



Expert Panel – Technical Assessment Report

Zaragoza

European Green Capital Award 2016

April 2014

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1 INTRODUCTION

7th Environmental Action Programme (EAP)

The Commission commenced the 7th Environmental Action Programme (EAP) in 2013 which sets out a strategic agenda for environmental policy-making with 9 priority objectives to be achieved by 2020. It establishes a common understanding of the main environmental challenges Europe faces and what needs to be done to tackle them effectively. This programme underpins the European Green Capital Award in relation to policies for sustainable urban planning and design.

Protecting and enhancing natural capital, encouraging more resource efficiency and accelerating the transition to the low-carbon economy are key features of the programme, which also seeks to tackle new and emerging environmental risks and to help safe guard health and welfare of EU citizens. The results should help stimulate sustainable growth and create new jobs to set the European Union on a path to becoming a better and healthier place to live.

Cities play a crucial role as engines of the economy, as places of connectivity, creativity and innovation, and as centres of services for their surrounding areas. Due to their density, cities offer a huge potential for energy savings and a move towards a carbon-neutral economy.

Most cities face a common core set of environmental problems and risks, including poor air quality, high levels of noise, GHG emissions, water scarcity, contaminated sites, brownfields and waste. At the same time, EU cities are standard setters in urban sustainability and often pioneer innovative solutions to environmental challenges. An ever-growing number of European cities are putting environmental sustainability at the core of their urban development strategies.

Thus, in order to enhance the sustainability of EU cities, the 7th EAP fixes the goals that by 2020 a majority of cities in the EU are implementing policies for sustainable urban planning and design.

European Green Capital Award

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 initiative was launched by the European Commission in 2008.

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-Gasteiz in 2012, Nantes in 2013, currently Copenhagen for 2014 and Bristol in 2015. All are recognised for their consistent record of achieving high environmental standards and commitment to ambitious goals.

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 on-going 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**”.

1.1 ANNUAL AWARD PROCESS

The first cycle of the European Green Capital Award, a biennial process at that time, led to the inaugural award for 2010 going to Stockholm and Hamburg as the 2011 European Green Capital. The second cycle, completed in 2010, resulted in the Spanish City of Vitoria-Gasteiz becoming the 2012 European Green Capital and Nantes in France becoming European Green Capital in 2013. In 2011 the approach was modified to become an annual call and found the 2014 European Green Capital, Copenhagen and the following year the European Green Capital for 2015, Bristol. This annual cycle continues on to find the 2016 European Green Capital. The evaluation format was also modified in 2011 in order to streamline the entire process whilst giving the Jury a more significant role in the process.

The 2016 Competition cycle for the first time was open to applications from cities with a population of over 100,000 inhabitants, as the limit for previous cycles was over 200,000 inhabitants. This opened the competition to over 400 cities from EU Member States, Candidate Countries (Turkey, FYROM, Montenegro, Serbia and Iceland) and European Economic Area countries (Norway and Liechtenstein).

This year the Expert Panel has carried out a technical assessment of each of the 12 environmental indicator areas (detailed in Section 2.2) and provided a ranking of applicant cities together with qualitative comments on each application. This ranking is derived as a result of primary expert assessment, clarification from the cities and peer review from another expert (more details on this procedure in Section 2). This information is now presented to the Jury in the form of this report together with a number of proposed shortlisted cities. The number and list of shortlisted cities chosen to proceed to the next stage will be the ultimate decision of the Jury.

The shortlisted cities are invited to present their vision, action plans and communication strategy to the Jury.

The Jury will assess the shortlisted cities based on the following evaluation criteria:

1. The city's overall commitment, vision and enthusiasm as conveyed through the presentation.
2. The city's capacity to act as a role model to inspire other cities, promote best practices and spread the EGC model further – bearing in mind city size and location.
3. The city's communication actions including:
 - Citizen communication to date in relation to the 12 environmental Indicators, effectiveness via changes in citizen behaviour, lessons learned and proposed modifications for the future.

- The extent of the city's local partnering to gain maximum social and economic leverage.
- Outline of the city's EGC communication strategy should they win.

Based on the proposals from the Expert Panel & information presented to the Jury, the Jury will make the final decision and select the city to be awarded the title of European Green Capital 2016. The winner will be announced at an award ceremony in Copenhagen, Denmark on **24 June 2014**.

1.2 AIM OF THIS REPORT

This Technical Assessment Report provides an overview of the approach to this award. It presents the technical assessment of the Expert Panel for each of the 12 applicant cities, which forms the basis for shortlisting the cities. This is presented per indicator per city for transparency of the overall process.

A supplementary report presents examples of good practice across all 12 indicators via examples taken directly from the cities applications. This report also serves to benchmark each of the applicant cities within indicator. Ideally both of these reports should be read in tandem.

Both of these reports are compiled and edited by RPS Group, Ireland, acting as Secretariat for the European Green Capital Award.

