	6	18		

The evolution of emission levels in recent years has been quite stable, following a downward trend. As far as health issues are concerned, special consideration must be given to three indicators: NO2, PM10 and O3. The main emissions of these pollutants or their forerunners come mainly from traffic, followed by domestic and industrial activities.

Number of days per year on which EU limit values were exceeded for PM10 (daily mean of 50 pg/m3) is given in the table above. Of the 10 points at which the PM10 are measured, 7 recorded an excess of the daily limit value for the protection of human health (35 days a year above 50 pg/m3). Despite this, the general downward trend continues for the number of times the daily limit value of PM10 is exceeded. The main factors include transport, civil engineering work and certain industries.

In 2008 the limit for the protection of human health was not exceeded at any of the six stations that measure the ozone in Barcelona (established as not exceeding the mean of 120 pg/m3 over an eighthour period more than 25 times a year), in accordance with the trend of the last four years. On average, this level has been exceeded on 10 occasions.

<u>Malmö</u>

Generally, surpassing PM10 level limits has not been a significant concern or tendency in Malmö. The total number of days that the EU limit values for daily mean $50\mu g/m3$ of PM10 was exceeded equates to approximately **0 to 5 days**, over the last 10 years in the urban background's air quality.

In Malmö's street environment, more excesses were recorded, roughly 5 to 15 times per year. Generally though, it can be concluded that particle contents do not exceed EU limits. While numbers are very rarely exceeded, there is no clear trend. The only assumption noted is that the number of excesses generally coincide with how "harsh" the winter has been. Consequently, cold temperatures in combination with snow and the intensity of salting and gritting are assumed to determine this number.

The number of excesses has been fairly constant in Malmö. During most years, no excesses of ozone are measured. However occasionally, up to 2 to 5 excesses have been measured; occurring from May to September, when Malmö receives long hours of daylight due to its northerly position.

In Malmö's city streets and public spaces the mean concentration of NO2 is measured at approximately 10 locations. While the environmental limit has been exceeded in some places, this has slightly improved, due to attentive efforts and a changing industrial sector, since the end of the 1990s. Consequently, there has been a reduction of the overall concentration urban background environment by approximately 25% in the city as a whole over 10 years. In spite of overall positive trends in Malmö, the greatest concern for NO2 is in Malmö's traffic-intensive street environments.

For particles (PM10) the concentration has remained constant between 15 and 20 μ g/m3 for the last 10 years in the urban background environment. Consequently, Malmö's particulate condition has not exceeded the EU limit values. To ensure effective monitoring of Malmö's air quality condition, the concentration of PM10 is measured at 5-8 locations with the help of a mobile monitoring unit, which tests different key locations in the city over a period a roughly months in each location.

Overall, despite certain measurements exceeded in some places, Malmö's air quality as a whole has improved (for the third year in a row), according to the **recently released** 2009 Air Quality Report.

<u>Nantes</u>

A number of measures have been undertaken by Nantes over the past few years to preserve and improve air quality, including:

- adapting to current issues in monitoring (changes in the measuring network, specific campaigns to measure certain pollutants in certain zones, developing forecasting models, involvement in studies and action research projects, etc.)
- Nantes Métropole was involved in the compilation in 2002 and the implementation of the Regional Air Quality Plan (PQRA) and the Atmosphere Protection Plan for Nantes-Saint Nazaire (PPA) in 2005
- transport has been integrated into urban thinking both via town planning documents (SCOT, PLU) and urban transport plans (UTP) in order to limit urban sprawl, develop public transport networks and green modes of transport, organise traffic, manage the parking available within the city, encourage mobility plans, adapt road infrastructures (converting urban motorways to urban boulevards, 30-kph zones, road-sharing, etc.), purchasing clean vehicles;

 regarding emissions from fixed sources: reducing industrial emissions (bringing the two incinerator plants in the agglomeration of Nantes into conformity), implementing a voluntary energy-saving policy in residential, service and industrial sectors (which forms part of the territorial climate plan of Nantes Métropole), reducing agricultural emissions (charter for no fertilisers within the agglomeration).

The results of these initiatives are evident when compared to other shortlisted cities in the graphic below. Nantes has the lowest level of N02 emissions.



<u>Nuremburg</u>

In Nuremburg air emission activities focused on traffic emissions. A substantial effort had been initiated already in the 1990s, but completed only recently: the City Council decided to block traffic crossing the city centre by only allowing access to delivery services and to private homes. At the same time, the pedestrian areas in the city centre were extended. These combined measures reduced traffic in the city centre (within the boundaries of the inner city circle) enormously and the traffic on the inner city circle has been kept constant since that time. Air quality data show that in the city centre air quality is in full accordance with European regulations and limit values have never been exceeded. Thus commuter and truck traffic on the main roads and on the middle circle became the most important issue to be tackled in order to further improve air quality in the city.

A broad and concise Air Quality Action Plan was established. It covers activities in four main areas of action:

1. Environmental Network (linking various modes of transport)

2. Traffic Management (by co-operation of logistic systems, improvement of traffic signs and orientation/guidance for specific transport modes)

3. Energy Efficiency and Climate Protection Activities in the building sector (contributing to emission reduction in heating and cooling of buildings)

4. Implementation of advanced vehicle technology

<u>Reykjavík</u>

The City of Reykjavík has for many years been in the lead among local governments in Iceland with respect to air quality. The City has had a positive impact on the minds of its inhabitants regarding the importance of good air quality and ways to improve it, but at the same time has had an impact nationwide.

The quality of ambient air in Reykjavík is generally good. The pollutants most likely to exceed health value limits are nitrogen dioxide (NO2) and particulate matter (PM10). Other air pollutants such as ozone (O3), sulphur dioxide (SO2), carbon monoxide (CO) and benzene (C6H6) are generally measured far below EU limit values in Reykjavík. No EU limit values exist for hydrogen sulphide, but the World Health Organization (WHO) has introduced guidelines on levels. H2S measurements in Reykjavík have not exceeded that level.

The City of Reykjavík differs from most other cities, in that PM10 pollution does not arise from heating systems or the use of wood-burning stoves or fireplaces; all heating in Reykjavík is from low- and high-temperature geothermal areas in and around the city.

Pollution by particulate matter in Reykjavík arises from a number of sources, of which transport is believed to the most important. According to a study carried out on the composition of PM10 in Reykjavík in winter, about 70% of PM10 pollution is attributable to motor vehicles. The use of studded tyres in winter is a large factor, as these tyres wear away asphalt surfaces. Asphalt is believed to account for about 55% of all PM10 pollution in Reykjavík.

In general, PM10 exceeds the daily EC health limit values far more often at the traffic hotspot monitoring station than at the monitoring station which measures urban background values.

Since the introduction in Iceland of new regulations on ozone in 2003, ozone has not exceeded the 8h mean of 120 μ g/ m3.



Mean annual levels of nitrogen dioxide (NO2) and particulate matter (PM10) have been falling since 2000. Increased precipitation since the turn of the century is believed to be an important factor. Over the same period the number of vehicles on the streets of the city has risen, but technological advances, such as catalytic converters in all vehicles and improved particulate filters in diesel-powered

vehicles, are believed to have contributed to the reduction. Nonetheless, the annual mean level of PM10 exceeds the annual limit levels provided in Regulations.

On the City of Reykjavík website, the public have access to statistics on levels of all air pollutants: both real-time data and graphic material (see www. loft.rvk.is). Various other documents and reports on pollution levels are also accessible on the website. Figures for PM10 appear on the homepage of the City of Reykjavík website, and in one of Iceland's leading on-line news sites. Information is presented clearly in easily-understood traffic-light form.

