GOOD PRACTICE REPORT
The authors of the Good Practice Report are Katie O’Neill and PJ Rudden, RPS Group, Ireland together with the assistance of the Expert Evaluation Panel.

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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# APPENDICES

APPENDIX A Expert Evaluation Panel Profiles
1 INTRODUCTION

The European Green Capital Award is the result of an initiative taken by 15 European cities (Tallinn, Helsinki, Riga, Vilnius, Berlin, Warsaw, Madrid, Ljubljana, Prague, Vienna, Kiel, Kotka, Dartford, Tartu & Glasgow) and the Association of Estonian cities on 15 May 2006 in Tallinn, Estonia. Their green vision was translated into a joint Memorandum of Understanding establishing an award to recognise cities that are leading the way with environmentally friendly urban living.

The establishment of this award is timely since Europe is now an essentially urban society, with three out of four Europeans living in towns and cities. Most of the environmental challenges facing our society derive from urban areas but it is also these urban communities that create and mobilise the commitment and innovation needed to resolve them. The European Green Capital Award aims to promote and reward these efforts.

It is important to reward cities which are making efforts to improve the urban environment and move towards healthier and sustainable living areas. Progress is its own reward, but the satisfaction involved in winning a prestigious European award spurs cities to invest in further efforts and boosts awareness within the city as well as in other cities. The award enables cities to inspire each other and share examples of good practices in situ. The winning cities to date include: Stockholm in 2010, Hamburg in 2011, Vitoria-Gastiez in 2012 and Nantes for 2013. All are recognised for their consistent record of achieving high environmental standards and commitment to ambitious goals.

It is important to note that the policy background of the European Green Capital Award is the Thematic Strategy on the Urban Environment (11th January 2006), which outlines the European Commission’s commitment to support and encourage Europe’s towns and cities to adopt a more integrated approach to urban management. This will ensure that Europe’s towns and cities become better places to live and reduce their environmental impact on the wider environment. The strategy also invites local and regional authorities to exploit the opportunities offered at EU level.

As the Thematic Strategy on the Urban Environment does not contain legislative measures, and because incentives are important, the European Green Capital Award can play a useful role here.

Similarly, the renewed Sustainable Development Strategy building on the Europe 2020 Strategy for an enlarged European Union aims to identify and develop actions that will enable the EU to achieve continuous improvement of the quality of life of both current and future generations. This can be done through the creation of sustainable urban communities which is precisely what the European Green Capital Award is promoting.

The objectives of the European Green Capital Award are to:

a) Reward cities that have a consistent record of achieving high environmental standards;

b) Encourage cities to commit to ongoing and ambitious goals for further environmental improvement and sustainable development;

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

The overarching message that the award scheme aims to communicate to the local level is that Europeans have a right to live in healthy urban areas. Cities should therefore strive to improve the quality of life of their citizens and reduce their impact on the global environment. This message is brought together in the Award’s slogan “Green cities – fit for life”.

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As of 2012
1.1 THE INDICATOR AREAS

The selection of the European Green Capital 2014 is based on the evaluation of the cities’ “green” performance under the following 12 environmental indicator areas:

1. Local contribution to global climate change

2. Local Transport

3. Green Urban areas Incorporating Sustainable land use*

4. Nature and biodiversity

5. Quality of local ambient air

6. Noise pollution

7. Waste production and management

8. Water consumption

9. Waste water treatment

10. Eco-innovation and sustainable employment*

11. Environmental management of the local authority

12. Energy performance*

* denotes modified or new indicator for this cycle.

1.2 APPLICANT CITIES FOR 2014 AWARD

Nineteen cities applied, however Paris withdrew their application therefore leaving eighteen applications for evaluation. A map and list, in alphabetical order, of these applicant cities are presented below.

Of the eighteen cities to be evaluated eleven are signatories of the Covenant of Mayors and thirteen European Countries are represented. The smallest city by population is Tampere in Finland with a population of 207,886, whereas Bursa in Turkey has a population of 1,905,570.
Table 1: Details of applicant Cities (presented in alphabetical order)

<table>
<thead>
<tr>
<th>City</th>
<th>Country</th>
<th>Population</th>
</tr>
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<tbody>
<tr>
<td>Antwerp</td>
<td>Belgium</td>
<td>472,071</td>
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<td>Brasov</td>
<td>Romania</td>
<td>278,048</td>
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<td>Bristol</td>
<td>UK</td>
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<td>Brussels</td>
<td>Belgium</td>
<td>1,048,491</td>
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<tr>
<td>Bursa Municipality</td>
<td>Turkey</td>
<td>1,905,570</td>
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<td>Copenhagen</td>
<td>Denmark</td>
<td>1,199,224</td>
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<td>Frankfurt</td>
<td>Germany</td>
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<td>Ljubljana</td>
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<td>Newcastle</td>
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<td>Stoke-on-Trent</td>
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<td>Tampere</td>
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<td>Thessaloniki</td>
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<td>Torino</td>
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<td>Trabzon</td>
<td>Turkey</td>
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<tr>
<td>Vienna</td>
<td>Austria</td>
<td>1,674,909</td>
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<tr>
<td>Zaragoza</td>
<td>Spain</td>
<td>666,129</td>
</tr>
</tbody>
</table>
1.3 THE AIM OF THIS REPORT

The aim of this report is to showcase “Environmental Good Practice” currently undertaken in the applicant cities for the European Green Capital Award 2014 title.

It is anticipated this Report will be widely read throughout European cities, including current, previous and potential applicants of the Award. In this way all cities will be inspired to adopt some of the tried and tested Environmental Good 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 Policies.

1.4 STRUCTURE AND APPROACH OF THIS REPORT

The members of the Expert Evaluation Panel (who are listed in Appendix A) were requested, as part of their duties, to indicate two examples of Environmental Good Practice for their primary indicator area. These examples were to include novel initiatives which may be transferable to other European cities.

The European Green Capital Secretariat compiled and edited this information which is now presented in twelve individual Chapters, one per environmental indicator area. This report does not intend to benchmark the eighteen applicant cities as per previous reporting.
2 LOCAL CONTRIBUTION TO GLOBAL CLIMATE CHANGE

Climate change is something all cities have to consider regardless of size, population or location. The follow are some best practice examples extrapolated from the applications for the 2014 title of European Green Capital. Hopefully these will offer some new and innovative idea to other cities across Europe and indeed the world in terms of managing Climate Change on a local urban level.

Copenhagen

The Copenhagen Climate Plan will lead the City of Copenhagen towards a 20 percent reduction in carbon emissions by 2015, reducing a 2005 level of 2,500,000 tonnes CO₂ to a level in 2015 of 2,000,000 tonnes per year. The Climate Plan encompasses 50 specific initiatives. The initiatives are inter-related, and have been grouped into six themes as follows:

- 44 of the 50 initiatives in the Copenhagen Climate Plan have been launched (but not yet completed). These include energy refurbishment of municipal buildings (schools, kindergartens etc.), putting up wind turbines, improving conditions for electric vehicles and establishing small parks for recreation purposes and rain water drainage.

- The emissions from one kWh of electricity and from one kWh of district heating, has been reduced significantly since 2005. The emissions from one kWh of electricity were 5% lower in 2010 than in 2005, and the emissions from kWh of district heating were 16% lower in 2010 than in 2005.

- The city has build an organisation for implementation the Copenhagen Climate Plan and assigned the required funds to it. Thus, the City of Copenhagen has set up a Climate Secretariat, which is to support the initiatives in the Climate Plan, and to follow the implementation of the 50 initiatives in the Climate Plan closely.

- The city council has assigned the necessary funding. In 2010 an amount of DKK 28 million was assigned for implementation of the plan, as well as DKK 62.5 million during 2011-13, making a total of DKK 90.5 million. This is approximately equal to EUR 12 million. Also, the City Council has also issued a loan guarantee of DKK 5.5 billion (EUR 738 million) to the city’s utility company in relation to investments in offshore wind turbines.