2 TECHNICAL ASSESSMENT PROCEDURE

2.1 APPLICANT CITIES FOR 2016 AWARD

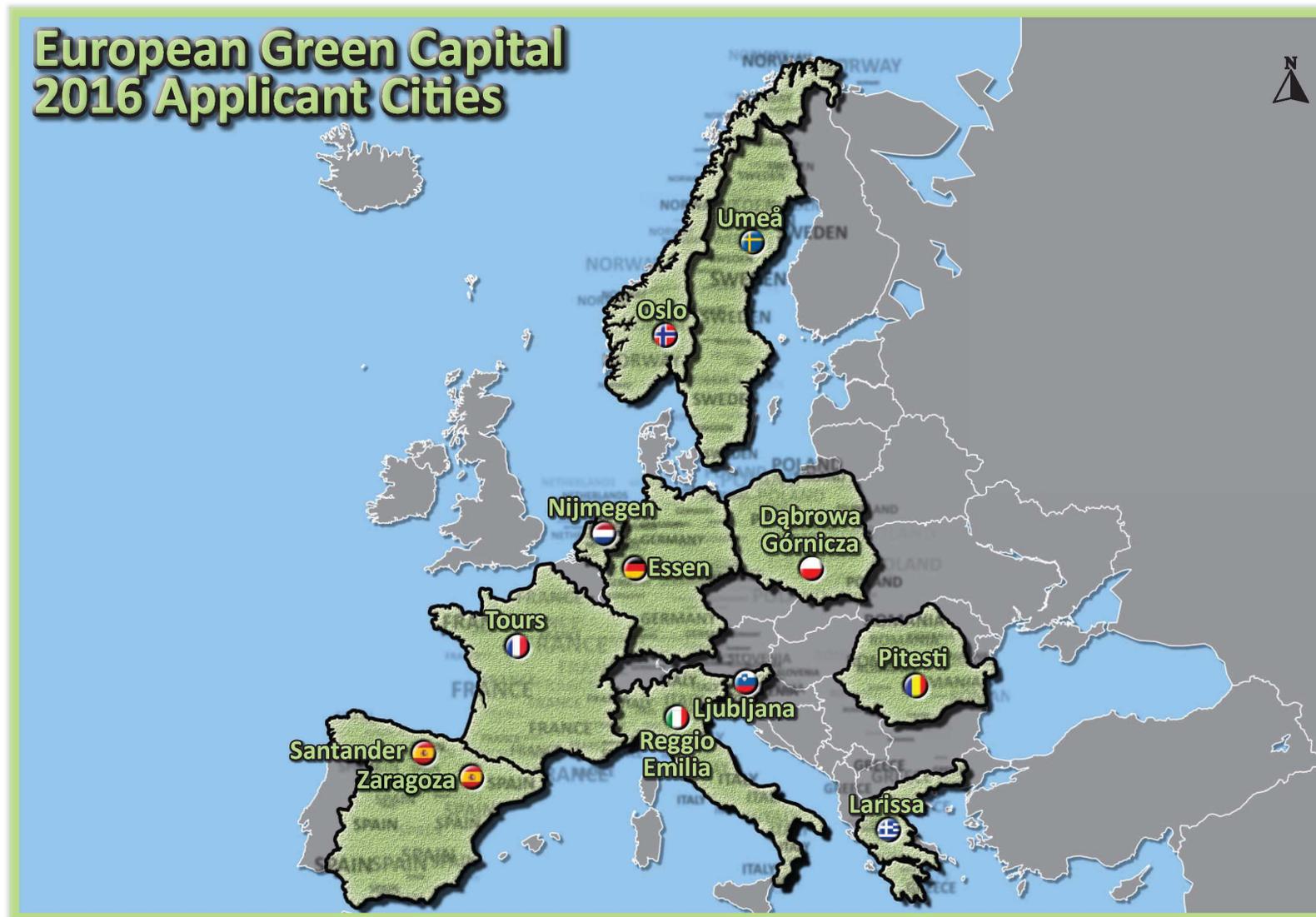
A total of 12 cities applied for the 2016 Award. Details of the 2016 applicants are included within the map and table below.

Of the 12 cities to be evaluated 11 are signatories of the Covenant of Mayors and 11 of the eligible countries from across Europe are represented. The smallest city by population is Umeå in Sweden with a population of 118,000, whereas Zaragoza in Spain has the largest population of 698,917. Over half of the applicants for the 2016 Award became eligible to apply for the first time under the new population threshold criteria of over 100,000 inhabitants.

Table 1: Details of applicant Cities (presented in alphabetical order)

	City	Country	Inhabitants	Signatory of the COM
1	Dąbrowa Górnicza	Poland	121,107	Yes
2	Essen	Germany	571,000	Yes
3	Larissa	Greece	163,000	Yes
4	Ljubljana	Slovenia	282,994	Yes
5	Nijmegen	The Netherlands	166,000	Yes
6	Oslo	Norway	623,966	Yes
7	Pitesti	Romania	206,082	Yes
8	Reggio Emilia	Italy	170,086	Yes
9	Santander	Spain	170,086	Yes
10	Tours	France	132,677	No
11	Umeå	Sweden	118,000	Yes
12	Zaragoza	Spain	698,917	Yes

Figure 1: Map of European Green Capital 2016 Applicant Cities



2.2 TWELVE INDICATOR AREAS

The selection of the European Green Capital 2016 is based on the following 12 environmental indicator areas:

1. Climate change: mitigation and adaptation
2. Local transport
3. Green urban areas incorporating sustainable land use
4. Nature and biodiversity
5. Ambient air quality
6. Quality of the acoustic environment
7. Waste production and management
8. Water management
9. Waste water treatment
10. Eco-innovation and sustainable employment
11. Energy performance
12. Integrated environmental management

For the 2016 cycle the 12 indicators areas have been retained as they were for the previous cycle but have incorporated some changes to the text content and titles of the indicators, the most significant of which being the redevelopment and repositioning of Indicator 12 – Integrated Environmental Management. Please see **Section 2.3** for updates.

2.3 APPLICATION FORM

The format of the Application Form was modified for the 2015 award cycle to ask cities to provide information for each of the 12 indicator areas in the format of “Present Situation, Past Achievements and Future Plans” underpinned by the EMS principles of “Plan, Do & Check and Act”. This was found to be successful and was retained for the 2016 award cycle. A copy of the 2016 Application Form is attached in **Appendix A**.

For this award cycle some modifications have been made to the indicator structure, allowing for a more consistent document across the 12 indicators. The Guidance Note was also revised for the 2016 award cycle to provide a policy background and further relevant information to shape applicant cities responses. The 2016 Award Application Form has 4 sections per indicator as follows:

- A. Describe the present situation.

- B. Describe the measures implemented over the last five to ten years.
- C. Describe the short and long term objectives for the future and proposed approach to achieve these.
- D. List how the above information can be documented, add links where possible. Further detail may be requested during the clarification phase. Documentation should not be forwarded at this stage.

For all indicator areas, information should be provided on short and long term commitments in the form of adopted measures and approved budgets. These measures must be proven by references and links where possible to published reports, plans or strategies. Further information on these references and links may be requested by the Expert Panel during the clarification phase. The 'budgets' refer to approved budgets to be used for the implementation of these reports, plans or strategies.

The 2016 Award Application Form also included a new section at the start of the application form 'City Introduction & Context'. Within this section the each applicant is required to give an overview of their city and a general background to their application. A legislative non-compliance background check of applicant cities was also conducted as part of the 2016 award technical assessment.

Each section must be completed within the word limit given and can include graphs, diagrams and photos to a specified limit.

2.4 EXPERT TECHNICAL ASSESSMENT PANEL

The Technical Assessment Panel consists of 12 experts who bring internationally recognised expertise within each of the areas covered by the indicators to the process. Profiles for each of the experts can be found in **Appendix B**.