When the air quality response team issues a warning, it is sent to all major media, to all preschools and schools in Reykjavík, and to all municipal agencies. The warning explains why the level of a certain air pollutant is expected to exceed health limit levels, and advice is provided on how to reduce pollution, if possible. The City also regularly issues updates on air quality to a large number of recipients, stating how often health limit levels have been exceeded, and what the source of pollution was.



Vitoria-Gasteiz

In the case of Vitoria-Gasteiz, its air quality indicators analyse the values of the major urban air pollutants, mainly from sources as transport, fossil fuel use in industry and heating systems, and compare them with the risk level or threshold established by legislation. The air pollutants selected for the establishment of local guidelines are the following: particulate matter with an aerodynamic diameter of <10 μ m (PM10), sulphur dioxide (SO2), ozone (O3) and nitrogen dioxide (NO2).

7 NOISE POLLUTION

Environmental noise is the most common source of stress for city dwellers. Health experts have linked noise pollution to a number of health problems, including cardiovascular disease, elevated hormone levels, psychological problems and even premature death. Yet, as the demand for mobility grows, the use of cars, trains, and planes increases, and so does the level of noise.

Barcelona

Like other European cities of similar characteristics, Barcelona has notable noise levels, mainly as a result of the type of urban fabric, which has a high population density (approximately 15,000 inhabitants per square kilometre), high traffic levels (approximately 6 million journeys per day), its metropolitan dimension, its considerable attraction for tourists, the coexistence of different activities in one single space, etc. As a result and since acoustic pollution represents a significant environmental challenge, Barcelona City Council has worked hard over the last 20 years to change the trend of growing noise levels.

The main source of noise in the city is vehicle traffic, which is a consequence of mobility; the continuing extended use of private vehicles in daily travel around the city and the steady rise in the number of motorcycles and mopeds. Night-time leisure activities are the second cause of noise in the city. However, the main complaints filed by citizens refer to noise produced by specific sources, such as public road works, outdoor activities, sirens, loading and unloading activities.

In 2007, 48.27% of Barcelona's areas were classified as high acoustic sensitivity zones (A); 32.61% of the sections were classified as moderate acoustic sensitivity zones (B); and 19.12% of the sections were classified as low acoustic sensitivity zones (C) (see Table 7.1). 97.4% of the street sections of the city comply with the acoustic capacity assigned for the day-evening time period and 88.5% comply during the night period. The city has quiet areas in which noise levels are below 50 dB during the day and 45 dB at night: special noise quality protection zones (zonas de especial protección de la calidad acústica - ZEPCA), parks and gardens, special blocks and 2.3% of the city's street sections.

The strategic noise map of Barcelona defines how the city sounds. Barcelona's strategic map includes the noise map, the acoustic capacity map and the general population figures. The noise map of Barcelona was prepared on the basis of more than 2400 measurements that were taken in 2007. It determines the current acoustic situation of the city and allows for the detection of those points or areas that are unique in acoustic terms to assign them the most appropriate emission limit values by considering the different uses given to the ground space. The noise levels obtained are broken down in accordance with noise sources: e.g. traffic, leisure activities, large crowds, commercial axes, tramways and industry.



Citizen awareness of the problem of noise in the city Awareness is another of the tools used by the City Council to reduce noise levels. It uses a variety of channels:

- Environmental education guides on the subject, such as: Menys soroll, millor (The less noise, the better); and on for motorcyclists, mou-te bé (Getting around on your motorbike).
- Issuing of sound level meters to schools.
- Joint programme with the provincial association of vehicle repair workshops of Barcelona to raise awareness that selling non-official exhaust pipes is wrong, as they exceed the legal noise levels.
- The issue of noise in the media in terms of its relevance and the campaigns put into practice by the City Council.
- Dissemination of the noise problem among citizens using bibliographical compendiums such as Sons i sorolls (Sounds and noise).

<u>Malmö</u>

The Environmental Programme (2003- 2008), was approved by the City Council to address Malmö's environmental challenges, noise reduction was an important priority. According to this programme, Malmö aimed to meet the national goals, including a 5% reduction of traffic disturbance by 2010, compared with 1998 levels. Related programmes concerning urban noise pollution include the Traffic Environment Programme (2005) and Malmö's Traffic Strategy (2004), as it is urban traffic which creates the large majority of Malmö's noise pollution, followed by rail and industry; as well as Malmö's renewed Environmental Programme (2009- 2020).

To meet Malmö's noise-pollution reduction targets, in 2008 a city-wide action plan was approved, the Malmö Measurement Programme to Address Noise. This action plan was produced in accordance with the EU Directive 2002/49/EG, as well as the Swedish Directive on Regulation on Environmental Noise (SFS 2004: 675). In this document, 21 quality measures of different kinds are presented, including: measures at the source; protective measures; physical planning, environmental inspections; preventative measures, and joint actions/exchange. This plan contains both short and long-term, as well as objective goals and effective goals for the period 2009-2013. The plan concerns noise levels and activities, at roads, railway and industry/businesses.

An additional policy, specific to new building construction is the Traffic Noise Policy, which came into effect in 2003. This policy clarifies the requirements for noise level allotments for new buildings.

<u>Nantes</u>

The Exposure to Noise Plan (PEB) makes it possible to manage urbanisation around the airport and the PGS makes it possible to protect the neighbouring residents exposed.

The Nuisance Plan (PGS) adopted in 2003 concerns the communities of Saint-Aignan de Grand Lieu, Bouguenais and Rezé. It affects 1,751 homes, and 723 applications have been submitted to finance works. A budget of €1.7 million has been allocated from the Airport Sound Nuisance Tax to finance the communities' noise abatement works.

A sound experience and urban excursions are organised by the CPIE Ecopôle (network of associations supported by Nantes Métropole) on an ongoing basis. These are to raise public awareness of noise nuisance and its prevention by means of walks through the city.

<u>Nuremburg</u>

Nuremburg are at the lower end of people exposed to both day time and night time noise limits. The following graphic depicts the placing of the shortlisted cities; all are somewhat in line with the exception of Barcelona where citizens are exposed to a much higher level of noise.



Strategic noise mapping according to the EU Environmental Noise Directive

Various organisations have been individually responsible for measuring different sources for traffic noise in the context of the implementation of the EU Environmental Noise Directive, so far the Federal Railway Authority mapped noise from railway tracks, the Flughafen München GmbH [Munich Airport Company] aircraft noise at Nuremberg Airport, and the Landesamt für Umweltschutz (State Environmental Office LfU) the traffic noise from motorways, Federal and State roads outside the conurbation.

The strategic noise mapping for the Nuremberg city area was finished in 2009. Distinctions were made by types of noise polluter: road traffic, rail traffic (only trams and underground, excluding railways) and specific trade plants (IPPC plants: integrated pollution prevention & control). The maps are available to the public on the internet.

<u>Reykjavík</u>

The City of Reykjavík has introduced various measures in order to counteract traffic noise. As well as new traffic structures and alterations to existing ones, special arrangements have been made to mitigate noise levels and to ensure that noise will not exceed 55dB(a) outside buildings, as provided in Icelandic regulations. Special measures have been implemented in many places around the city to reduce traffic noise in locations where increased traffic has had a considerable impact on noise levels. Noise levels are calculated or measured at the relevant location and efforts are made to mitigate the situation as much as possible.

A growing proportion of noise complaints received by the Public Health Authority in recent years relates to noise originating at construction sites. When the noise regulations were revised in 2008, rules were introduced to limit the time when noisy and especially noisy work is permitted, in order to reduce noise from building sites. After the new regulations were introduced, more success has been achieved in reducing noise from construction and noise nuisance in residential areas.