- Coal has been replaced with biomass at unit 1 at Amagerværket (Amager Power Plant). The unit is owned by Vattenfall and was put into operation as old, less efficient CHP units in the city were shut down. Amagerværket was the first plant in Denmark subject to a requirement for a minimum percentage of biomass-based CHP production. Amagerværket is mainly biomass-fired, with coal as a backup fuel. This initiative has been the main cause of a
20 percent reduction in CO₂ emissions per MWh heat from the district heating system realized from 2009 to 2010.

The plan also sets the goal that Copenhagen is to be a carbon-neutral city by 2025.

Rotterdam

A climate proof city and port for the benefit of people, the environment, and the economy; that is the challenge confronting the initiators of the Rotterdam Climate Initiative (RCI): the Port of Rotterdam, the City of Rotterdam, employers’ organisation Deltalinqs, and the environmental protection agency DCMR. The Rotterdam Climate Initiative participates in the C40 Climate Leadership Group, a world wide alliance of large cities all over the world collaborating on the issues of climate change. They cooperate closely with the Clinton Climate Initiative. In this respect, Rotterdam plays a leading role in the climate change approach of port cities.

In 2007, the overall CO₂ emissions in Rotterdam amounted to approximately 29Mtonnes, compared to 24Mtonnes in 1990. Expectations are that, should no measures be taken, overall CO₂ emissions would rise to 39-46Mtonnes by 2025. The main objective is to limit CO₂ emissions to 12Mtonne by 2025, 50% of the level in 1990. This means that 27-34Mtonne of CO₂ emissions need to be reduced whilst expanding the Rotterdam economy.

Initiatives to achieve this limit of CO₂ emissions by 2025 include the following:

Carbon capture and geological storage (CCS) Hub

In 2011 a series of goal-specific initiatives are being taken by companies in order to create a Rotterdam CCS Network. It all starts with two demonstration projects: ROAD and the Green Hydrogen Project. These projects will be at the demonstration phase around 2015, at which point they will achieve a reduction of 1.6Mtonnes of CO₂ annually. Expanding the network will enable a reduction of 17.5Mtonnes/year by 2025. At that time the CCS network will provide a robust backbone for low-carbon industrial and economic growth in Rotterdam. Large-scale demonstrations will serve as stepping stones towards full-scale implementation:

- Developing and improving capture and storage technologies;
- Reducing CCS costs;
- Creating a CCS network.

These initiatives are supported by the CINTRA-consortium and the development of a Common Carrier Pipeline (R3CP). Four participating companies Vopak, Anthony Veder, Air Liquide and Gasunie are pooling their resources and expertise in the CINTRA-consortium to create a turnkey solution to the logistical CCS challenge both emitters and CO₂ storage providers have to face. Captured CO₂ is to be gathered at a CO₂ hub either by (inland) barges or through pipelines. At the hub, the CO₂ can be stored and treated and subsequently transported, again by ship or pipeline, to offshore storage facilities. The envisaged seagoing vessels will be able to offload the CO₂ through an offshore infrastructure (e.g. submerged flexible hoses, fixed loading towers or Single Point Mooring) on a stand-alone basis (EOR).
Biobased Economy

The same network approach is chosen for biomass. The production of biofuels is becoming increasingly important for Europe if it is to have a sustainable future. Rotterdam is the leader in Europe when it comes to facilitating the biobased industry and enabling it to utilise the advantages of the existing (petro-) chemical cluster. Rotterdam promotes the use of robust and standardised sustainability criteria and certificates for biomass.

In line with the Covenant of Mayors, Rotterdam are committed to achieving 20% renewable energy in 2020. This will mostly come from biomass applications in transport and in power generation. With regard to wind energy, the city’s goal for 2020 is to double the current capacity of 151MW to at least 300MW, partly achieved on the new build port expansion of Maasvlakte 2.

Energy Efficiency

In the built environment Rotterdam focuses on connecting existing buildings to the heating network and making existing homes and offices more energy efficient. Since more than 50% of the housing stock is owned by housing corporations, their support of RCI ambitions is crucial. Agreements have been made between the city and all housing corporations to reduce CO₂ between 2010 and 2018 with 20%. The results are monitored annually. The results are promising: the amount of natural gas used to heat houses in Rotterdam is at 1,234 m³/year a third less than the Dutch average (1,800 m³/year).
3 LOCAL TRANSPORT

Good local transport links and options for urban dwellers are critical for a city to function in a sustainable way. The following examples from Vienna and Zaragoza offer some excellent ideas for cities.

Vienna

Some cities adopt comprehensive plans for their local transport, where environmental, social and economic objectives and targets are jointly pursued, where hard as well as soft measures to promote more sustainable forms of mobility are promoted, and where transport and land use planning is integrated. A good example of a Sustainable Urban Mobility Plan is presented by Vienna.

Vienna’s Traffic Master Plan 2003, has a broad scope under the heading of “Intelligent Mobility – Intelligently Mobile”, incorporating five dimensions: sustainability, efficiency, Innovation, cooperation, and acceptance.

This plan includes quantitative targets:

Sustainable traffic development

- Traffic reduction: stabilisation of car performance within the city boundaries
- Modal shift: a long-term reduction of the proportion of individual motorised traffic on 25% of all routes

Noteworthy aspects which are not seen in many cities include Sustainable social development:

- Growing, social and gender equal mobility possibilities for users of environmentally friendly transport
- Improvement of mobility for people with difficulties in getting around
- Design traffic and transport installations according to the “two senses principle” (hearing/seeing, hearing/touching, seeing/touching)
- Adjustment of traffic behaviour for male road users to the more city-compatible behaviour of women and
- Attain a considerable increase in traffic safety (reduction of fatalities and injuries by 50% by 2020 in comparison to 2002).
- Environmentally sustainable development
- Reduction of traffic related noise pollution: in comparison to 1996, 20% less people affected by noise pollution by 2020

Sustainable Urban Mobility’ Plans is a concept endorsed and promoted by the European Commission, for further information please visit www.mobilityplans.eu
**Zaragoza**

Cities all over Europe are now taking serious steps to promote cycling through a combination of measures to make it more convenient, attractive and safe to choose the bicycle. Zaragoza shows impressive progress to date from an initial low level. This progress was achieved via a number of initiatives:

- Increasing cycle tracks from 13,780 km in 2003 to 104,145 km in 2011 including the construction of independent cycle lanes. Separation of the cycle lanes is done using polythene pieces that make it easier to merge with the road and vice versa as well as a correct drainage of the street.

- Another measure that has contributed to increase bike trips in the city has been the launching of a public system of bikes for rent. This now acts as an alternative means of transport for the people of Zaragoza. The Bizi service was launched on 28 May 2008, presently, 130 stations have been built with 1,300 bikes.

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

Therefore, a range of measures for promoting and raising public awareness have been developed, in parallel to the implementation of infrastructure, to integrate and promote the bike as a means of transport in the city.

Currently 41.5% of citizens in Zaragoza use a bike. 9.8% use a bicycle nearly everyday, 9.5% at least one per week and 7.4% use bikes on weekends. 8.8% uses bikes sometime every month, and 6.0% less frequently.
4  GREEN URBAN AREAS INCORPORATING SUSTAINABLE LAND USE

Every city has to deal with limitations, these being historical, geographical, political, economical and/or socio-cultural. Trying to work with these limitations by using creative and innovative solutions is a great asset for a city. Some excellent examples are provided by Rotterdam and Vienna.

**Rotterdam**

To become an aesthetically-pleasing as a place to live, work, study and recreate, whilst resolving the water issues, is the biggest dilemma in Rotterdam. Traditional solutions are inadequate here, as the costs would be exorbitant and existing buildings would be at risk. Innovations such as green roofs, ‘water plazas’ and alternative forms of water storage are essential. This year, the first water plaza will be built, see artist impression below. It combines playground and water-based fun with water storage during heavy rainfall. A 10,000m³ overflow facility is built for peak rainfall next to the underground Museum Park parking facility. In addition to the 5,000m² vegetation wall at West Blaak parking facility, 50,000 m² of green roofs have been fitted throughout the city, with the ambition to increase this to 160,000 m² by 2014.

Enterprises and citizens are invited to join through awareness projects, showcases and incentives e.g. green roof subsidies of €30,-/m².