Table 2: Expert Technical Assessment Panel

	Indicator	Expert	Title
1	Climate change: mitigation and adaptation	Mr. F. Javier González Vidal	Atmospheric pollution technical advisor. Regional Government of Valencia – D.G. Environmental Quality, Spain
2	Local transport	Dr Henrik Gudmundsson	Senior Researcher, Department of Transport, Technical University of Denmark
3	Green urban areas incorporating sustainable land use	Ms. Hedwig van Delden	Director, Research Institute for Knowledge Systems (RIKS), Maastricht, The Netherlands & Associate Professor, the University of Adelaide, Australia
4	Nature and biodiversity	Dr Jake Piper	Senior Research Fellow at Oxford Brookes University, Faculty of Technology, Design and Environment
5	Ambient air quality	Dr Steen Solvang Jensen	Senior Scientist, Department of Environmental Science, Aarhus University, Denmark
6	Quality of the acoustic environment	Dr Diogo Alarcão	Specialist in Acoustic Engineering. Principal Researcher and Professor at Instituto Superior Técnico University of Lisbon, Portugal & the Polytechnic Institute of Lisbon, Portugal.
7	Waste production and management	Mr. Larry O'Toole	Regional Director, Waste, Energy & Environment Division, RPS Group, Dublin, Ireland

8	Water management	Mr. Shailendra Mudgal	Executive Director, BIO Intelligence Service (BIO), Paris, France
9	Waste water treatment	Dr Ana Lončarić Božić	Associate Professor Faculty of Chemical Engineering and Technology, University of Zagreb, Croatia
10	Eco-innovation and sustainable employment	Dr Stefan Ulrich Speck	Project Manager environmental economics and policies, European Environment Agency (EEA), Denmark
11	Energy performance	Prof Dr Manfred Fishedick ¹	Vice President of the Wuppertal Institute and Professor at the Schumpeter School of Business and Economics, Wuppertal, Germany
12	Integrated environmental management	Mr. Jan Dictus	Founder, GOJA Consulting for Environment and Sustainable Development, Austria

2.5 TECHNICAL ASSESSMENT PROCEDURE

2.5.1 Primary Technical Review

The Experts were asked to assess each application based on its own merit and then benchmark all applications against each other within each indicator area. Each indicator area has three component parts: present, past and future. **Each part carries equal consideration by the expert.**

2.5.2 Clarifications

The Expert Panel members were given the opportunity to ask clarifications of the applicant cities on the basis that questions could only be asked on information already received i.e. no new information could be requested from the applicant cities.

2.5.3 Ranking Criteria

Experts use a defined ranking system. Under this ranking system a rank of 1st, 2nd, 3rd etc. is applied to each city per indicator. Since there are 12 applications to be evaluated then each city must be ranked from 1st as the best to 12th the weakest. **Note: these are not quantitative scores but rankings.**

2.5.4 Peer Review

It is important to note that a peer review was carried out for the technical assessment round. All Expert Panel members assessed their respective primary indicator, and each indicator was also assessed by a second panel member (co-evaluator). This peer review exercise ensures a quality check of the assessment process. Where the two experts differ radically on a ranking, they must work together to reach a consensus. The final ranking is a combination of both reviewers' assessments.

¹ Prof Dr Manfred Fishedick declared a conflict of interest with the Essen application due to previous involvement with the Essen city administration. In the case of Energy Performance and Eco-Innovation and Sustainable Employment indicators, external experts Jim Gannon (RPS Group) and Olivier Gaillot (RPS Group) conducted the technical assessment for the Essen application with due regard to the procedure for other applications.

Table 3: Indicators and corresponding Primary Expert & Peer Reviewers

	Indicator	Primary Expert	Peer Reviewer
1	Climate change: mitigation and adaptation	Mr. F. Javier González Vidal	Dr Henrik Gudmundsson
2	Local transport	Dr Henrik Gudmundsson	Mr. F. Javier González Vidal
3	Green urban areas incorporating sustainable land use	Ms. Hedwig van Delden	Dr Jake Piper
4	Nature and biodiversity	Dr Jake Piper	Ms. Hedwig van Delden
5	Ambient air quality	Dr Steen Solvang Jensen	Dr Diogo Alarcão
6	Quality of the acoustic environment	Dr Diogo Alarcão	Dr Steen Solvang Jensen
7	Waste production and management	Mr. Larry O'Toole	Mr. Jan Dictus
8	Water management	Mr. Shailendra Mudgal	Dr Ana Lončarić Božić
9	Waste water treatment	Dr Ana Lončarić Božić	Mr. Shailendra Mudgal
10	Eco-innovation and sustainable employment	Dr Stefan Ulrich Speck	Prof Dr Manfred Fishedick
11	Energy performance	Prof Dr Manfred Fishedick	Dr Stefan Ulrich Speck
12	Integrated environmental management	Mr. Jan Dictus	Mr. Larry O'Toole

2.5.5 Conflicted application

In the event of a conflicted application, where an expert cannot complete an unbiased assessment of an application for personal or professional reasons, a suitable external expert is identified by the Secretariat to complete both the primary technical review and the peer review of the conflicted application. The review carried out by the external expert is discussed with the main evaluator for the indicator and the peer reviewer and the overall rank is agreed amongst the 3 experts involved.

For the 2016 award cycle this was the case with the Essen application for the Energy performance primary assessment and the peer review of the eco-innovation and sustainable employment indicator.

2.5.6 Background Check

As part of the technical assessment process a high level background check is carried out by the European Commission on all applicants to identify if any applicant is in breach of environmental legislation or is not meeting European reporting requirements. A report was prepared and non-compliances were discussed by the technical assessment panel. Correspondence received by the Commission in relation to applicant cities was also circulated and discussed by the technical assessment panel during the technical assessment process.²

² For the 2016 European Green Capital Awards cycle letters of complaint was received by the European Commission in relation to the Ljubljana and Tours applications. The complaints were assessed by the experts and considered during the technical assessment process.

3 TECHNICAL ASSESSMENT RESULTS

Based on the technical assessment results, the Expert Panel has proposed to shortlist the following 3 cities (in alphabetical order) for the title of European Green Capital 2016:

Essen - Ljubljana - Oslo

The expert panel would like to commend the smaller cities who have applied, 2 of which have submitted high quality applications: Nijmegen and Umeå. Both of these applicants have demonstrated excellence in a number of the environmental indicators assessed.

As a result of the expert panel's findings the Jury have decided to include the 2 cities of Nijmegen and Umeå to the shortlist.

Therefore the shortlisted five cities (in alphabetical order) for the title of European Green Capital 2016 are:

Essen - Ljubljana - Nijmegen - Oslo - Umeå

The Jury will invite these five cities to the next stage of the evaluation process.

The Expert Panel's detailed ranking for the shortlisted cities in all indicator areas is detailed in Table 4, with the detailed ranking for all indicator areas for all of the applicant cities provided in **Appendix C**.