The City of Reykjavík has given priority to green transport in recent years, with the Local Agenda 21 and other programmes and has been encouraging the people of the city to use other modes of transport than private cars, i.e. to walk, cycle or take the bus more than is currently the case. This is conducive to reducing noise pollution from traffic. The City has also placed emphasis on development and use of green vehicles, powered by hydrogen, methane or electricity, which lead to reduced noise levels. The City has already introduced many quiet green vehicles for its operations, such as buses and waste collection vehicles.

As Iceland's largest domestic airport is located within the City of Reykjavík, there is considerable air traffic over the city. In June 1999 the City of Reykjavík reached an agreement with the Ministry of Transport that touchdowns practiced in flight instruction and training should be transferred to another airfield at an appropriate distance from Reykjavík. This led to a reduction in noise and inconvenience from that type of air traffic in the vicinity of Reykjavík Airport. The operating licence for the airport is issued by the Public Health Authority which sets strict requirements for noise levels, including restrictions of operating hours, "touch-and-go" landings, and noise on the ground. ISAVIA (Flugstoðir ohf.), which manages the airport, as well as the City of Reykjavík jointly examined the flight paths of all smaller aircraft over the city and designed them to minimise inconvenience caused by landings and take-off s. Unusually noisy models of aircraft have been banned from using the airport except in emergencies. Furthermore, under the current Municipal Plan 2024, the airport is to be moved to the periphery of the city. In the ongoing revision of the Plan this policy is assumed to be readopted.

Another measure which has an impact on traffic noise is to reduce speed limits. Since 1995, systematic efforts have been made to reduce speeds within residential districts from 50km/h to 30km/h, and now the vast majority of neighbourhoods containing schools have this speed limit. The people of Reykjavík are also being discouraged from using studded tyres. Ever since 1980, the City authorities have campaigned against the use of studded tyres in winter in order to reduce wear and tear on tarmac which leads to particulate-matter pollution. These efforts are increasingly successful and have also led to reduced traffic noise in winter.

Vitoria-Gasteiz

The City Council has designed and implemented a plan for moving heavy industries of the metallurgical and chemical sector (which had been absorbed by the residential urban growth) to new industrial areas located in the suburbs of the city and away from the residential zones.

The steel company "Sidenor" was moved from the residential district of Zaramaga to Jundiz Industrial Area. First noise abatement actions took place when the company replaced and insulated 1500 windows in about 500 homes, but finally the business was transferred to Jundiz on a land swap agreement made with the City Council. Another important move was realized with the "Forja y Prensados" steel company, which affected the Arambizkarra neighbourhood. In a first instance, night production was banned, but eventually a land transfer exchange was negotiated with the City Council. Similarly, the agreement is terminated by a swap of the company land by other municipal land located in the new industrial areas.

The "Noise and Vibration Regulation Ordinance 2000" established the maximum levels of noise allowed, and the acoustic measures to implement in companies, bars and private houses, as well as the corresponding fines. This regulation imposed more restrictive conditions on noise than its predecessor. Around the same time a Noise Inspection Action Plan was put into place with the aim of limiting volume levels with the installation of sound control equipment that works in real time on musical equipments. This equipment is mandatory for new owners of pubs and discotheques as well as for others who systematically do not respect the legal limits on noise.

The "Environmental Action Plan 2002-2007 of the Local Agenda 21" includes a Protocol of collaboration with the rest of Municipal Departments that are involved in areas in which noise pollution is or can be an issue as the Urban Planning Department and the Municipal Police. One of the key achievements has been the removal of some of the noisiest industries from residential areas to

industrial areas. In addition, a transitional area has been established between the industrial and the new residential areas in which there is scope to include less dense and less polluting industrial activity, enabling the City to continue with its economic development plans.

Noise education and training was supplied to 20 Municipal Police members in 2008 to monitor industrial noise during night time.

8 WASTE PRODUCTION & MANAGEMENT

Every year, each of the 500 million citizens living in the EU throws away more than half a tonne of waste. The management and disposal of this waste is a major challenge for our cities and towns. The Waste Framework Directive (2008/98/EC) sets out basic concepts and principles for waste management across the EU, such as the "polluter pays principle" and the "waste hierarchy". The waste hierarchy sets an order of priorities for waste management with the preferred option of waste prevention, followed by re-use, recycling, other forms of recovery such as energy from waste, and improved final disposal followed by monitoring.

Waste should be managed so that it does not endanger human health, harm the environment, pose risks to air, water, soil, plants or animals, be a nuisance through odours or noise, or adversely affect places of special interest.

The following table shows the variation of both household and municipal waste generation across the six shortlisted cities. Nuremburg is the lowest in terms of household waste generated per inhabitant with Barcelona at the top of the table producing 426.74 kg per inhabitant.

Waste production					
	Household	Municipal	Household (variation		
City	(KG/Inh/year)	(Kg/inh/year)	over last 5 years %)		
Barcelona	426.74	442.46	3.20%		
Malmo		506	n/a		
Nantes	522	477	-1.60%		
Nuremburg	247.4	563.5	2.2		
Reykjavik	315	465	-12%		
Vitoria-Gasteiz	329	390.4	3.34%		

Vitoria-Gasteiz

Vitoria-Gasteiz has dramatically improved its percentage of recycled municipal waste from 11.8% in 1999 to 23.9% in 2008. While still a way to go to reach the 56% Nuremburg has achieved, the city is making excellent positive progress.



The city has a new pneumatic waste collection system with underground pipelines and five Recolecting Centres, this has been introduced in the historical centre and three new districts. The system, involving an investment of \in 23 million, is now in several areas of the city. Four of these are in the City's new suburbs whereas the fifth is in the City's mediaeval centre. Currently, the system relies on 814 collecting points, and its network is more than 40 km long. In 2009, this system collected approximately 5,000 tonnes of municipal waste.

In 2006, the City built a MTB plant. It processes 100% of the municipal household and commercial waste but shortly will also start to process the waste from Álava province. The biodegradable waste that is decomposed through aerobic and anaerobic procedures produces biogas which can be collected and burnt as a fuel to produce electricity, which, in 2009, supplied 75% of the electricity consumed by the plant. The aim is to produce 108% and to sell surplus electricity to the grid. In 2009, this plant processed 58,000 tonnes. The plant was financed through the EU Cohesion Funds.

<u>Reykjavík</u>

Reykjavík does not have any incineration but disposes of all waste to landfill. This is partly as the city does not rely on fossil fuels for heat etc but make use of geothermal conditions present. The recycling rate is quite good at 31% considering relatively low ambition in waste management.



<u>Nuremburg</u>

Six years ago, the City's top eco-political objective, to cease landfilling, in particular biodegradable waste was achieved. This was made possible by the consistent implementation of household waste sorting and separate collection of recyclable / reusable waste, and by building an up-to-date incinerator plant, also incorporating energy recovery. From the above graph it can be seen Nuremburg have almost 100% diversion from landfill. This is an amazing achievement when compared to the other shortlisted cites and European cities in general.

By incinerating residual waste in our energy-efficient plant and generating electricity and heat for district heating, around 66,500 tons of mineral coal can be substituted every year (energy recycling). At the same time, this avoids around 110,000 tons of harmful CO2 emissions. There is, however, an economic problem. So far, the recycling of products has not led to reduced consumption of resources. Some environmentalists even argue that this is an obstacle to mandatory reduction of resource consumption. So far, waste recycling has not reduced the absolute amount of resources consumed.