During the ‘Green Year’ of 2008, Rotterdam constructed eight vegetation roofs, the largest of which was on the Sophia Children’s hospital. The goal was to communicate by showing, not only the beauty, but emphasising the usefulness of green roofs for water storage, insulation, improving air quality and biodiversity. As part of the ongoing renovations, a roof park (Roofpark Vierhavenstrip) on top of a multifunctional building, which also functions as a dike protecting the city against floods, is due for completion in 2012.
Having a strategy with clear targets is crucial for sustainable land management, as is knowing where your city is at present and how effective past actions have been. The latter however, is not yet a common practice in all cities. Good practices in this regard are shown by Vienna.

**Vienna**

The city of Vienna has been monitoring green areas for 20 years, measuring the size, condition and development of green areas in the city of Vienna. Infrared aerial pictures are taken and interpreted. More than half of Vienna, 51 percent (or 214 km²) is covered in vegetation. The majority is forest, followed by residential gardens, green areas in residential complexes, sport and leisure areas as well as agriculturally used areas. About a fifth consists of green areas such as parks, green inner courts and increasingly roof gardens. In total, every Viennese has an average of 120 m² of green.

In the case of green area monitoring, the entire city area is divided into 60,000 partial areas. The complex data analysis provides important insights on the medium- and long-term development of the city and green area structure and the effectiveness of planning, maintenance and green encouragement measures and thus provides indispensable information on the historic developments, the current situation and as input into the development of a spatially explicit strategy for future developments.

In the future there will be numerous activities and measures for the greening of the city including:

- **Free climbing plants**

  Climbing plants offer the opportunity for green promotion even in the smallest area in the most densely built up areas. Especially there, where there is no room for roots or on very narrow roads where tree planting is not possible. They act as sun protectors, attract bees and butterflies or simply provide shade. Areas decorated with climbing plants also offer nesting spots for birds. Green facades are easy to do if the correct plant type is chosen and a few rules are observed. It is cheap and grows quickly. Besides free advice from the city of Vienna, climbing plants are distributed for free, so that many residents can be informed of the advantages of having as many green walls as possible.

- **Neighbourhood garden initiative**
After the successful pilot project in Ottakring, Vienna, further neighbourhood gardens are now to be developed. Neighbourhood gardens are large areas where several neighbours plant a joint garden which also contributes to a better neighbourhood. The city of Vienna encourages such projects.

- **Out onto the balcony- greener balconies**

  Green balconies are good for the environment too. They improve the micro climate, filter pollutants and therefore improve air quality. 5 different design solutions are offered, based on typical balcony types. Based on these five “balcony templates” tips for all the other Viennese, tips for Viennese residents are developed and communicated.

- **New trees for Vienna**

  100,000 avenue trees contribute to the positive situation of green areas in Vienna. This impressive proportion is continually being improved. A large proportion of these trees are good for the people and environment: trees aren’t only a beautiful sight, but filter pollutants out of the air, improve the micro climate, take up CO₂, protect from the summer heat and are welcome providers of shadow.

- **Roof, inner court and vertical greening**

  Green facades, roofs and inner courts are an active contribution to quality of life in the city. Last year, the funding sum was nearly doubled: instead of only 100,000 Euros, there are now 200,000 Euros available. The city of Vienna supports the creation of green walls with a maximum of 2,200 Euros per object. According to the size of the project, the funding reaches from 10 to 100%.
5 NATURE AND BIODIVERSITY

A very important action for the development of nature and biodiversity in cities is organising green areas into a green network. The continuity of green areas connects urban areas with the centre, it fights fragmentation and helps nature and biodiversity to enter the city while it also has a direct social function.

Bristol

Bristol has designated a Wildlife Network including Sites of Nature Conservation Interest (SNCI) and Wildlife Corridors. SNCI’s are the city’s locally valuable sites for nature conservation; they make a vital contribution to delivering Biodiversity and Geodiversity Action Plan targets and maintain local natural character and distinctiveness.

To produce the update to the Local Plan, the Bristol Development Framework, an Urban Wildlife Corridor Assessment Methodology was developed to provide a sound scientific basis on which to designate wildlife corridors in Bristol and protect them from the impacts of development.

Wildlife corridors help to protect SNCIs from harm and provide an essential physical link between sites and the wider countryside. The Wildlife Network contributes substantially to the city’s overall green infrastructure and other ecosystem services such as flood storage, carbon absorption and reducing the urban heat island effect.

Bristol is at the forefront of thinking and action in defining its Wildlife Network and defending its function through integration with land use policies.
Copenhagen

Awareness programmes on biodiversity issues are very important and useful, especially for young people and schoolchildren. The following are examples from Copenhagen, of such programmes and initiatives ongoing to promote nature and biodiversity in the city.

- Copenhagen has a number of manned playgrounds where education awareness staff are present during the day time. Five of these playgrounds are participating in the Nature Detectives project and offering nature guidance and teaching materials to children and their parents, as well as to institutions. At the playgrounds children can learn about nature and explore their surroundings. The playgrounds are, for example, located in disadvantaged neighbourhoods where many citizens have a limited knowledge about nature and rarely move in places other than their own neighbourhood.

- In order to disseminate knowledge about nature and biodiversity to the general public, in 2002, the City of Copenhagen built a Nature Workshop called Streyf. The Nature Workshop is located in one of the large nature areas of Copenhagen, Utterslev Mose. The Workshop forms the basis for up to 10,000 visiting children and adults each year. The users of the Workshop are individuals and institutions, and large public events with nature guides are regularly taking place.

- Preservation of old trees and dead wood is another focus area in the operation of the green areas in the City of Copenhagen. Old trees are often habitats for many species, and at the same time, safety issues for people using the parks must be managed, as falling branches are potentially fatal. By felling old trees and through new plantings, Copenhagen has put in considerable effort to inform its citizens; in this connection, preservation and rejuvenation plans for trees have been drawn up.

- In connection with the desire to create biodiversity and natural flowering meadows, in 2010, a major nature management event was held where voluntary citizens learned how to scythe grass areas in order to help increase biodiversity. The aim was to create awareness about and interest in green and blue areas in the city, as well as to find new ways of using the parks.

- Several of the natural habitats of Copenhagen are managed by means of grazing cows, horses and sheep. For example, Utterslev Græsningslaug was created in 2002 to realise an initiative in the development plan for Utterslev Mose. Utterslev Græsningslaug owns a flock of sheep which spends almost the entire summer half-year in an area of Utterslev Mose. The sheep tend the area in a more nature-friendly way than common lawn mowers. Members of Utterslev Græsningslaug are mainly families with children.
6 QUALITY OF LOCAL AMBIENT AIR

Clean air is a key priority for all cities across Europe. However, achieving clean air is a difficult task for cities due to the high levels interaction with every other aspect of urban living. Bristol and Frankfurt offer examples of how to improve the quality of local ambient air.

Bristol

Bristol’s Air Quality Management Plan is now part of the Joint Local Transport Plan, and covers the whole of Bristol City. Bristol has delivered a substantial programme of regulation, investment, highway management and promotional work to reduce pollution from transport in the city. To date Bristol has:

A. Improved traffic management and reducing emissions in the Air Quality Management Areas (AQMA):

- Upgraded the traffic control system to improve traffic flow at critical intersections and improve the reliability of public transport.
- Reduced congestion at key points in the centre by restricting ‘waiting’ and by ‘green wave’ controlled traffic lights.
- Reduced speed limits on 5 kilometres of motorway access into the centre.
- Promoted good environmental driving and servicing with subsidised training and promotional material for fleet drivers.
- Promoted and piloting alternative fuelled vehicles, with the BCC fleet having over 100 LPG and hybrid vehicles.
- Developed electric vehicle infrastructure with 40 charging points installed by 2011.

B. Reduced congestion:

- Improved a network of cross city bus routes with improved passenger facilities, priority at traffic lights, bus lanes and real-time bus information.
- Improved cycling facilities and encouraging cycling through a £22m Cycling City project.
- Introduced Residents’ Parking Zones to ease congestion by preventing commuter parking except in controlled places.

C. Improved accessibility:

- Focused public transport and cycling improvements on key employment areas, education facilities and services such as hospitals.