3.1 ZARAGOZA TECHNICAL ASSESSMENT

3.1.1 Local contribution to global climate change

Main evaluator: Mr. F. Javier González Vidal

Co-evaluator: Dr Henrik Gudmundsson

Ranking: 6th

Comments:

The city has provided the data source and methodology used to develop the inventory. Whereas trends have been provided since 2005, a sectoral breakdown is missing.

The city has adopted a strategy for climate change mitigation that is linked with the air quality strategy and is complemented with the adaptation strategy (2010). Under this umbrella the city is planning to set ambitious targets for the mid-term, such as being a zero carbon city by 2030, which given the situation could be over-optimistic.

The actions implemented cover the most relevant sectors, with nice examples on the building and transport areas under EU initiatives and making use of a sustainability indicators system to monitor progress.

Future plans in Zaragoza are to be developed under the mentioned strategy and the sustainable energy action plan, but specifics on the actions, timing and funding have not been provided.

The city is aware of the work that still remains to be done with regards to raising awareness, since some of the traffic interventions have not been easily accepted by the citizens. While this is not the ideal situation, the effort of the city to implement unpopular measures is commendable.

The adaptation strategy establishes a Decalogue of actions but these are not explained with detail in the application.

3.1.2 Local Transport

Main evaluator: Dr Henrik Gudmundsson

Co-evaluator: Mr. F. Javier González Vidal

Ranking: 5th

Comments:

Zaragoza is major regional capital with a well-developed transport system, including four ring roads, commuter trains, trams, buses, and emerging cycle network. The city has adopted a SUMP in 2006 and is undertaking a number of measures to further improve its transport situation. On shared electric vehicles Zaragoza is the most advanced city in Spain with 3000 registered users in 2013 and a city ordinance has resulted in now 18% hybrid drive taxis.

Compared to other cities Zaragoza has moderate performance for the local transport indicators for cycling infrastructure provision and the density of the public transport network, but in terms of low use of the car for short urban trips, Zaragoza is at the top end of the list with a share of only around 30%, which is especially remarkable considering high car ownership levels in Spain.

Zaragoza has committed to change its present transport model to a more sustainable one, with a number of accomplishments so far. Among the most significant is first tram line through the city centre, which has meant a remarkable improvement to street appearance, and significantly reduced car traffic, in addition to innovations in tram technology. Overall between 2005 and 2012 traffic intensity in the city has been reduced by 14.5%, and even 28.3% in the city centre, even if the car is still the most used mode, and the city's policies in this area face some opposition.

Significant bicycle infrastructure has been put in place in recent years together with a relatively large and popular bike-sharing system and the extension of 30 km/h streets for cars. This has led to a strong increase in bicycling; data suggests that citizens of Zaragoza are more and more adopting the bicycle as part of everyday life.

A number of initiatives are planned: further 40 km of dedicated cycle lanes as well as additional bicycle parking and connection points to other modes will be implemented; bus only lanes will be extended as well as and signal prioritisation, and a possible second tram line is being studied; a gradual shift to achieve 80% hybrid and electric buses by 2020 is planned to start 2015; safe routes to school will cover 70% of schools by 2020. The proposed measures are not described in much detail, and apart from the tram line no information about budget commitments or performance evaluation is given. There is no information about overarching goals or targets for the future, e.g. in terms of emission reductions, modal shares, or levels of alternative fuel vehicle penetration. Land use planning, Freight transport, and stakeholder involvement are also not mentioned in sufficient detail.

3.1.3 Green Urban areas Incorporating Sustainable land use

Main evaluator: Ms. Hedwig van Delden

Co-evaluator: Dr Jake Piper

Ranking: 5th

Comments:

In the framework of the PGOU, the City, by using the Urban Planning Agreements, has allowed local companies to move from the city centre to new industrial areas. This has made it possible to construct residential development in different city districts and improve the quality of life.

The urban program “Esto no es un solar” (This is not a vacant lot) has implemented since 2009 actions in nearly 70 unused vacant lots with a double goal, social (create employment), and environmental and urban development (recovery and integration of the city's vacant lots).

For more than 20 years, the City has been carrying out an active reforestation, planning 1632,5 ha of new forest areas, contributing in a direct way to climate change mitigation, land conservation and water resources, and improving the quality of life of its citizens. According to the index of citizens' quality of life, 97% of the residents reply to be fully satisfied with the quality of life in Zaragoza.

Zaragoza and its area of influence have a new Strategic Framework 2020 that presents the big objectives that should mark the future of the city and its region. Zaragoza Strategy for Adaptation to Climate Change establishes measures on territorial planning, land uses and changes.

Zaragoza has shown clear examples for past improvements (e.g. green areas have been multiplied by 2.5 in last 10 years) and presents good plans for the future. It is however unclear to what extent these plans are approved and funding is secured.

3.1.4 Nature and biodiversity

Main evaluator: Dr Jake Piper

Co-evaluator: Ms. Hedwig van Delden

Ranking: 2nd

Comments:

Section 4a gives a good description of Zaragoza's environment as it affects biodiversity, in terms of climate, habitats, levels of protection, topography, etc. There is an extensive Natura 2000 area and 38% of the wider territory is protected one way or another. The number of protected species has risen sharply over the past decade. There is evidence of survey and monitoring work in progress; pressures upon biodiversity are listed.

Zaragoza structures its nature areas in terms of three themes: a green matrix, a blue matrix, and the connections between them, using this structure to develop its biodiversity planning. Figures are given for replanting of municipal land, though whether there are any specific measures in place to enhance biodiversity within these new areas is not detailed.

Zaragoza has developed a set of plans over two decades to protect its biodiversity, and this is integrated within the city's General Urban Plan and Strategy for biodiversity conservation. This strategy is said to have six axes, though only four are listed here. Activities achieved and in progress are listed under the three-theme structure, and this includes master planning, restoration work and reforestation of the broad zone outside the city but within its municipal boundary.

There is also interesting work in progress within the city concerned with traditional farming ecosystems, recognising the importance of the balance of biodiversity and traditional agriculture. These sites also have social significance, as they give more vulnerable groups (unemployed, elderly) opportunities to interact with the environment. Zaragoza is undertaking work to protect raptors and bats within the city, and carrying out monitoring work on bird species. There is also work on invasive species which threaten native species within and beyond the designated sites.

The city has consulted its citizens on their satisfaction and reports strong improvements – nevertheless the city recognises that much more work needs to be done to raise awareness. The city's website provides a good system for encouraging volunteers into opportunities for working with nature and information and learning about species and habitats.