It may be essential to establish product-related environmental compatibility assessments and impact predictions across the entire product life cycle, including the development, production, marketing, use

and disposal phases, thus encompassing the total resource consumption. In future, waste management activities will need to take into account waste creation, as well as optimal waste disposal. The eco-political objective of the next few years must be to transform the waste and recycling economy into an economy of material flows and to strengthen recycling of resources. The City of Nuremberg therefore intends to take part in a relevant research project within the next few years. The objective is to investigate whether it is possible to retrieve valuable metals (e.g. copper) from filter dust.



The total amount of Nuremburg waste for disposal decreased considerably between 2004 and 2005. In this period, the collection of organic waste from households was significantly expanded. Between 2002 and 2003, the total amount of waste decreased considerably, because recycling by business enterprises became effective through the implementation of the commercial waste ordinance. At the same time, less organic and green waste had arisen due to weather conditions.

<u>Nantes</u>

Recycling and prevention are now contributing to a reduction in greenhouse gases in Nantes. Work is currently being undertaken locally to reduce refuse collection vehicle mileage in order to limit emissions including, optimisation of rounds, simultaneous collection of sorted and unsorted household waste using the "Tri-sac" (bag sort) system. The energy recovered is used to offset the incinerator emissions.

Putting in place the "TRI'SAC" system in densely populated residential urban areas, including those with social housing, makes it possible to offer a comprehensive selective household waste collection service to all populations, irrespective of their circumstances. Likewise, it is possible to have a household waste composting facility at the foot of a building, making it accessible to everyone.

Tri'sac is a door-to-door selective collection system. There are 30-litre bags in two colours: a blue bag for non-recyclable waste, a yellow bag for recyclable waste. Once collected and delivered to the separation centre in the same refuse collection vehicle, the yellow bags are separated from the blue bags using an optical reader.

Developed in 2006 and involving 125,000 inhabitants, this means of selective collection limits the number of dustcarts on the road because of the simultaneous collection of several flows without the addition of extra rounds. This increases performance in sorting in densely populated municipal areas (Nantes city centre and collective housing complexes) and may enable us, in due course, to collect

just fermentable waste in densely populated areas without changing the collection procedure and whilst achieving significant performance.

The Trisac operation will be extended in 2013 to other parts of the Nantes city centre area, as well as to collective housing in Nantes, Rezé, Saint-Sébastien, Orvault and Saint-Herblain.

In addition, a third biodegradable branch could be developed with a third bag, making it possible to collect kitchen waste as of 2012 in the same urban areas.

Work has begun on the prospects of further diversifying the recycling channels and experimenting with the recycling of flexible plastics, although this would not be rolled out across the whole of France.

Waste as a resource in <u>Malmö's</u> Western Harbour – A Closed System Approach

Malmö's Bo01 neighbourhood (completed 2001) has an interesting approach to waste management. Waste serves as a part of a closed system – a much needed resource which provides a fuel source for the city's waste-to-energy incinerator. More so, food waste is used both to produce biogas used in city buses as well as for fertiliser. The diagram below was designed with Bo01 in mind.





In additional to 'conventional' waste separation for recycling, a high-tech waste management system for food and remaining waste was incorporated. The so-called **ENVAC Vacuum System** collects food and other wastes in two separate waste streams. Once a certain amount of waste has accumulated, a vacuum pump transports waste to holding tanks just outside of the neighbourhood, until it is collected and taken to a separate facility. Not only does this system manage waste, it also influences the neighbourhood's urban plan. Streets are built in a more compact fashion favouring cyclists and wakers, because streets do not have to be built in a way to accommodate large-scale waste-removal equipment.

<u>Malmö</u>

The SYSAV Waste to Energy plant in Malmö is the most energy efficient plant in Sweden. With an advance flue gas cleaning system SYSAV manages to stay below emission requirement. This plant has four boilers, the two oldest of which came into operation in 1973. They are hot water boilers which produce district heating. Both boilers and the systems for cleaning flue gases are reconditioned and developed to reflect the heightened demands on waste combustion. The two newest boilers are steam boilers, generating both electricity and district heating.



The total plant capacity is 550,000 tonnes per year. The plant produces approx. 1.4 MWh of district heating a year (heats 70,000 houses) and 250,000 MWh of electricity per year.



Malmo has undertaken an effective and visible campaign to highlight the use of food waste for biogas production, estimating that 10kg of food waste is enough to drive roughly 10km.

Total diversion from landfill in the city is an impressive 95%, and with such excellent initiatives in place this will be on a par with Nuremburg's almost 100% very soon.

Barcelona

Of the benchmarked cities Barcelona has had the largest increase in annual household waste production, note, no figures were available for Malmö. In a time when all emphasis is on waste reduction and prevention, this is an area Barcelona perhaps needs to review. Both Nantes and Reykjavík show a downward trend with Nantes achieving a good level of reduction.



9 WATER CONSUMPTION & WASTE WATER TREATMENT

A clean and healthy city guarantees its citizens access to clean and safe water for drinking and other daily uses. The EU recognises the importance of clean drinking water through the Drinking Water Directive (98/8/EC) which ensures that the water delivered to citizens via urban water supply systems is safe to drink. Cities and towns must regularly monitor the quality of water delivered at the tap and keep consumers informed of the quality.

A clean urban environment is among the goals of the Urban Wastewater Treatment Directive (91/271/EEC). This Directive requires all cities and towns with populations of 2000 or more to have sewage collection systems in place and to treat the wastewater to certain minimum standards before it is discharged into the environment. Although it is the most costly of all of the EU environmental requirements to implement, the reductions in pollution it has brought are significant. This legislation has helped clean up our rivers, lakes and coastal areas and has been important for meeting the health-based standards of the Bathing Water Directive (2006/7/EC).

<u>Malmö</u>

To prevent leakage, as pipes are replaced, high density polyethylene pipes are incorporated. Systematic leak investigations are conducted (in essence listening and testing) within the water catchment area, which amounts to 10- 15% of the annual water distribution. All pipe work personnel are trained in the Swedish Water Diploma Course, so they are able to handle valves and other appliances in a correct manner (in order to prevent pressure surges).

To work with the rehabilitation of the water network, old pipelines are renewed based on statistics concerning the number of leaks. This is measured against the age and direction of the pipelines. The water tariff for non-domestic metering is higher than the tariff for domestic metering, as an incentive to target large-scale users.

In reference to its water quality, the City of Malmö and VA SYD have worked with campaigns which attempt to highlight Malmö's water quality, and thus encourage residents to **drink tap-water** instead of bottled water – better in terms of quality as well as environmental impact (i.e. transportation and packaging). There is also a focus for customers to "flush through", in order that the water distribution system features the greater turnover, to increase the quality of the drinking water.

In some newer neighbourhoods, for example in Malmö's Western Harbour, developers are encouraged to invest in the most water-friendly devices to encourage holistically sustainable buildings. In Rosengård Hilda neighbourhood, rainwater capture is starting to be practiced in buildings first built in the 1960s. This is being done together with resident campaigns so they become familiar with the various changes in their neighbourhood.

The wastewater treatments plants in Malmö were upgraded to take better care of extended nitrogen removal, more than 10 years ago, in the late 1990s. New and stringent requirements to address the removal of organic material, phosphorus and nitrogen were introduced four years ago. At Malmö's Sjölunda Sewage Treatment Plant, additional upgrades were undertaken to comply with these requirements.

The remaining sludge from Sjölunda is authorised to be used as fertiliser, thus instead of a waste product, nutrients are returned to the farmland turning 'wastewater' into a valuable resource.



DRICK KRANVATTEN! Tips, Inspiration och ideer

In addition to traditional measures to manage wastewater, the City of Malmö have also analysed various climate change scenarios to address the effects that climate change will have, and is having, on Malmö's water supply, water situation, as well as increased levels of storm water. In the future, it is anticipated that this will result in increased rainfall and consequent urban flooding. The effective management of storm water hence becomes increasingly important. Malmö are actively working to disconnect storm water from the combined system, resulting in a smoother flow and a reduction in the risk of overflow.