D. Improved quality of life and encouraged sustainable communities:

- Created two pilot 20mph zones to engender cultural shift to lower speeds and create more liveable streets that encourage walking and cycling.
- Developed the Frome Greenway walking and cycling route to access the city’s new city centre retail centre.
- Promoted ‘car sharing’ schemes enabling community car hire when a car is required.

Public information and engagement
Bristol is committed to public engagement on environmental issues and disseminates information on air quality through the following channels:

- Real – time “live” data driven web site (www.bristol.airqualitydata.com)
- Bristol web site
- National data.gov.uk web site
- European Air Quality Now (CITEAIR) web site
- Specific initiatives, e.g. consultation on AQ action plan\AQMA changes, including questionnaires, focus groups and a web presence.

Bristol regularly engages with citizens when changes are proposed to air quality action plans or when the Air Quality Management Area boundary is changed via a new consultation web site called Citizen Space.

Frankfurt

In 2005 Frankfurt introduced a Clean Air Plan, its objective is compliance with EU limit values. Top priority was given to medium and long-term measures. Those concerning traffic have been continuously updated and have been helping to control air pollution for just under three decades.

A number of initiatives are proposed for the future in order to comply with EU limit values; these include but are not limited to:

**Individual motorised transport**

The third stage of the low emission zone began in 2012. Only green-badged vehicles will then be allowed to enter the low emission zone. Frankfurt expects the third stage and the improved emission standards to lead to an 8.5% reduction in PM10 emissions and a 3.5% reduction in NO₂ emissions compared with 2010.

**Paving stones for the photocatalytic degradation of NO₂**

In a pilot project, special paving stones containing titanium dioxide are being laid on some 5,000 m² in the Kurt-Schumacher-Strasse. TiO₂ accelerates the natural process of photocatalysis, i.e. the decomposition of nitrogen oxides by light irradiation. The chemical reaction produces a water-soluble nitrate, which is discharged into the sewers with rainwater.

**Municipal vehicle fleet**

The municipal authority has decided that, in the future, account will be taken of CO₂ emissions, noise development and exhaust emissions when new cars are procured for the city council. Preference will be given to vehicles that already meet the Euro 6 level, if available.

**Electromobility**

As part of the “Frankfurt e-mobility 2025” strategy, a large number of individual projects will be promoting the use of electric cars and the requisite charging infrastructure, other electrically powered vehicles and the interlinking of different transport means (“travel chains”) until 2025.
# 7 NOISE POLLUTION

Coherent policy with integrated initiatives including citizens concerns and ideas leading to an increase in their overall wellbeing is considered as a priority for Noise management in cities.

**Brussels**

Brussels is endeavouring within a global approach to control noise in an urban situation:

- Since 1997, several measures have been implemented in order to better identify and control the noise problem.

- A current control system of 17 measurement stations located throughout the city.

- In 2009, the adoption of the Second Plan to Prevent and Combat Noise in the Urban Environment

- In 2010, a Noise Atlas was made available. This contains data and an analysis of strategic maps of the progressive rehabilitation and the different “black spots” via:
  - Collaboration between the regional administrations for the Environment and for Mobility, to include the acoustic rehabilitation projects in the Multiannual Plan for Public Works.
  - The systematic consideration of noise when issuing urban and environmental permits for large projects
  - Collaborative protocols with public transport companies
  - A subsidy for soundproofing homes, which has been offered since 2002.

In order to combat equipment noise, a guide of good practice and the best available technologies has been made available for all operators of an HVAC installation (Heating, Ventilation and Air-Conditioning). Information sessions have also been offered to local authorities and professionals.

A decree now regulates neighbourhood noise. The Region has also published a brochure entitled “the Rights and Duties of the Citizen”.

One-off awareness campaigns are regularly organised. Recently a brochure entitled “10 points - How to make less noise” has been published.

Since 2007, an awareness programme for young people, accompanied by a theatrical presentation, has been offered to primary schools. In 2009, two days of studying the problem of “Young people and noise” were organised for health workers, teachers, technicians and public authorities.
Bristol

Bristol’s approach to noise is based on the following key themes:

1. All citizens are entitled to a healthy life not constrained by external sources of noise.
2. Land use planning powers are used to remove and control noise sources and to avoid creating new noise problems.
3. Pollution control and licensing powers are used to protect residents from noise nuisance caused by neighbours and other sources.
4. Transport planning and transport management powers will be used to manage traffic noise.
5. Parks and green spaces will be managed and improved to protect quiet areas.

BCC has developed an evidence base on noise issues in the city to inform its approach. This includes:

- Collecting data on resident’s complaints about noise and its source
- Annually surveying the population to ask about noise problems
- Mapping road noise

Residents’ Perception of Noise

Resident’s perception of noise is a significant factor in their quality of life. Bristol undertakes a statistically robust annual survey of the population asking about noise, as part of its Quality of Life Survey. This allows data to be produced for the city as a whole and at neighbourhood (ward) level.

This map generated from the responses to the survey reveals the responses to the road noise perception question at a smaller geography. Perception of high road noise levels correlates well with proximity to major roads. In 2005 some 49% of the population were concerned about noise. Since then the level dropped to 39% in 2009, but rose again in 2010 to 46%.

Bristol is bringing all their initiatives and actions together to form a single Noise Strategy, ensuring integrated action. This will have regard to the existing noisescapes (i.e. those sounds that are inherent to a city) and also include all environmental noise sources that affect the citizens of Bristol, including neighbour and neighbourhood noise, entertainment noise, commercial and industrial noise, and transport noise.
8 WASTE PRODUCTION AND MANAGEMENT

For this indicator 2 examples of Good Practice are presented in order to represent various elements of good waste management practices such as prevention, collection, treatment etc.

Brussels

The Fourth Regional Plan for Waste Prevention and Management in Brussels reinforces the idea of dematerialisation, which was introduced in the third plan. This plan aims to achieve measurable prevention objectives for many waste streams by 2020. These reductions focus on specific waste streams (food, paper, packaging etc) and specific target groups (households, workers, students etc) as follows:

- Reduction of 37kg/inhabitant/year of household waste (objectives per stream: food, paper, packaging etc)
- Reduction of 37kg/worker/year of office waste (objectives by stream: food, paper, packaging etc)
- Reduction of 6.5kg/student/year of school waste (objectives by stream: food, paper, packaging etc)
- Recycling of 50% of municipal waste
- Reduction by 10% of the production of non household waste
- Recycling of 50% of industrial waste
- Recycling of 90% of construction and demolition waste

The plan anticipates the development of several measures for implementation by 2013. These measures include:

- Development of the “employment-environment alliance” for waste. This project aims to develop the Brussels economic sectors in the environmental field and in particular waste management.
- Development of an “Ecopôle” in Brussels. This more than 5 million Euro project is developed thanks to support from the FEDER 2007 - 2013 programme. The project is targeting the creation of a social economy centre in the area of waste recovery as well as the creation of an expertise centre in re-use and recycling techniques, while enabling the employment and social inclusion of people with low qualifications. The objective is to reach 4 000 tonnes of recycling per year in the bulk waste and IT hardware streams.
Brussels is also participating in the ‘\textbf{-100kg/resident/year}’ campaign, which is coordinated by the Association of Cities and Regions for Recycling and Sustainable Resource Management (ACR+) whose objectives are transposed in the Fourth Regional Plan for Waste Prevention and Management. These efforts are becoming more necessary due to the significant population growth which is expected over the coming decade in Brussels.

\textbf{Rotterdam}

Around 6,000 \textbf{underground and semi-underground containers for waste collection} replaced overground concrete storage containers and plastic waste bags, upgrading the city’s appearance. The concrete container storages have been recycled since 2004, gaining a second life as concrete shell for underground containers. One year later, the initiative CycleCity introduced a public private collaboration using unemployed workers to turn waste into useful products. The memorandum Waste Management 1996 - 2005 initiated this change in waste trapping. It consists of four goals:

1. Sort at the source
2. Keep it cheap
3. Improve the service
4. Improve public space

A lot of time and effort was devoted to locating the containers. For instance, plans were drawn up per district in cooperation with the inhabitants, trying to involve people and encourage them to take up their responsibilities. Waste agendas were circulated door to door and polls were conducted. The outcome was that although it is a matter of taste, 83\% of the inhabitants of Rotterdam prefer the underground containers to the overground concrete container storages. Service is perceived as better with 77\% of inhabitants feeling the city has become cleaner. Due to additional collections, any overflow of the collection points for glass, paper and textile is prevented. In 2010 the costs were €259 per household.