A worthwhile and varied set of plans for future work is set out in terms of green infrastructure, some of this is funded by European research projects; there is only one reference to other funding and no timelines, so support for these plans seems weak. Overall, Zaragoza appears to be working to protect its biodiversity and nature across a broad spectrum and already has some significant achievements.

3.1.5 Quality of local ambient air

Main evaluator: Dr Steen Solvang Jensen

Co-evaluator: Dr Diogo Alarcão

Ranking: 2nd

Comments:

The city has topographical constraints as it is located in a populated valley area and is a communication node but it is also favoured with strong winds along the valley. No information is provided on the contribution of long-range transport of air pollution to concentration levels in the city.

Zaragoza has 3 air quality monitor stations in the city (traffic area, urban background, industrial) and also reports from additional 4 stations under the CONTROL NETWORK opened in 1990. Additionally, the city has an air quality modelling system for prediction of short-term forecasts (48 hours).

At present, the city is in compliance with all EU air quality targets and limit values. This is an achievement given that almost all larger cities in Europe are not in compliance. Zaragoza has demonstrated declining air pollution and air quality levels are relatively low.

The target value for ozone has not been exceeded the last 3 years and has had a profound decrease over the last 10 years. Annual NO₂ has not been exceeded since 2008 and has had a downward trend since 2005. The daily PM₁₀ is not exceeded and the annual PM₁₀ has not been exceeded since 2010 and has decrease sharply since 2007. Annual PM_{2.5} is well below limit values and has been decreasing since 2009.

The city has an integrated climate and air quality plan 'Strategy for Climate Change Mitigation and Improvement of Air Quality' from 2005 that aims to reduce CO₂ emissions per person by 30% during 2005-2015. Specific objectives for air quality are not given.

The city attributes the decline in levels over recent years to emission reduction from industries and decreases in car traffic due to urban mobility planning (28% reduction in city centre and 15% at entrance roads). Closing of the ring roads has reduced the number of trips of heavy vehicles in the city and has reduced NO₂ concentrations by 17% between 2006 and 2012. The city has also established new tram lines, commuter trains, redistributed urban bus network, increased cycle network, new network of slow streets and pedestrian trails, municipal subsidy for hybrids and energy efficient cars (18% of taxis are hybrids), promoting 45 recharging stations, and car sharing. The city has implemented intense control on industries with a reduction of 14% in emissions in the period from 1996 to 2005 including reduction of smell nuisances of about 90%. Particle emissions were reduced by 95% in the industrial district during 2002-2007. Better cross-reference to indicator 1 (climate change) and 2 (transport) should have been provided to understand measures taken.

Information to the public is provided through the press, information board in the city centre, and website, and awareness raising is fostered by the Campaign of Environmental Education.

The city has an ambitious goal in 2020 to reach concentrations levels under those recommended by WHO related to particles, NO₂ and ozone that are more stringent than present EU limits values for particles and ozone but the same for NO₂ (40 µg/m³). WHO guidelines for PM₁₀ is 20 µg/m³ (EU 40 µg/m³), 10 µg/m³ for PM_{2.5} (EU 25 µg/m³) and 100 µg/m³ (8 hour) for ozone (EU 120 µg/m³ not to be exceeded more than 25 days a year averaged over 3 years). The 'Strategy for Climate Change Mitigation and Improvement of Air Quality' runs until 2015.

The future strategy focuses on a sustainable mobility within the city, better efficiency of the municipal sectors, introduction of renewable energies and investments in the industrial sector. No new air quality plan is presented.

3.1.6 Comments: Quality of acoustic environment

Main evaluator: Dr Diogo Alarcão

Co-evaluator: Dr Steen Solvang Jensen

Ranking: 8th

Comments:

The data provided regarding the share of population exposed to noise values is very confusing and incomplete, and mixes different indicators (Lday + Lnight with Lden + Ln). From the provided data, apparently, a share of population of 36.4% and of 17.3% are subjected respectively to Lden > 55 dB and Lden > 65 dB, while 18.2% of population is exposed to values of Ln > 55 dB (only road traffic noise). These are rather low share values and thus the actual situation seems to portray a good quality of the acoustical environment.

5 quiet areas are mentioned, with a total area of 257.5ha, which is certainly important, but figures related to citizens living in their vicinity should also be known. An excess value of 5 dBA is referred, but this doesn't make clear what the actual noise levels inside these quiet areas are, and this aspect should be better clarified.

It is stated that awareness campaigns were done but that some measures suffered from strong citizens' opposition, particularly the reduction of private car usage in the city centre. Thus, it is advised that future campaigns should be planned in order to prioritise involvement of all stakeholders in order to maximize their outcome.

The existence of a Noise Action Plan 2010-2015 with 75% of the budget already invested is positive, however only reduction measures for populations subjected to night levels over 65 dBA are indicated, which, although positive, seems very unambitious. The statement that the introduction of a tram will as an estimate reduce the noise levels by about 15 dBA is not realistic from the given data of expected traffic and bus reductions, and should be better analysed.

Future actions are interesting, especially the launching of tram line 2, application of low noise pavements, reduction of buses and replacement with hybrid-buses and the introduction of new 30 km/h speed areas and pedestrian and bikers zones. The global goal of reducing noise levels by 1.3 dBA that the city has set is certainly a positive aspect, but grounding for this exact figure together with the quantitative expected benefits in terms of population exposure would strengthen the goal.

3.1.7 Waste production and management

Main evaluator: Mr. Larry O'Toole

Co-evaluator: Mr. Jan Dictus

Ranking: 7th

Comments:

Waste planning is implemented through a Waste Management Plan for Aragon and this plan has directed the development of the waste management system in Zaragoza.

There is an extensive network of collection systems covering a wide range of recyclables and a pneumatic system is installed in one district. The recycling rate is reasonable although diversion rates from landfill are good. The treatment of waste is carried out primarily at a sophisticated Waste Treatment Centre which was opened in 2009 with a capacity of more than 450,000 tonnes per annum. The facility includes a number of lines and processes for the treatment of the various mixed and separate waste streams and includes biogas production and composting although as the 'organic' waste is not source separated there are limited applications for the final product.

A company has been contracted to carry out a pilot on separate food waste collection. Specific annual awareness campaigns are carried out and a strategy for home waste prevention is referenced however limited information is provided on specific prevention programmes although there has been a 23.5% reduction in waste generated per capita since 2002 which is 16.3% below the national average.

The city has set targets to recycle 50% of waste by 2018 and to reduce the quantity of waste going to landfill by 15%. There are also plans to manufacture solid recovered fuel to further reduce diversion rates from landfill.