Thus, to prevent urban flooding, or an overflow of Malmö's drainage system or sewage treatment facilities, the city aims to manage rainfall in a more 'natural' manner, simultaneously creating pockets of urban biodiversity. This water management strategy is an important part of Malmö's climate adaptation strategy which addresses green and blue adaptations to climate change in cities.



Taken from "Blue-green fingerprints in the City of Malmö, Sweden" by Peter Stahre

Nantes

With the exception of Reykjavík which has no water metering, Nantes has the lowest level of households metered when compared with the six shortlisted cities.



Nantes employs a number of water preservation measures:

- On a daily basis, the quality of water produced in plants is monitored continuously by sensors, which makes it possible for teams in central locations to check the water in real time.
- Management of water renewal during storms is ensured by minimum threshold levels in reservoirs, while guaranteeing sufficient autonomy for network security (approximately 1 day of consumption).
- With respect to water distribution, monitoring sensors ensure an acceptable level of residual chlorine in the network.
- Teams have equipment and information enabling them to verify turbidity and chlorine concentration before the water is returned, in order to guarantee the continuity of water quality throughout the network.
- Non-return valves have been systematically installed on all meters, at the responsibility of Nantes Métropole.
- Operation is analysed by looking for a weak points in the network. This work is done primarily in areas where the water circulates slowly, with significant holding time, which could result in deterioration of water quality. These studies make it possible for the network to operate optimally in order to improve water quality.

The Water Directorate monitors water usage in order better to manage the risks of water return, particularly by means of studies of consumers at risk.

<u>Nuremburg</u>

Nuremburg already meets the objectives of the Water Directive in many respects, including:

- No water extraction for Nuremberg's water supply is above the long term groundwater regeneration rate; none of the water-bearing strata used by us is overused or shows a long-term decrease in groundwater volume. 95% of our water is extracted from the first groundwater storey.
- The extraction catchment areas are protected by extensive source water protection areas.
- The strategies used have included purchase of land in particularly sensitive areas, in some cases demolition of buildings, conversion of farmed fields to grassland, co-operation with agriculture (cultivation agreements), influencing planning for traffic routes and trade areas to be favourable to water protection. The success of these measures is monitored. For the past 15 years, for example, in co-operation with farmers we have worked towards nitrate and pesticide input not increasing, and ideally decreasing. In one water extraction area we have been able to measure a decrease of nitrates in the water.
- In the water extraction areas, the amount and quality of groundwater is intensively monitored.
- The price structure is a significant incentive for water-saving.

Waste water collection for the Nuremberg city area (with 502,815 inhabitants) is mainly achieved with a combined system. The sewage network has a length of 1,415 kilometres. The waste water of 99.9% of all properties is connected to the central sewage treatment plants. The very few properties not

connected to the public sewer network are remote individual houses or gardening companies in the outskirts.



The waste water from these properties is treated in approved small sewage treatment plants or pit latrines without an outlet. The sludge removed from these plants is monitored by the City Waste Water Treatment Department and is treated in the central sewage treatment plant. Thus all properties are connected to a proper waste water treatment system.

This situation was achieved ten years ago. Nuremberg's two waste water treatment plants have been adapted to increasingly strict stipulations according to a Water Management Law since the mid 1980s. Thus, for over 10 years, they have been up to the current state of technology fulfilling all requirements for further waste water treatment for the elimination of nutrients according to the Urban Waste Water Directive.

<u>Reykjavík</u>

Unlike most cities, a large proportion of Reykjavík citizens' consumption of water comes from neighbouring geothermal areas and utilisation of geothermal heat count for a great share of the entire energy regime in whole Iceland. The geothermal water is used in multiple ways that contributes greatly to improved environmental performance, public health and guality of life in the world's northernmost capital. It is in a way used for central heating in all houses in Reykjavík, as the hot water from the hightemperature geothermal areas at Nesjavellir geothermal plant is used to warm up cold groundwater, and has totally replaced coal and oil as a source of energy for house heating.

The residents are comfortably able to heat their houses and ventilate, resulting in generally good indoor air quality (IAQ) and



rare sick building syndrome. The geothermal heat is also used for highly popular, inexpensive and widely accessible outdoor swimming pools in most of the city's districts. In addition the geothermal heat is used for tap water, snow-melting systems and industrial manufacturing.

Inspection of drinking water safety as well as pollution control in the water protection area and external factors that may impact on Reykjavik's water protection area is based on Icelandic legislation. Although not an EU country, Iceland adopts the majority of EU environmental legislation under the auspices of the EEA (European Economic Area), to which Iceland is a contracting Party.

The EU Water Framework Directive is now being implemented in Iceland. Even though this Directive has not yet been transposed into Icelandic law, the Reykjavík Public Health Authority began monitoring lakes and rivers in the water protection area at the beginning of 2009. Drinking water fully (100%) meets the criteria of the European drinking water directive 98/83/EC: Over the last ten years only two samples, out of 120 samples taken every year, have exceeded guideline limits.

Vitoria-Gasteiz

Vitoria-Gasteiz shows the lowest level of water losses in pipelines when benchmarked in the table below. A vast difference can be seen between the less than 6% losses in Vitoria-Gasteiz and more than 14% in Nantes. This water loss represents a huge cost for the municipality and ultimately the citizens.



Vitoria-Gasteiz meets the requirements of the Water Framework Directive 2000/60/EC, and is committed to getting Europe's waters cleaner through the participation of its citizens.

The level of compliance with Directive 98/83/EC on water quality is 100%. During recent years, no exception has been requested with regard to drinking water quality parameters. This is achieved in the Araca Drinking Water Treatment Plant through treatments of treatments

Vitoria-Gasteiz is committed to improvement and infrastructure renewal in relation to water quality:

- Improvement in supply quality control
- Establishment of a remote control system for treating water for drinking and chlorination facilities located in the municipality.

- Analytical control tests on arrival (taps) to monitor the entire process of supply and revision of facilities.
- Adaptation of the Drinking Water Laboratory in order to achieve ISO 17025 certificate.
- Adjustments to fulfill the requirements of Directive 98/83/EC for water consumption.
- Implementation of a legionella and enteroviruses control in water catchments and networks.
- Implementation of a taste and odour control in water supply.
- Adaptation of the Drinking Water Plant to meet current and future needs.
- The strengthening of relationships with the universities through a Commission that enables regular collaboration in R&D.

Vitoria-Gasteiz and the city partners offer a wide variety of environmental education activities in terms of waster water treatment, including:

- Walks along the river Zadorra: this activity aims to provide students with an overall perception of the river and its location in relation to the city.
- Visit to the Araka Drinking Water Station: to raise awareness of the water cycle and the city's participation in the Zadorra system and to promote water conservation.
- Visit to the Crispijana water treatment plant: to learn about the different stages in the water supply, and to promote the return of water to the Zadorra under the best conditions.

<u>Barcelona</u>

Water is supplied by the company Aigües de Barcelona (Agbar), based on the readings of individual meters installed in homes, business premises and industries. 99.61% of domestic clients and 99.94% of non-domestic users have meters. Today, only 0.3% of users continue to receive their water supply via the storage of water in private tanks, a system that is being withdrawn (at an average annual rate of 9%) and replaced by direct supply and meters. Across the metropolitan area, the proportion of supply via storage tanks in comparison with direct water supply fell from 1.5% in 1994 to 0.41% in 2008.