Rotterdam are currently engaged in a pilot with \textbf{electric garbage trucks} called Binkie, and the first hybrid-electric waste collection trucks from Volvo. ‘Binkie’ charges with the power generated in the waste incineration plant from its own collected waste, closing the cycle and contributing to cleaner air.
Access to clean and safe drinking water is essential for urban citizens. With water growing ever more precious cities must be pro-active in their use of this resource. Examples of good practice in water management from Frankfurt and Ghent are documented below.

Frankfurt

The “Sensible water use in Frankfurt am Main” project was developed in 1990 and implemented in 1992. The aim was to remove the link between water consumption and population and economic growth. The water-saving campaign that became known as the “Frankfurt Way” relied on citizens understanding the need to use water sensibly. Neither bureaucratic force nor ascetic self-denial was required.

The “Minus 20%” marketing campaign used posters, brochures and radio advertising. The “Water Saver of the Year” prize was awarded from 1993 onwards. A special kiosk in an underground station sold water-saving devices for do-it-yourself installation.

The measures were designed to encourage a sensible approach to water and to publicise the opportunities for upgrading water-saving devices in the home. The public utility (today Mainova AG) worked together with plumbing companies to replace toilet cisterns and to equip whole residential areas with water-saving taps.

The aim of the campaign – to reduce water consumption by 20% by 2000 – was achieved in 1998. Much of the success was attributable to the housing construction sector and to industry via initiatives such as:

- 100% of the water consumed by business and private customers is metered and the quality is checked.

- The water lost from leaking pipes is roughly 3.3% of the amount distributed. There has been a steady decrease in leakages in the water network over a number of years (2003: 690; 2009: 479).

- One aim of the EU Water Framework Directive is to ensure the sustainable use of water resources and stable groundwater levels. In 1999 the first groundwater management plan in Germany based on the Federal Water Act was drawn up for the Hessian reed marsh. In order to stabilise groundwater levels in Frankfurt’s municipal forest, treated water from the River Main was drained into the ground.

- Further measures include the detection and treatment of soil contamination, the designation of drinking water protection areas and their monitoring, in particular along traffic routes. In those places, treated water from the Main is drained into the ground in such a way as to avoid contamination of the drinking water pumps.
Ghent

In response to a growing demand and trend to reduce water usage, Flanders Inter-municipal Company for Water Supply (TMVW) on behalf of Ghent, is offering its specific expertise as regards water management to support municipalities, public institutions, industry and other third parties in their challenges with their (future) water household and management.

To cater for future trends in the availability of ‘raw’ water supplies, TMVW is reorienting its supplier’s configuration and intake patterns. Under a comprehensive agreement with two other major water companies, a mutually supporting network and production clustering will be established in order to ensure a guaranteed supply and back up capacity for the entire western part of Flanders.

The climate adaptation action plan 2011-2013 includes actions which prepare the water infrastructure for the future effects of climate changes (flooding, water shortage). The most important actions in the water infrastructure are:

- **Municipal Building Regulations**: climate adaptation measures will be integrated in the building regulations. In the first phase, the water hierarchy, which incites us to use rain-water as much as possible and to keep in situ will become part of the regulations. In a second phase, heat-controlling measures will be integrated.

- **Application of the water hierarchy in the public area (squares, green zones and roads)**: Creative design suggestions will be offered to designers as a result of which infiltration and buffering facilities will be integrated in the public area in such way that other functions will be safeguarded to a maximum extent.

- **Collective rain-water facilities for allotments, industrial parks and new developments**: creative design suggestions to integrate collective facilities for infiltration and buffering into public areas and/or private areas are being examined. Particular attention is paid to the aspects of maintenance, judicial statute of collective facilities and the follow-up of the capacity of the collective facilities in terms of development and the grant of permissions.

- **The application of alternative water sources - Grey water systems**: In the framework of water shortage and the competition in use of roofs for the collection of rain-water, the construction of green roofs as heat-protecting system and the installation of energy-creating systems, it seems to be necessary to search for alternative water sources. Grey water (e.g. water coming from showers, washbasins etc) is such an alternative water source. The practicability of the purification and local use of grey water will be examined by means of a number of cases.
10 WASTE WATER TREATMENT

The treatment of waste water is a vital step in the continuous water cycle but also in terms of protecting the natural environment. With great advances in waste water treatment and corresponding increase in the quality of water discharged into the received environment all stakeholders are benefiting. Examples of good practice from Copenhagen and Antwerp are presented below.

**Copenhagen**

Increasing urban development in Copenhagen with accompanying expansion of the sewer system, as well as increased rainfalls intensity have meant increased pressure on central treatment plants. To minimise this pressure draining off of stormwater in new urban development areas and in major renovation work is to be carried out according to the SUDS principles (Sustainable Urban Drainage Systems). The new Ørestad district which was founded in 1996 and today is an area of 150 hectares, was established with a three-stringed system. In the three-stringed system, household wastewater is discharged to a central treatment plant, roof water is discharged to recreational canals whereas road water is treated locally before being discharged to the recreational canals.

The City of Copenhagen has adopted the Copenhagen Climate Adaptation Plan which describes the risk of harm to the city on account of a changed climate and provides solutions to address climate change. Several of the solutions provided are about management of storm and wastewater. These are the two main principles of climate change adaptation of the city:

- Climate proofing of sewers by bypassing stormwater which is subsequently managed locally either through seepage to the groundwater or by discharge to the recipient. The current estimate based on hydraulic models and the forecasts for the climate of the future shows that in the long term 30% of stormwater must be detached from the sewer and managed locally in order to maintain the current service level of the sewer.

- Systems for management of rainfall during cloudbursts must be established for the purpose of protecting the city against big losses due to flooding. These include a wide range of methods for diversion of the water during cloudbursts to areas where the rain will not do harm. These are squares, sports facilities, parks, etc. for temporary storage of stormwater. Another method is to establish fairways or gutters which can discharge water to the ports.

In connection with the most recently concluded budget agreement it was decided to launch a “cloudburst plan”. The aim of the plan is to reduce damage to the city because of heavy rainfall. Initially the plan includes projects where solutions are self-evident, as well as establishment of solutions in areas where the damage is particularly serious. The plan also includes establishment of a comprehensive emergency management service which is to manage serious and sensitive areas until permanent solutions can be set up. There will be initiatives over a number of years until the city can be considered “climate proofed”.

At the same time, it was decided to allocate funds for the commencement of a water partnership with the City of Copenhagen, City & Port Development, Copenhagen Energy and a number of knowledge institutions as well as private enterprises with the purpose of developing and testing intelligent, innovative and future-proofed water solutions in the large urban development area, Nordhavn. .
Antwerp

Antwerp is preventing flooding due to heavy rain by measures such as constructing buffer basins and clearing watercourses. Investments have been made in extra pumping capacity. If necessary, waste water is discharged into natural watercourses. After monitoring the water flow rate, infrastructural measures have been taken to reduce flooding frequency and duration. New buildings must install a flow-back prevention system to prevent floodwater flowing out of the sewage system. Other measures include:

- The Port Authorities are implementing the Strategic Plan for Water Balance. It includes plans for two pumping stations for installation in and discharge to the docks.

- The city of Antwerp and Flanders have had the Schelde Wharfs Masterplan drawn up. The Masterplan links water breaking solutions with the functions and equipment in every section of the wharfs. The raising of the water breakers is a spatial intervention implemented within the developmental vision of Antwerp as 'City by the River' and historic harbour city.

- Controlled flooding areas have been installed to buffer the water even in case of heavy rainfall.

- For new urban development projects such as the Cadix district on the island Eilandje and Nieuw Zuid, the construction of a wadi or water square for local buffering of water is included in the design where possible.