Overall the city has made very significant progress in recent years but it would be good to see more of an emphasis on waste prevention and source separated collection particularly for food waste.

3.1.8 Water management

Main evaluator: Mr. Shailendra Mudgal

Co-evaluator: Dr Ana Lončarić Božić

Ranking: 1st

Comments:

Zaragoza put forward an excellent presentation; concise and informative with effective use of graphics and images.

Zaragoza has been exemplary in reducing the overall water consumption. Zaragoza has reduced water consumption from 135.54 litres per person per day in 2000 to 99.86 litres per person per day in 2012. Consumption per capita figures are impressive and among the lowest in Europe and the plans for 2020 are also ambitious.

An interesting pricing structure for water consumption is utilised to encourage efficient usage of water, for example householders that achieve a 10% reduction in water consumption also receive a 10% reduction on their water bill. Furthermore a tiered pricing structure for cubic metres used is employed with those with low water usage achieving significant savings and those consuming excessive amounts can pay almost 5 times as much in the higher tiers.

The water reuse initiatives are also good and crucial to future reduce the dependence on freshwater. It would be useful to focus on network water losses as they are still very high.

A better understanding of water energy nexus could help in achieving energy savings through better water management.

3.1.9 Waste water treatment

Main evaluator: Dr Ana Lončarić Božić

Co-evaluator: Mr. Shailendra Mudgal

Ranking: 7th

Comments:

Zaragoza is served by two WWTPs with secondary and tertiary treatment, treating 99 % of generated wastewater. Total annual wastewater load of the city in p.e. is not given in the application. Of total 38,220,000 m³ treated in 2012, 66.67% originated from households while the rest pertained to commercial and industrial activities.

A few rural districts and small industrial areas are not yet connected (1%) to the collecting system and WWTPs. Information on type and efficiency of water treatment currently applied for this fraction is not provided.

Based on average values presented both WWTPs comply with the requirements of Urban Waste Water Treatment Directive. 100 % of generated sludge is used for energy production, in farming and for composting.

Wastewater treatment is significantly improved in the past period. Measures were implemented to address the flooding problems. Zaragoza is implementing Plan for Improving its Water Infrastructures, funded by the Operational Programme of Cohesion Funds-Feder 2007-2013. Plan included actions to fully implement wastewater treatment, to improve rainwater management, to renovate sanitation networks and to avoid flooding problems. Implemented measures and the corresponding impacts are well described in the application.

Future actions related to connection of small neighbourhoods and new industrial areas, water reuse, track of consumption, surveys of pharmaceuticals and nitrogen elimination are indicated generally but explicit measures, timelines and/or costs are not provided.

3.1.10 Eco-innovation and sustainable employment

Main evaluator: Dr Stefan Ulrich Speck

Co-evaluator: Prof Dr Manfred Fishedick

Ranking: 6th

Comments:

The application of Zaragoza is very ambitious by providing a picture of a city with a lot of potential in the field of eco-innovation and sustainable employment.

Overall the application shows good examples in eco-innovation, such as the Valdespartera Eco city, a bioclimatic sustainable construction model, whose centralized system manages the network of drinking water, sewage and treatment of rainwater, irrigation system and supply of gas and electricity, lights pneumatic waste collection and environmental control of dwellings; the digital city (GP) aims to create an intelligent citizenship with zero paper in the administration, all public lighting with LED; efficient use of private vehicles; and other uses of IT to support the greening of the city (Zaragoza Open Government Strategy for the Digital City 2012-2015). Another noteworthy aspect of the application is the emphasis of Zaragoza as a city of water.

The application discusses EC funded project in some detail also describes the plans for the future. However information on funds supporting these plans is missing.

An interesting project is also the Aragon foundation for the development of new hydrogen technologies which works for the development of hydrogen new technologies in synergy with renewable energies

3.1.11 Energy performance

Main evaluator: Prof Dr Manfred Fishedick

Co-evaluator: Dr Stefan Ulrich Speck

Ranking: 5th

Comments:

The overall mid-term ambition of the city is commendable and exceeds the targets of most of other cities in Spain. The energy policy of the Municipality of Zaragoza takes on the objective 2010-2020 of reaching a 24% reduction in consumption and an increase of a 35% in the installation of renewables in order to reach a fall of 24% in CO₂. The goal (or forecast) for 2020 is to increase the share of renewable energies regarding the electricity consumption from 70.14% (2010) to 109.98% (2020). In that context, the city would become net-exporter of electricity (cf. table on page 7). However, it was made clear that due to the current period of crisis and the uncertainty of the sector of renewable energies in Spain dynamic and ambitions might slow down. Particularly the dedicated attempt to reduce electricity consumption in the city is ambitious, but nevertheless a necessary objective to carry out the goals for 2020. So far, several measures have been implemented to support this goal due to the city self-assessment the evolution until now shows that the actions are being carried out in a positive way.

The city tries to fulfil the targets by specific measures e.g. the Municipal Bylaw on Saving, Efficiency and Use of Renewable Energies in Buildings (2009) that fosters the improvement of the energy system of the city by planning, saving energy, efficiency and using renewable energies. The bylaw for instance regulates the orientation of the building façades and includes several compulsory elements (e.g. rehabilitation of buildings, installation of thermal-solar panels in the covers of the buildings for producing hot water, centralization of air conditioning (cold and heat) will be compulsory in new apartment buildings for multiple users with a built surface conditioned equal or over 2,500 m²).

The examples listed in section B of the application show that the city is already following various activities (comprehensive approach) including participatory elements: "The MEETING CLUB WITH

AGENDA 21 LOCAL is an original initiative of the Agency of Environment and Sustainability born from the collaboration between the City of Zaragoza and business organizations for working together to reach sustainable development in the city. It is a key element for social participation in the city. The Club is developing actions on energy saving and efficiency addressed to non-industrial sectors of a second rank energy expending but that together represent an important reduction of CO₂ emissions and a valuable example." The municipality of Zaragoza runs several educational measures (STOP TO CO₂ program, GREEN HOUSEHOLDS, GOYA PARK, e2 DEMOCRACY) and students from the Zaragoza University have made energy audits as part of the participation process of Zaragoza Agenda 21. In addition, there is a voluntary agreement between the industrial sectors with the City Council with an investment over €6 million.

In section C of the application, a long term strategy is outlined, however the description follows so far more general goals and is not very specific, but it is valuable to mention that the energy related strategy seems to be directly linked with smart city planning activities (i.e. idea of a compact and multifunctional city). "The proposal for the Zaragoza of the future is a strategic plan that articulates the city and its surrounding area in an urban, compact, global and polycentric model able to keep and strengthen its connections with the nearest urban areas and other places."