In accordance with the EC Water Framework Directive (2000/60), water cycle policies in Catalonia and Barcelona are based on achieving a suitable - guaranteed supply of quality water resources for water users - management of the water cycle based on its ecological and social values.

In order to anticipate drought situations, the City Council has drawn up the Municipal Action Plan for the Risk of Drought, which contemplates drastic, specific measures to save water, as well as to inform and raise awareness among the population. 2007 and 2008 were marked by long periods of drought. The various agents responsible for water management work hard to avoid restrictions and obtain new water resources through the recovery of irrigation channels and wells and the reuse of purified water, among others. At the same time, the citizen awareness and information work was intensified with the publication of specific material and a far-reaching awareness campaign that included a specific website The Treatment Programme for Urban Wastewater (*Programa de Saneamiento de Aguas Residuales Urbanas 2005 - PSARU 2005*), developed by ACA, is a hydrological planning instrument that implements the Sanitation Plan for Catalonia. The PSARU 2005 is situated within the framework of Directive 91/271/EEC on urban wastewater treatment and Directive 2000/60/EC, which sets forth a community action framework in the area of water policy, aimed at water protection. Its objective is to reach a good status for superficial water bodies by 2015, through the development of measures to protect, improve and regenerate these water bodies.

Public cooperation enables the city's residents to benefit from quality water. A key example of this is the Ríos Project, an initiative set up by the Hábitats, Association whose main objective is to encourage society to take part in conserving and improving its rivers. Interested citizens actively and voluntarily

participate to maintain the ecological balance of rivers. In addition, the City Council's guide to environmental education, "El agua y la ciudad" (Water and the City) broadened public awareness of the water cycle in Barcelona: where water comes from, its standard, the persons or institutions that work with it, supply systems, etc.

10 ENVIRONMENTAL MANAGEMENT OF THE LOCAL AUTHORITY

This chapter reports on how the EGCA shortlisted cities perform in relation to the following criteria:

- Environmental Management Systems (EMS)
- Green Public Procurement (GPP)
- Energy efficiency and management in public buildings

10.1 ENVIRONMENTAL MANAGEMENT SYSTEM (EMS)

Environmental management systems (EMS's) are based primarily on the now famous Deming Cycle (Plan, Do, Check and Act). An EMS can be viewed as a cycle of continuous improvement or total quality (environmental) management.

The world's first environmental management standard BS 7750: *Specification for Environmental Management Systems* was published by the British Standards Institute (BSI) in 1992. The corresponding Irish standard IS 310: *Environmental management Systems-Guiding Principles and Requirements* was published in 1994. However, IS 310 was superseded in 1996 by ISO 14001 and 14004.

ISO 14001 defines an environmental management system as "the part of the overall management system that includes organisational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing achieving, reviewing and maintaining the environmental policy".

A simpler definition of an EMS is "a management tool designed to help a company manage the environmental aspects of its operation" (Bouchier et al., 1998)

An EMS is based on five principles:

- Principle 1: Commitment and Policy
- Principle 2: Planning
- Principle 3: Implementation
- Principle 4: Measurement and Evaluation
- Principle 5: Review and Improvement

An EMS is a living plan, not something that is placed on a shelf, and forgotten (Magette et al., 2001)

Barcelona

The environmental management of the City Council falls within the scope of the Citizen Commitment to Sustainability – Agenda 21 of Barcelona. Barcelona's Agenda 21 has an important social and citizen participation dimension. Evidence of this is the voluntary signing of the Citizens" Commitment to Sustainability by around 640 organisations.

However, in addition to ensuring citizen involvement, the Agenda 21 has a consultative government body, the Agenda 21 Council, which is a real mechanism for the city's environmental management. Accordingly, and unlike most of the Agendas 21 in the world, Barcelona's Agenda 21 is the sum of the agendas 21 of its signatories (including the School Agenda 21), turning it into a co-responsibility strategy for building a sustainable future for the entire city of Barcelona. For monitoring purposes, it has a set of 21 quantitative indicators that are published on a regular basis and there are also signatory conventions for assessing the progress of the respective action plans.

<u>Malmö</u>

Malmö City Council recently renewed and approved both the Environment Programme (2009- 2020) and the Energy Strategy (2009) to support the city in achieving some rather substantial goals, in terms of its purchases, its energy consumption, as well as how it functions as a collective organisation. A general environmental objective of the Environment Programme states that it should be "**easy to do**

the right thing in Malmö", in the city's own activities and for city citizens.

According to this programme, "In 2020, resource usage will be characterised by sustainability and long-term thinking. It will be easy for residents, industry and the municipality itself to make sustainable choices when it comes to commodities, services, travel, and waste management." To achieve this, the Environmental Programme includes the following objectives, specific to its own activities and responsibilities:

- Sustainable procurement: The City of Malmö will revise its procurement and purchase procedures, and the municipality's use of resources. The proportion of organic and locally produced food purchased by the City of Malmö will grow.
- Decreased use of dangerous substances: Information, cooperation, and supervision will contribute to phasing out the circulation of hazardous substances. The City of Malmö will exclude commodities containing hazardous substances at the procurement stage. Sustainable materials will be chosen in all sectors.
- Waste will be recycled: The trend of ever increasing quantities of waste must be halted. An effective way of doing this is to minimise the creation of waste. The system for sorting and recycling waste will be simpler and more easily accessible.

In the Energy Strategy, several guidelines and principles for achieving this in different areas are presented. Using energy mapping as the basis it is for instance possible to establish efficiency programs for buildings and structures. By developing and strengthening energy counseling the motivation for putting efficiency measures in place is increased. For new developments it is suggested that the energy demands established in Miljöbyggprogram SYD (The Environmental Building Program South) are followed. Regarding transports, it is important to promote pedestrian, bicycle and public transportation but also to strive for more energy efficient vehicles and ECO-driving. A Switch to Renewable Energy Sources Switching to renewable energy sources is an important strategy for decreasing the environmental impact and securing a future energy provision. There are great possibilities of replacing fossil fuels with renewable energy sources.

When it comes to electricity and heat production, bio-fuels, hydro-power and, wind-power and solarenergy are the solutions being discussed. In regards to fuels there are many interesting possibilities such as biogas, hydrogen gas, electricity and various hybrids of these. In Malmö, district heating is prioritized because it is effective, safe and has good fuel flexibility. For electricity production, continued investments in wind and solar energy are suggested.

The municipality's official cars should consist of environmental vehicles which are driven by biogas, electricity or electrical-hybrids. For public transportation biogas is suggested in the short term, later to be replaced by renewable energy.

Nantes

The Nantes Metropolis Agenda 21 is the principal tool for environmental management of the urban community.

ISO 9001 certified since 2001 and OHSAS 18001 certified since 2004. It's ISO 14001 certification was awarded in April 2010, for integrated quality, safety and environmental certification. 270 agents were involved in this certification.

<u>Nuremburg</u>

Between the years 1998 and 2000, the City of Nuremberg directed and coordinated a project implemented by four Bavarian cities "Eco Audit in Municipal Administration" and, in this context implemented EMAS certification in a number of institutions.

<u>Reykjavík</u>

The City of Reykjavík's Local Agenda 21 is the principal policy statement on environmental issues. Under the policy, the City's aim is that the City administration and businesses in Reykjavík are to set an international example in the use of environmental management tools. The policy has led to increased environmental awareness and continuous rise in number of certified environmental management systems by the City, even though targets to increase the percentage of the number certifications have not been set.

The City of Reykjavík's environmental action plan, Green Steps, is based upon its Local Agenda 21 and other City policies on environmental issues. The Green Steps are reviewed annually as part of work and financial planning. In the revision of the plan for 2010, the emphasis was on climate issues. An estimated €1.4 million was be allocated to structural projects relating to the Green Steps in 2010. Costs of altered services, publicity, education and other Green Steps tasks are not included in that sum.