Antwerp have implemented a Green Building Code, various binding decrees have been included in this code regarding efficient water usage:

- Green roofs: For all new construction, extension or important renovation works, it is obligatory to minimally equip new roofs as extendable green roof, if these roofs have a slope of less than 15°.

- Rain wells: Installing a green roof is not obligatory if the roof is equipped with a water well, of which the capacity corresponds to the size of the roof surface. It is obligatory to reuse water collected in the rain well by using a pumping system connected to at least one toilet or washing machine. The pumping system is not obligatory if the various discharge points can be fed by gravity. The pipeline network for the reuse of rain water, connected to the rain well, can not be directly connected to the drinking water network.

- Segregated system: Every building must be equipped with: 1) pipelines for dry weather discharge, in a red-brownish material, 2) segregated pipelines for water discharge, in a grey-coloured material. Drainage galleries are not allowed be connected to the waste water discharge, but can be connected to the overflow wells for rain water.
11 ECO-INNOVATION AND SUSTAINABLE EMPLOYMENT

In order for cities to create a future for its citizens sustainable employment is key, this is often realised through eco-innovation. Many cities are fostering an ethos of eco-innovation via clean tech initiatives. Examples from Vienna and Rotterdam are presented.

Vienna

An EcoBusinessPlan sponsored by the city of Vienna supports Viennese companies in implementing environmental / sustainability - relevant measures in the company and contributes to decreasing administrative costs. When the EcoBusinessPlan Vienna was founded in 1998, the goal was to reduce negative environmental impact from commercial and industrial activities in Vienna. In 2005 the plan was expanded to include a third aspect - sustainable development.

The EcoBusinessPlan Vienna has achieved a number of successes in more than ten years of existence: 817 participating companies, with more than 11,000 environmental projects from waste prevention to energy saving measures to rearranging complete production processes.

The following savings have been achieved to date:

- Savings in administrative costs: 68.2 Million Euro
- Savings in drinking water: 2,983,400 m³
- Savings in waste: 118,947.8 Tonnes
- Savings in dangerous waste: 11,630.6 Tonnes
- Savings in energy: 745 GWh
- Savings in transport kilometers: 105.2 Mio. km
- Savings in CO2: 90,415.9 Tonnes
- Savings in raw materials: 22,457.3 Tonnes

The source data for this balance (savings through implemented environmental measures in individual companies) is collected by companies and consultants annually, input into a databank, checked and accumulated by an external evaluation team currently consisting of the KMU Forschung Austria and the Wuppertal Institute. Additionally, an annual survey of participating companies shows that 98% of companies see the programme as a total success.

The EcoBusinessPlan Vienna networks with similar initiatives around the world and is engaged with knowledge transfer to municipal and regional administrations domestically and abroad.

Rotterdam

The revitalisation of the Stadshavens area of Rotterdam is based on wellbeing and actively experimenting and learning in an industrial area, multifunctional use of space, creating a dense and compact, healthy, green, clean and strong district, where people like to live and work: Clean Tech Delta (CTD).

A multitude of parties cooperate to transform the area into an energy efficient, climate proof, attractive centre with renewable non-fossil energy generation, sustainable use of materials and waste and new mobility concepts. The parties involved are: Arcadis, Eneco, Erasmus University, Rotterdam University, Hoogheemraadschap Delfland, City of Delft, City of Rotterdam, Delft University of Technology, TNO, Van Gansewinkel group, Vestia and the citizens that inhabit the area. Apart from the time large-scale infrastructural changes require, the multi-party concept slows down progress too.
The idea behind it is: take it slow to make swift progress. Once an agreement is reached, operations move at rapid pace.

**Floating buildings**

The CTD area offers opportunities to research and develop innovative solutions to climate change, to experiment with floating buildings and showcase these. The ‘brains’ involved focus on climate projects such as the national research programme ‘Knowledge for Climate’, the national Delta programme, the Netherlands Water Centre (NWC) and programmes such as Rotterdam Climate Proof and the Dutch Climate-KIC Centre, an initiative of the European Institute of Innovation and Technology (EIT).

NWC, Dutch expertise centre for water and delta technology, will be located in the Floating Pavilion, the first offshore climate proof building. It will not be alone for long as Rotterdam has planned a community of innovative floating buildings (including residential housing).
12 ENVIRONMENTAL MANAGEMENT OF THE MUNICIPALITY

The environmental management of a city is a very complex and often overlapping task. This all-encompassing area includes Green Public Procurement (GPP), Energy efficiency and management in public buildings and the use of organic and fair trade products. Tampere and Antwerp are presented as examples of good practice in this indicator area.

Tampere

Tampere is increasingly using the service procurement tender processes; one of the main objectives is social criteria for people with disabilities, long-term unemployed and young people focused on employment. In addition, competitive tendering awards extra points for the quality of eco-labelled, organic and fair trade products, such as the use of sustainable development criteria.

In 2012 the project to promote and review the extended services, the acquisition of environmental impacts and sustainable development criteria for inclusion into the procurement process commenced.

Tampere was elected as Finland's first Fair-trade city in 2008. The City is committed to developing the procurement ethically and promotes fair trade within their dissemination of information and events. Fair City supports for the trade group, with representatives from the churches, business, civil society, and will monitor the commitment. Tampere University has received the first Finnish high school award as Fair Trade University.

The City Strategy of Tampere's target is to provide residents with opportunities for an environmentally friendly lifestyle. Fair trade is seen as one of the concrete measures to promote sustainable development. Tampere as a key environmental target has been recording organic and Fair-trade products as the increased use.

To date 155 Tampere kitchens have joined the “Stairs Create” and other programs, and are committed to contribute to the use of organic raw materials on a regular basis. Stairs Create and other voluntary programs, aim to help increase the number of professional kitchens which use organic products as part of the sustainable development of their activity. Tampere Meal provides a daily meal to approximately 35,000 residents of Tampere in kindergartens, schools, hospitals, nursing homes, elderly service centres and offices. In 2012, the meal was used to find out opportunities to increase the use of local food catering.

Antwerp

Antwerp has all the means to increase the sustainability of its city. The buildings are the best example of their ambitions. The objective is to decrease the city services' CO₂ emissions by 50% by 2020. The 227 largest city buildings already have an energy account. Gradually these are being replaced with telemetric systems, which will continually monitor consumption and assesses measures taken according to its energy efficiency and search for and adjust any anomalies. An ambitious investment program costing 50 million euro has been created for energy saving measures from 2010 to 2013.

The Den Bell project was a purposefully sustainable choice to gather more than 2800 employees in one central building. The benefits with regard to space usage and energy consumption are clear, but this also meant a decrease in transportation. The garage in Den Bell is solely for company cars and visitors. It features 20 charging points for electric vehicles. Den Bell applies the principle of paperless office. They also employ night-time ventilation. At night the larger part of the building is cooled down by using outside air for ventilation. During the day time this provides a pleasant indoor climate without using classic cooling techniques.
The **Museum aan de stroom** (MAS -Museum by the stream) has centralised many of its museums into one new and sustainable building. The transported collections are now saved and displayed in optimal conditions. The following sustainable techniques have been applied to the MAS:

- Cooling water from the nearby docks is used for cooling and dehumidification.
- The complete lighting of the museum is done by LED spots.
- The emergency generator is fed by biodiesel.
- A system for rain water collection has been incorporated.

In 2010 Ecofest were tasked with creating a sustainable plan for event, this event plan will be used in all other coming events. For the New Year’s drink and other city events over 20,000 reusable cups were supplied to these events. This enables the city to limit the amount of waste generated at the event and also to make the guests aware of their impact on the environment and how they can reduce it. Besides these reusable cups another 10,000 free reusable cups are available since 2000 for smaller parties and events.
Energy use in cities has a direct link to other impacts including climate change and air quality. As such it is critical that cities use energy at its most efficient and also move towards an energy mix that includes more renewable and sustainable energy sources. Examples of good practice in this area are found in Copenhagen and Vienna.

**Copenhagen**

In addition to the Copenhagen Climate Plan, which will make Copenhagen reach a 20 percent carbon reduction by 2015, the City has developed a wide-ranging action plan “The 2025 Copenhagen Climate Action Plan”, which will lead the City to carbon neutrality by 2025. This plan is expected to be adopted during 2012.