The city is following a multi-targeted approach and combines energy related goals with the ambition to improve living standards. The Valdespartera ecocity in this context plays an important role as example and learning project. "The City has chosen a model of sustainable growth based on successful experiences such as Ecociudad Valdespartera, which combines bioclimatic criteria in its architectural layout (distances and orientation of the buildings) and the use of plants and renewable energies to create microclimate conditions adapted to the severe weather conditions of Zaragoza. It has also been obtained an important improvement of energy efficiency and quality of life as it is stipulated by the Municipal Bylaw on energy eco efficiency and the use of renewable energies in buildings and its facilities."

3.1.12 Integrated Environmental Management

Main evaluator: Mr. Jan Dictus

Co-evaluator: Mr. Larry O'Toole

Ranking: 5th

Comments:

Zaragoza has had a strategy since 1998 already and is renewing this strategy towards 2020 and 2030. The strategies have been developed with civic participation. More than 200 entities have participated in defining the strategies.

Several thematic plans and strategies have been developed that fit within the overall strategy. There are separate scenarios being developed for green economy and social policies.

The management of the sustainability and environment activities is situated at the Agency of Environment and Sustainability and is the major driver for the sustainability strategy of the city. The Agenda 21 -Environment Sector Board created in 1998 is the organization for a dialogue with citizens and companies. The relation between the two organizations and the political responsibility is not clear from the application.

There are a total of 39 indicators (Based on European Common Indicators) that evaluate the quality of air and sustainability of the city every year. It is unclear however if this report is presented to the city council.

The city is leading by example. Zaragoza introduced E-management leading to Zero paper; renovation of public lighting with LED. Energy and water management is introduced in municipal buildings. Environmental management is requested from suppliers; they are asked to supply a carbon footprint.

Zaragoza is active in relevant networks already for many years (2000 Aalborg commitments) and stays also active in international cooperation projects.

Environmental goals are strongly integrated in spatial planning (avoiding urban sprawl) and city renovation (renewable energy).

APPENDIX A

Application Form for EGC 2016 Title

Application form for the European Green Capital Award 2016

City Introduction & Context

Give an introductory overview of the city and a general background to the application.

Discuss positive and negative factors that have influenced the quality of the environment within the city and its surrounding area.

The city's infrastructure plan should be briefly explained.

Applicants are advised to include any former or outstanding environmental legal proceedings in this section.

(max. 1000 words)

1. Climate change: Mitigation & Adaptation

Refer to Section 2.1 of the Guidance Note

1A. Present Situation

Describe the present situation in relation to CO₂ emissions, including any relevant disadvantages or constraints resulting from historical, geographical and/or socio-economic factors which may have influenced this indicator area. Where available, information/data should be provided from previous years (5 – 10) to show trends.

Provide figures for, and comment on, the following specific indicators for the city:

1. Total CO₂ emissions equivalent (tonnes) per year;
2. CO₂ emissions equivalent per capita (tonnes) per year;
3. CO₂ emissions equivalent per capita (tonnes) resulting from fuel use in transport;
4. CO₂ emissions (tonnes) per MWh electricity consumed;
5. CO₂ emissions reduction target(s) (e.g. 20% by 2020).

Mention any target(s) adopted specifically for the municipal administration (e.g. carbon neutral municipality by 2020).

Give details of any Baseline Emission Inventory prepared by the city, mentioning the baseline year. Provide a breakdown of the main sources of emissions. Scientific grounds should be provided for any claimed reduction in CO₂ emissions.

(max. 600 words)

1B. Past Performance

Describe the measures implemented over the last 5 to 10 years to reduce greenhouse gas emissions, including resources allocated to implement these measures. Comment on which measures have been most effective.

Make reference to:

1. An overall strategy for climate change or any other strategy or action plan to reduce emissions, for this period;
2. Mainstreaming of climate protection measures across municipal services and in key areas of action such as energy efficiency in residential and commercial buildings, public transport and waste management. Highlight any innovative schemes for the built environment such as low carbon zones;
3. Mechanisms used (e.g. local regulations, financing schemes, partnerships). Explain how the city works on emissions reduction with other governmental bodies, private sector service providers, enterprises and citizens. Mention relevant national legislation or programmes and participation in EU-funded projects or networks.

Describe the city's approach to adaptation to the impacts of climate change.

Provide details on how this approach is monitored.

(max. 1200 words)

1C. Future Plans

Describe the future short and long term objectives and proposed approach for further emissions reduction, 'climate proofing' and adaptation to the impacts of climate change. Describe planned measures, including timescales and emphasise to what extent plans are supported by commitments, budget allocations, and monitoring and performance evaluation schemes.

Make reference to any long-term strategy employed.

Briefly explain the rationale for choosing these future measures and highlight any innovative financing arrangements.

(max. 800 words)

1D. References

List supporting documentation, adding links where possible. Further detail may be requested during the clarification phase. Documentation should not be forwarded at this stage.

(max. 400 words)

2. Local transport

Refer to Section 2.2 of the Guidance Note

2A. Present Situation

Describe the present situation in relation to local transport and mobility flows from the surrounding region, including any relevant disadvantages or constraints resulting from historical, geographical and/or socio-economic factors which may have influenced this indicator area. Where available, information/data should be provided from previous years (5 – 10) to show trends.

Briefly describe the present general features of the current transport systems (modal shares: walk, bike, car-sharing, public transport (train, tram, metro, bus), structural features and governance arrangements).

Include data for the following specific indicators:

1. Length in meters of designated cycle lanes along roads (but physically separated from other traffic) in relation to the total number of inhabitants in the city (meters of lane per capita);
2. Proportion (%) of population living within 300 metres of an hourly (or more frequent) public

- transport service;
3. Proportion (%) of all journeys under 5 km by private car (as car driver or car passenger). Please describe the modes of transport included in calculating the car proportion;
 4. Proportion (%) of public transport vehicles classified as low emission vehicles, meaning the proportion of buses among the publicly or privately owned and operated bus fleets that have certified lower emissions than EURO V emission standards.

(max. 600 words)

2B. Past Performance

Describe the measures implemented over the last five to ten years. Particular reference should be given to achievements in reducing congestion, encouraging a shift away from transport by private car, and improving environmental performance and efficiency of transport. Include information on hours lost to congestion (to get in and out of the city during peak hours).

Make reference to integrated transport, land use planning as well as stakeholder involvement.