Vitoria-Gasteiz

Vitoria-Gasteiz is working on integrating environmental aspects into the whole management system in the Council with "Best practice guidelines" and education to employees as main actions, which are prioritised to external certifications as ISO 14001 or EMAS. Some Departments of the City Council have already applied some sort of certifications:

• Environmental Management: The Municipal Center of Enterprises-MCE, which promotes the creation of new private enterprises while promoting education on environmental management, is certified by Ekoscan since 2007, an environmental management certification similar to ISO 14001, but adapted to SMEs. Ekoscan has been recognized as one of the "Best Project for Environmental Management Systems in Small Companies" by DG (Enterprises of the

European Commission). The MCE, integrated in the Economic Development and Strategic Planning Department- EDSP, aims to manage both public (4 people from de EDSP) and private sector (currently 22 companies with 60 employees) energy, water and waste needs with Ekoscan.

- Quality Management System (ISO 9001): Implemented in the Finance Department (ASIAC Public Information Service), in the Health and Consumption Department (Laboratory) and in the EDSP (except the Conventions and Tourism Unit).
- Japanese "5s" Management System: Implemented in the Sport Department, Urban Infrastructure Department (Service of City green zones and gardens) and Finance Department (Direction Service).

In 2008 the elaboration of "GEO-Vitoria-Gasteiz: Diagnosis and environmental sustainability" was completed, which has been conducted under the supervision of the United Nations Environment Programme (under the GEO Cities Programme Framework), and will serve as a basic element for the development of the new LA21 Action Plan.

Vitoria-Gasteiz held the II Forum of European Union–Latin American & Caribbean Local Governments in 2010, where the "Vitoria-Gasteiz Declaration" on sustainable development and social innovation and cohesion was adopted.

Also in 2010, Vitoria-Gasteiz participates in HUMBOLDT, a four-year EU project aimed at the implementation of a European Spatial Data Infrastructure (ESDI) as planned by the INSPIRE initiative, meeting the goals of Global Monitoring for Environment and Security (GMES).

Currently, in May 2010, Vitoria-Gasteiz has been invited to participate in the Global Project on "Measuring the Progress of Societies" hosted by the OECD, where in collaboration with other international and regional partners the project seeks to become a world wide reference point to measure and assess the progress of their societies.

10.2 GREEN PUBLIC PROCUREMENT (GPP)

"Europe's public authorities are major consumers. By using their purchasing power to choose environmentally friendly goods, services and works, they can make an important contribution to sustainable consumption and production – what we call Green Public Procurement, or GPP.

Although GPP is a voluntary instrument, it has a key role to play in the EU's efforts to become a more resource-efficient economy. It can help stimulate a critical mass of demand for more sustainable goods and services which otherwise would be difficult to get onto the market. GPP is therefore a strong stimulus for eco-innovation.

To be a success, GPP needs clear and verifiable environmental criteria for products and services. A number of European countries already have national criteria, and the challenge now, as GPP becomes more widespread, is to ensure that the criteria are compatible between Member States. A level playing field will boost the single market, ensuring that what is good for the EU is also good for the environment." EU Commissioner for Environment Janez Potočnik on GPP³

³ EU Commissioner for Environment Janez Potočnik on GPP. http://ec.europa.eu/environment/gpp/index_en.htm

Green Public Procurement (GPP) % of Eco-labelled, Organic, Energy-Efficient Products					
	Paper	Food	Vehicles	Green Electricity	
Barcelona	100%				
Malmo		27%	80%		
Nantes		100%	46%		
Nuremburg	100%	10%			
Reykjavik				82%	
Vitoria-Gasteiz	100%	55.00%	14%		

<u>Barcelona</u>

Due to a municipal contract specifications document, all public childcare facilities consume at least 5% of food with an ecological agriculture certificate. Four of these centers reach 25-30% and one underwent a pilot test to reach 50%. Catalonia is the first autonomous community in Spain to agree on and promote recommendations on the location, publicity and content for food vending machines located in settings with small children and adolescents with the aim of improving their eating habits.

Another pioneering initiative in Spain was the incorporation of environmental clauses and ethics into the contracts for the procurement of park and garden maintenance worker's clothing (~700 employees). Some of these suppliers also undergo external audits to confirm that they apply the ILO agreements. Currently, all clothing worn by park and garden employees carries an Oeko-Tex 100 European label.

<u>Malmö</u>

The city has worked actively to create a market for clean-fuel vehicles in Sweden, through joint purchasing and the prioritisation of clean-fuel vehicles in the public vehicle fleet. More than 80% of cars operated by the city are classified as eco-vehicles, in terms of efficiency and fuel mix. Many of the Malmö city vehicles run on ethanol, a biogas/natural gas mix or are electric hybrids. Malmö also can

claim to have Sweden's first hydrogen car, used by employees of Malmö's Environment Department.

This hydrogen car runs on stored wind energy, from Malmo's energy provider, E.ON. Additional to

Malmo's hydrogen car, one city bus also operates on hydrogen, the rest running on a mix of natural gas and biogas. Malmö aims to continue in this direction, replacing older vehicles with green ones, to build a fleet comprised 100% of green cars. The city was also recently awarded for this effort, receiving the 2009 Green Fleet Award for the European Fleet of the Year.

Efforts are ongoing to green Malmö municipal offices, lowering the city's energy consumption and saving municipal resources. In particular, low-energy lighting and energy-efficiency office products have become standard practice, and Malmö has experimented with some interesting systems in

several of the city's schools to increase energy efficiency. The city's IT service has also introduced the Nordic Swan eco-labelled computers into the standard products available. The move towards low-energy fittings extends also to the outdoor environment. Malmö city traffic lights now operate almost exclusively on LED and low-energy systems are used for street and park illuminations.

<u>Nantes</u>

A voluntary process has been begun with respect to purchasing: social and environmental requirements in markets (organic, local products and equitable commerce in collective meals, organic cotton work-clothing, labelled office supplies, PEFC/FSC certified wood), dialogue with suppliers,

strong involvement in the Grand Réseau Ouest of sustainable public contracting, as well as of Procura at the European level. The offer is growing and suppliers' commercial policies take these concerns into consideration.

The work of raising the awareness of the City towards the market's economic players contributes significantly to this.

Peri-urban agriculture, development of short-circuits: Nantes Métropole is working on the development of production and public contracting for school meals (CAP44/building a performative and multi-year rural agriculture).

Vehicles: between 1999 and 2009, the percentage of clean vehicles for the City of Nantes rose from 25% to 37%, and from 16% to 29% for the urban community since 2001.

<u>Nuremburg</u>

Since 2005, all cars purchased have been in exhaust class Euro 5. Latest acquisitions of trucks for various purposes have been made according to standard Euro 5/EEV which is a standard going beyond Euro 5.

On the 23rd July 2003, Nuremberg City Council unanimously set an aim of 10% of all products consumed in school cafeterias and other municipal canteens and service points from organic farms or certified organic processors by 2008. Since October 2008 more ambitious targets of up to 50% of organic food in schools and day care centres are set.

Since January 2009, only recycled paper is purchased. This includes paper towels and toilet paper.