One of the central themes in the 2025 Copenhagen Climate Action Plan, is green energy production. Therefore, the preliminary 2025 Climate Action Plan encompassed an ambition to erect more than hundred wind turbines (onshore and offshore) with a total capacity of approximately 360 MW.

Also included in the plan is increased separation of plastic waste, full replacement of coal with biomass in the city’s combined heat and power plants (CHPs), establishment of one or two geothermal plants, installing 30,000 m² photovoltaic cells on municipal buildings, and making it easier for citizens to instal photovoltaic cells.

An important part of the City’s green growth strategy is to engage businesses and citizens in innovative partnerships. An example of this approach is the North Harbour Energy Partnership. The North Harbour Energy Partnership is between the City of Copenhagen, City & Port Development, DONG Energy, Copenhagen Energy and the Ministry of Climate and Energy.

The partnership comprises nine specific projects which will all help ensure that the North Harbour becomes an urban area with innovative green energy solutions. These will be solutions which enhance and develop the initiatives which have to be taken at all events in connection with urban development in the North Harbour, in close interplay with a wide range of enterprises. The partnership focuses on innovative solutions which also have:

- A significant CO₂ impact
- Significant growth potential
- High cost effectiveness
- Considerable market maturity in both the short and long terms
- High branding value
- The specific projects in the North Harbour Energy Partnership are:
  - Smart Energy
  - Intelligent housing
  - Street lighting
  - Onshore power supply
  - Electric cars
  - Low-temperature district heating
  - District cooling
  - Heat storage
For the production of energy in Vienna, modern innovations, such as the consistent use of heat-power combination and the expansion of the district heating and cooling networks, lead the way.

The goal is not to allow decentralised incineration processes, as in small units where technical emission reduction measures such as filters are not economically viable. Reduction measures to keep the air clean only become economically viable for larger central units.

Using a combination with a large district heating network, Vienna manages to attain a comparatively low conversion loss of 8.6% for electricity and heating production. A further focus is waste heat utilisation in district heating. This is based practically exclusively on the waste heat from thermal waste treatment plants and modern and efficient heat and power combination methods.

Densely built-up areas force the city to mainly use grid-bound energy carriers. This allows the subterranean supply without using the surface. An adequate infrastructure of grid-bound energy carriers is one of the city of Vienna’s focal points. The most important energy carrier is natural gas with a 48% proportion of the total energy supply. The high use of natural gas together with the consistent use in a combined heat and power plant leads to very low emissions and therefore provides a considerable contribution to Vienna’s climate protection.

Further successes include: practically no coal use, and practically no use of petrol. With the use of renewable energy carriers, a differentiation between emission free plants and plants with incineration processes is necessary. The emission free plants such as solar thermal and photovoltaic allow decentralisation, i.e. several decentralised locations. Vienna has been providing incentives for the expansion of solar-thermal installation for water heating and photovoltaic plants for electricity production for quite some time.

Plants for renewable energies with incineration processes take place in large facilities such as the biomass power plant Vienna. Since 2006, with a plant efficiency of 80%, around 48,000 households are supplied with electricity and 12,000 with heating. Wien Energie has also been operating its own water power plants for decades. The water power plant Nußdorf, which began operation in 10,000, supplies Eco electricity for more than 10,000 households. Wien Energie also participates in 2 large Danube power plants. Additionally, the supplied performance of all of Wien Energie’s wind power plants in Austria is around 42.5 Megawatt.

At the moment there are 52 solar thermal facilities with a total surface area of 16,0000 m² have been installed on the municipal authority’s buildings. On Viennese swimming pools alone, there is around 15,000 m². Additionally, 19 photovoltaic facilities with a total production of around 200 kWp are installed on municipal objects.
Indicator No. 1 - Local contribution to global climate change.

Mr. Chris Bremmer, Business Line Manager ‘Sustainable Cities’, TNO (Netherlands Organisation for Applied Scientific Research), Utrecht, The Netherlands. chris.bremmer@tno.nl

Chris Bremmer is Manager of the Business Line “Sustainable Cities” at TNO, the Netherlands Organisation for Applied Scientific Research. He holds an MSc in Geosciences with 21 years experience of environmental and geoscience studies for industry and National and European governments. He is currently responsible for TNO’s programme ‘Sustainable Cities’ which includes national and international strategic studies and innovation projects related to emissions and air quality monitoring, water technology, Life-cycle assessments and climate adaptation and mitigation, focusing on the Built Environment.

Indicator No. 2 - Local transport.

Expert: Dr. Henrik Gudmundsson, Senior Researcher, Department of Transport, Technical University of Denmark.

Henrik Gudmundsson has been a Senior Researcher in Sustainable Transport at the Technical University of Denmark since 2006. He is educated as Environmental planner and has a PhD in Business Economics from Copenhagen Business School. His main area of research is sustainable transport policy analysis, including the use of knowledge and indicators in the design, implementation and monitoring of transport policies and plans. Henrik is the National Principle Contact Point (PCP) on transport indicators in Denmark for the European Environment Agency (EEA), and a member of the scientific advisory board for the Swedish government’s Transport Analysis agency. Henrik is currently involved in five major research projects, two of which are funded by the 7th Framework Program of the European Union. He is a member the Committees on 'Performance Measurement' and 'Transportation and Sustainability' of the US Transportation Research Board.

Before assuming his current position Henrik has been involved in State of the Environment Reporting for Denmark at the National Environmental Research Institute (1993- 2006) and prior to that he was a Head of Section in the Danish Environmental Protection Agency (1988-2003).

Indicator No. 3 - Green Urban areas Incorporating Sustainable land use.


Hedwig van Delden holds a Master of Science degree in Civil Engineering with a specialisation in Water Resource Management and Environmental Sciences from the University of Twente, the Netherlands. Since 2005 she holds the position of Director of the Research Institute for Knowledge Systems (RIKS), Maastricht, the Netherlands. Hedwig works in model integration, land use modelling and scenario studies, especially on the integration of and interaction between socio-
economic and biophysical processes on which she frequently publishes. Her research on the integration of spatially explicit models frequently leads to teaching and speaking assignments in universities and scientific and policy-oriented congresses and events worldwide. Besides her research, in her role as Managing and Scientific Director of the RIKS, she manages and provides scientific leadership to national and international projects of various sizes that focus on the design, development and use of integrated models for policy support.

**Indicator No. 4 - Nature and biodiversity.**


Stamatis Chondrogiannis is an architect and town planner. He has designed many “green” projects such as schools, museums, theaters as well as private housing and alternative tourism resorts. In his town planning projects he investigated the relation between built space and nature and the adaptation of big public works, such as roads, harbors and waste treatment installations to their natural environment. He prepared co-planning programs for the management of environmentally sensitive areas, e.g. the biotopes of the sea turtle and the monk seal in Western Greece.

He is involved with projects on monuments of cultural and architectural inheritance in Greece and other Countries, also concerning their connection with their natural environment, working closely with local and central government authorities as well as with universities, institutes and other organizations. He carried out programs for Greenpeace and WWF. He is a member of the Commission on Ecosystem Management of IUCN (The International Union for the Conservation of Nature)

**Indicator No. 5 - Quality of local ambient air.**

Expert: Dr. Steen Solvang Jensen, Senior Scientist, Department of Environmental Science, Aarhus University, Denmark.

Steen Solvang Jensen is Senior Scientist, PhD at the Department of Atmospheric Environment at the National Environmental Research Institute under Aarhus University in Denmark. He is a civil engineer with a specialization in planning with 22 years of experience within traffic planning and urban air quality assessment and management. He has worked as project manager within research, consultancy and administration, and has acted as an advisor for the Danish Environmental Protection Agency and international development agencies. His main experience is within research and development of integrated modelling systems for air pollution and human exposures for application in decision-support systems in urban air quality management and in air pollution epidemiological studies. These studies include mapping, impact assessment, scenario analysis, and policy options within emission, air quality, human exposures, health and external costs of air pollution as well as environmental impacts of renewable energy systems and technologies (hydrogen, biofuels, biomass).
He has published 27 peer reviewed journal articles; 2 contributions to books; 72 presentations at international conferences and seminars, 46 proceedings and other scientific papers; 51 consultancy reports, 34 popular articles & reports; and 29 popular presentations.

Indicator No. 6 - Noise pollution.

Expert: Mr. J. Luis Bento-Coelho, Professor, Instituto Superior Técnico, Lisbon, Portugal.

J. Luis Bento Coelho is an Electrical Engineer with a MSc. and a PhD. in Acoustics and is a Fellow of the International Institute of Acoustics and Vibration (IIAV). He is a Professor of Acoustics at Instituto Superior Tecnico (IST), TULisbon, Portugal, where he is the Head of the Group of Acoustics and Noise Control and the Director of the Diploma on Advances Studies on Acoustical Engineering post-graduate course. He is the Immediate Past President of the IIAV, is a member of the Expert Panel on Noise (EpoN) of the European Environmental Agency and a member of the EU-CNOSSOS Technical Committee. He is a Chartered Acoustical Engineer with a large experience on environmental noise, transportation noise and urban acoustics. He has been involved with noise mapping and action plans, being responsible for projects in large cities in Portugal and in Brazil, and for many transport infrastructures. He has published more than 200 technical and scientific papers, is the author of a chapter in the “Handbook of Acoustics & Vibration Control” (John Wiley & Sons, 2007) and is the co-author of a number of recent international technical reports.

Indicator No. 7 - Waste Production and management.

Expert: Mr. Larry O’Toole, Director, Waste and Energy Division, RPS Consulting Engineers, Dublin, Ireland.

Larry O’Toole is Director of the Waste and Energy Division at RPS Consulting Engineers. He is a Chartered Civil Engineer with 24 years experience of civil and environmental engineering and waste strategy and planning in Ireland and in the UK. He has been Project Manager for a broad range of waste and energy projects and is currently responsible for a team of engineers, scientists and waste planners providing a wide range of services to both the public and private sectors in UK and Ireland. These include national strategic studies, regional waste plans, siting studies, feasibility, design and procurement of recycling, recovery and disposal facilities and renewable energy projects including wind energy, anaerobic digestion and biofuels.

is a chartered member of Engineers Ireland and was their representative on the National Construction & Demolition Waste Council. He has presented widely on waste management including at the EU-Asia Solid Waste Management Conference in Ipoh, Malaysia in 2008 and at the International Conference on Cities and Climate Change, New Delhi, India, in 2011.
**Indicator No. 8 - Water consumption.**

Expert: Mr. Giovanni Bidoglio, Head of Water Resources Unit, Institute for Environment and Sustainability, Joint Research Centre, European Commission, Italy.

Giovanni Bidoglio is Head of Unit at the Joint Research Centre of the European Commission where he provides science-based support to the implementation of EU Directives and Action Plans related to water resources, nature, regional and agricultural policies, and he interfaces research networks with EU policy making. His research interests include the sustainable management of water and ecosystem resources, mapping of ecosystem services, modelling of bio-geochemical fate and hydrological processes of pollutants, environmental risk assessment and environmental monitoring. His previous work included research on soil and groundwater protection and greenhouse gas emissions from natural ecosystems, and assessments of impacts of agri-environmental and rural development measures. He is member of various advisory boards and has published widely in the scientific press.

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**Indicator No. 9 - Waste water treatment.**

Expert: Ms Eduarda Beja Neves, Principal Researcher, Hydraulic and Environment Department, National Laboratory of Civil Engineering, Lisbon, Portugal.

Eduarda Beja Neves is Senior Researcher at the Environment and Water Department of the National Laboratory of Civil Engineering in Lisbon, Portugal (since 2003). She graduated in Chemical Engineering (1976) and specialized in Sanitary Engineering (1977). From 1986 to 1990, she got her PhD at Purdue University Civil Engineering School (environment department) (USA). From 1995 to 1999 she was Associate Professor at the Civil Engineering Department of Instituto Superior Técnico in Lisbon where she graduated. Her research interests include water quality, water and wastewater treatment, performance indicators for urban waste services and, more recently, strategic environmental assessment, and water governance (in a changing world). She is author and co-author of a significant number of a broad range of publications including Technical Reports, Communications and Papers (to national and international meetings), Articles in books and in journals, Books, and Technical Advices.

She is Member and current Vice-President of the Water Resources Portuguese Association (APRH), she is Member of the Sanitary and Environmental Engineering Portuguese Association (APESB), and Member of the Engineers Professional Association, both under the Chemical Engineering and the Environmental Engineering Colleges.
Indicator No. 10 - Eco-innovation and sustainable employment.


Lars Fogh Mortensen has since 2006 been heading the work of the European Environment Agency (EEA) on sustainable consumption and production, including resource use and waste. His current responsibilities include providing analytical inputs to the EU road map on resource efficiency, the review of the EU action plan on sustainable consumption and production (including eco-innovation), various EU waste directives and to the EU and UN policy processes on green economy towards Rio+20. Previously, his responsibilities in the EEA included integrated environmental assessments, policy effectiveness evaluations and sustainable consumption. He is a trained economist from the University of Copenhagen and has over 15 years of experience on analytical and policy aspects of sustainable development from various international organisations. Prior to joining the EEA in 2003, Lars has worked at the OECD Environment Directorate, the secretariat of the UN Commission on Sustainable Development, the Danish Ministry of Environment and the European Topic Centre on Waste and Material Flows.

Lars has written and co-written a large number of reports and articles on various aspects of sustainable development. Highlights include the 2010 EEA assessment on consumption and the environment; the 2005 EEA report on household consumption and the environment; the 2001 OECD environmental outlook; the 2001 OECD environment strategy; the 1998 UN report on measuring sustainable consumption and production; and the 1995 UN report on indicators of sustainable development. He regularly makes keynotes and presentations on various aspects of sustainable consumption and production, and he currently sits in various European and global advisory boards and panels.

Indicator No. 11 - Environmental management of the local authority.

Expert: Ms Maria Berrini, Director, Ambiente Italia, Milan, Italy.

Born in Milan in 1956, she graduated in architecture at Politecnico di Milano. From 1981 she worked as a consultant, previously with Cooperativa Ecologia and then with Ambiente Italia of which she is President since the foundation. She coordinated dozens of European projects and hundreds of professional activities on local sustainability and environmental planning, spatial assessment, urban indicators, integrated environmental management. She has been for ten years the Italian member of the “Urban Environment Experts” Group of the European Commission and speaker in all conferences organized by the European Sustainable Cities Campaign. Since 2008 she is a member of the evaluation panel for the European Green Capital Award. In 2009 she was elected to the Board of Architects of Milan. Since 2011 she is a member of the Expert Group for the Reference Framework for Sustainable Cities and has been elected to the Board of Trustees of the Green Building Council Italy. She cared the exhibition and the catalogue "Green Life, build sustainable cities” (2010 La Triennale, Milan), co-author of "European Common Indicators" (DGENV 2003); "Ensuring quality of life in Europe's cities and towns” (EEA, 2009) and “Measuring urban sustainability” (CE –DGENV, 2010).
Indicator No. 12 - Energy performance.

Expert: Mr. Per Berg, Professor in Landscape planning with a special focus on Sustainable Community Development at the Swedish University of Agricultural Sciences, Uppsala.

Per G. Berg is professor in Landscape Planning with a special focus on Sustainable Community Development in Urban and Rural settings. He has been Research Director for local community studies in 11 cities in the Baltic Sea region for 20 years and is at present investigating functional densification in Swedish townscapes in three cities. He has recently taken the initiative to study Sustainable Cities in a Research consortium including 12 European cities from north-Eastern St Petersburg to Southern Milan as a lead partner in a FP7 EU application currently under full evaluation. The Research of sustainable cities and local communities is done theoretically drawing from the cutting-edge policy documents of the UN Habitat agenda, in practical case studies and in leading a practical implementation project in Uppsala Sweden. With a background in Biology and Chemistry he has for 30 years had a particular interest in renewable energy issues.

Per G. Berg is member of the ICE Engineering Sustainability Journal and Journal of Environmental Quality Editorial Advisory Board and currently organiser of the 4th international landscape architecture conference in St. Petersburg in June 2011.