<u>Reykjavík</u>

The City of Reykjavík places emphasis on purchase of eco-labelled goods where possible. When cleaning services were put out to tender in 2009, applications from companies with an eco-label or environmental management system such as the Nordic Swan, ISO 14001 or similar, were given a favourable weighting. The entire City's kindergartens, and its largest office building, which houses the majority of the City's administration, are now cleaned by companies certified with the Nordic Swan Eco-label. The City's requirement for eco-labelling has contributed to a great increase in applications for the Nordic Swan Eco-label, which resulted in the doubling of eco-labelled Icelandic products and services last year. Environmental criteria have been applied in tenders for other categories of goods and service, such as purchase of furniture, printing service and waste collection lorries.

Increasing the share of the total consumption of eco-labelled, organic and energy-efficient Products City of Reykjavík procurement policy and rules: According to the city's procurement policy, environmental factors are to be taken into account by employees undertaking purchasing on behalf of the City. The City's procurement rules were revised in 2009. One of the main objectives of the revisions was to make green procurement a principle in the entire City's procurement. In revision of the rules, it was not deemed wise to make green procurement an absolute requirement due to the risk of legal action arising from tenders. In revision of the rules they were framed in such a way that the purchasing party must evaluate the environmental impact of the purchase; if the City's policy of green procurement is not followed, this decision must be supported by reasoned argument. Purchasers fill out a checklist, which must be submitted with the tender documents to the City's Procurement Office. This process facilitates monitoring of green procurement; the Procurement Office is able to pinpoint obstacles to green procurement, and can press for compliance with the City's green procurement policy.

International collaboration: The City of Reykjavík is a member of the ICLEI Procura+ project. Procura+ is an initiative designed to help support public authorities in implementing sustainable procurement – and help promote their achievements. The campaign was established in 2004 by ICLEI to help drive the mainstreaming of sustainable public procurement. In March 2009 the City of Reykjavík hosted an international conference on green procurement in collaboration with ICLEI. The EcoProcura conference has been held regularly since 1998. EcoProcura is a European conference to provide a platform to promote exchange and dialogue amongst purchasers from all levels of governments, suppliers, policy-makers and multipliers on strategies and the latest practical solutions for implementing sustainable procurement. The conference in Reykjavík was attended by 220 participants from 41 countries. The City of Reykjavík saw the EcoProcura conference as an opportunity to engender greater interest and understanding of green procurement within Iceland. The conference indeed had an impact, as purchasers, suppliers and consultants in Iceland showed increased interest in eco-friendly procurement.

Domestic collaboration: The City of Reykjavík has been collaborating since 2003 with the State Trading Centre and the Ministry for the Environment to introduce green public procurement in Iceland. The City participated, for instance, in the formulation of a new purchasing policy for the Government, in which green procurement is one of the three main pillars, and also in the National Action Plan for Green Public Procurement. The City of Reykjavík has representative on the steering committee on green procurement in Iceland. The steering committee has e.g. set up a website on green public procurement in Iceland (see www.vinn.is), criteria documents for green procurement and held conference on green public procurement.

Green procurement: By becoming a member of the Procura+ project at the end of 2009, the City of Reykjavík undertook to formulate objectives regarding green procurement. These objectives have not yet been formulated, but they will refer to the product groups covered by the campaign (electricity, construction, food, IT products, cleaning products, buses).

10.3 ENERGY EFFICIENCY AND MANAGEMENT IN PUBLIC BUILDINGS

Cities make demands on a wide range of resources, from energy and water to minerals and metals. The EU's Thematic Strategy on the Sustainable use of Natural Resources highlights the danger of using natural resources at a rate that exceeds their regeneration capacity.

Green buildings that require less energy for lighting, heating and cooling through more sophisticated use of materials, façade design and innovative air flow systems, are an important component of the effort to achieve efficient and sustainable European cities. Similarly, those buildings that actively incorporate lower-carbon energy generation can make a significant contribution to the overall energy performance of our cities. The development of block, district and city 'group-thinking' in relation to energy performance in cities is also critical. Development of compatible and integrated energy infrastructure on a whole city basis will form the platform on which smart-cities can optimise their energy performance.

Energy Consumption in Municipal Buildings					
	Energy	Energy	Energy		
	consumption	consumption	consumption		
	(heating)	(electricity)	(total)		
	kWh/m2	kWh/m2	kWh/m2		
Barcelona	50.9	42.74	93.64		
Malmo	112	62	174		
Nantes	79.61	103.49	183.1		
Nuremburg	164	n/a			
Reykjavik	152.9	74.3	227.2		
Vitoria-Gasteiz	n/a	59.47			

<u>Barcelona</u>

The Energy Improvement and Saving Plan in Municipal Buildings (PEMEEM) plans to reduce the energy consumption of municipal facilities by 20% between 2008 and 2020. In addition the city undertakes to carry out the following:

By 2012:

- approval and implementation of short-term actions included in the PEMEEM: monitoring and investments in energy efficiency and savings (renewable energy facilities and tri/cogeneration).
- energy efficiency will be increased in the lighting and climate control of municipal premises through the implementation of low-consumption light fittings, electronic reactance, timers, etc., as well as compliance with the established climate control temperatures and the application of good practices.

By 2016-2020:

• the production and consumption of renewable energy sources will be increased in all municipal buildings, thereby increasing the current network of municipal thermal solar and photovoltaic power stations or contracting energy supplies from renewable sources.

<u>Malmö</u>

Malmö has worked to improve energy efficiency in its municipal buildings (roughly 1,500,000 m2), and

has ambitious targets for energy efficiency and renewable energy. Malmo's Service Department, the city's property administrator, has worked to reduce energy consumption, simultaneous to supporting greener alternatives. These are backed by Environmental Programme and Energy Strategy.

<u>Nantes</u>

Nantes is making a consistent effort to Increase the energy efficiency of community and municipal buildings, electricity consumption has been decreasing constantly since 2005.

Between 2006 and 2008, more than 4000 lighting units have been replaced with more effective versions, an operation which is recognised and valued for its energy efficiency within the context of the French regulation, Certificats d'Economie d'Energie à 27 Gwhcuma.

<u>Nuremburg</u>

Since 1997, there has been a successful municipal energy management scheme which systematically monitors and reduces heating and electric energy used in municipal buildings. The scheme purposefully influences project development, new construction projects, refurbishment of existing buildings, maintenance and running of buildings, i.e. the entire life cycle of municipal buildings. The City of Nuremberg thus acts as an important model for its citizens in the way that it deals with its own buildings and properties.

The amount of electricity used by the entire municipal administration decreased by about 9 percent between 2002 and 2007. This is a very good result, in spite of increasing IT technology use. Since 2000, heating energy, adjusted to various weather conditions, has also continuously decreased by 13 per cent.

<u>Reykjavík</u>

The use of heating and electricity is not considered an important environmental issue in Reykjavík, as all electric power and heating derive from sustainable utilisation of renewable energy sources. Nonetheless, efforts are being made to enhance energy efficiency in various ways, such as improved insulation of buildings.

Vitoria-Gasteiz

Local Energy Plan 2007-2012

The Plan for the "Energy Optimization of Municipal Buildings and Public Lighting of the City" derived from the deal that Vitoria-Gasteiz signed in 1999 with the Basque Energy Board (EVE) and was designed for promoting the rational use of energy and the use of renewable energy in the municipal buildings. Different energy optimization projects (savings, efficiency and renewables) have been studied and defined in this framework. The budget of this plan for 2008 was $\in 8$ M, and one of the main activities carried out that year was the installation of solar photovoltaic units in the city ($\in 5,970,000$).

Pilot Project

In terms of energy saving, in 2004, the Council launched a pilot project to reduce the intensity of public lighting through the installation of electrical flow reducing and stabilising equipments in the city light system. The purpose was to reduce the intensity of light at night, when activity is minimal. The initiative has been carried out in the industrial zone of Jundiz, achieving savings of 40% of total consumption in the area and savings €40.000 per month.





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