Comment on which measures have been most effective, enabling frameworks and lessons learned.

(max. 1200 words)

2C. Future Plans

Describe the short and long term objectives for local transport and how you plan to achieve them. Emphasise to what extent plans are supported by commitments, budget allocations, and monitoring and performance evaluation schemes. Make reference to integrated transport, land use planning as well as stakeholder involvement.

Refer particularly to:

1. Reduction of overall demand for transport;
2. Reduction of individual motorised traffic (passenger and freight);
3. Promotion of active forms of transport (walking cycling), efficient public transport, and CO₂-free city logistics;
4. Promotion of less polluting technologies, fuels (including renewable energy), behaviours and practices for passenger and freight transport;
5. Adoption and implementation of Sustainable Urban Mobility Plans and other integrative approaches.
6. Reduction of congestion and improvement of regional mobility flows.

(max. 800 words)

2D. References

List supporting documentation (e.g. survey about user satisfaction with the urban transport system), and add links where possible. Further detail may be requested during the clarification phase. Documentation should not be forwarded at this stage.

(max. 400 words)

3. Green urban areas incorporating Sustainable Land Use

Refer to Section 2.3 of the Guidance Note

3A. Present Situation

Describe the present situation in relation to green urban areas incorporating sustainable land use, including any relevant disadvantages or constraints resulting from historical, geographical and/or socio-economic factors which may have influenced this indicator area. Where available, information/data should be provided from previous years (5 – 10) to show trends.

Include information on the indicators mentioned below for both the inner city area and the overall city area:

1. The percentage of citizens living within 300m of public green urban areas > 5000m² and public green urban areas of any size;
2. The percentage of green areas, blue areas (water areas), residential areas, industrial or economic areas, mixed areas, brownfields (this will provide important background information on the character of the city and is not an evaluation criterion itself);
3. New developments: proportion of brownfield sites, densification in the inner-city or urban cores, greenfields;
4. Population density (inhabitants per hectare) in built-up areas (city area minus green and blue areas);
5. Population density (inhabitants per hectare) for new developments;
6. Quality of green and blue areas;
7. Investments in green infrastructures (e.g. sustainable urban drainage, green rooftops...).

Maps:

Provide a land use map that indicates 1) the municipality boundaries delineating the overall city area and 2) the inner city area.

Provide the percentage of green and blue areas (public and private) and soil sealing in relation to 1) the overall city area and 2) the inner city area, including trends over the past five to ten years.

Provide additional maps showing city parks, the scale of green and blue areas in the city and their connectivity and coherence.

(max. 1100 words plus maps)

3B. Past Performance

Describe the measures implemented over the last five to ten years. Comment on which measures have been most effective.

Make reference to:

1. Regenerating formerly developed sites (brownfields); inventorying and minimising the total area of fallow, derelict and contaminated land;
2. Increasing or sustaining population density in built-up areas while protecting green areas and providing a high quality of life within densely populated areas;
3. Renovating urban land and renewing urban design (involving stakeholders) to make city living attractive and enable a more sustainable lifestyle (e.g. short distances to services and facilities reduce the transport demand and promote walking and cycling; multi-apartment houses save energy for heating, cooling, reduce infrastructural needs);
4. Limiting urban sprawl by cooperating with the neighbouring municipalities;
5. Limiting, mitigating or compensation environmental impacts of soil sealing;
6. Integrating current and future changes such as economic growth, demographic or climate change through sustainable land use planning;
7. Monitoring the effectiveness of management measures.
8. Quality of green and blue areas

(max. 1200 words)

3C. Future Plans

Describe the short and long term objectives and the proposed approach for their achievement.

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

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

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

Please make reference to the criteria that will be used to measure progress and impact.

(max. 800 words)

3D. References

List supporting documentation, adding links where possible. Further detail may be requested during the clarification phase. Documentation should not be forwarded at this stage.

(max. 400 words)

4. Nature and biodiversity

Refer to Section 2.4 of the Guidance Note

4A. Present Situation

Describe the present situation in relation to nature and biodiversity in your city, including any relevant disadvantages or constraints resulting from historical, geographical and/or socio-economic factors which may have influenced this indicator area. Where possible, show trends in biodiversity data and management over the past 5-10 years.

Make reference to whether:

1. There are any Natura 2000 areas in and around the city;
2. There are Management plans for these sites;
3. The habitats and/or species for which the sites have been designated are in good conservation status.

(max. 600 words)

4B. Past Performance

Describe the measures implemented over the last five to ten years. Comment on which measures have been most effective.

Make reference to:

1. Managing and increasing Natura 2000 areas designated for nature protection and biodiversity as described above;
2. Dedicated conservation actions to manage and restore the sites;
3. Protecting nature in other open spaces; Promotion of public knowledge and understanding of nature and biodiversity, particularly among young people;
4. Communication activities to promote Nature and Biodiversity including the Natura 2000

network among the public;
5. Monitoring the effectiveness of management measures.
(max. 1200 words)

4C. Future Plans

Describe the short and long term objectives for nature and biodiversity and the proposed approach for their achievement. Emphasise to what extent plans are supported by commitments, budget allocations, and monitoring and performance evaluation schemes. Demonstrate how this work coincides with the EU 2020 Biodiversity Strategy and Nature Directives and complementary national strategies.

(max. 800 words)

4D. References

List supporting documentation, adding links where possible. Further detail may be requested during the clarification phase. Documentation should not be forwarded at this stage.

(max. 400 words)

5. Ambient air quality

Refer to Section 2.5 of the Guidance Note

5A. Present Situation

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

Make reference to:

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

(max. 1,000 words)

5B. Past Performance

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

Particular reference should be given to:

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

(max. 800 words)

5C. Future Plans

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

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

(max. 800 words)

5D. References

List supporting documentation, adding links where possible. Further detail may be requested during the clarification phase. Documentation should not be forwarded at this stage.

(max. 400 words)

6. Quality of the Acoustic Environment

Refer to Section 2.6 of the Guidance Note

6A. Present Situation

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

Provide details on:

1. Share of population exposed to noise values of Lden (day-evening-night) above 55 dB(A);
2. Share of population exposed to noise values of Ln (night) above 45 dB(A);
3. The percentage of citizens living within 300m of quiet areas.

(max. 600 words)

6B. Past Performance

Describe the measures implemented over the last five to ten years for improving the urban sound quality and increasing awareness to noise. Comment on which measures have been most effective.

Make reference to:

1. Classification of territory (if applicable) into appropriate noise classes and with appropriate noise limits (e.g.: specially protected, hospitals/schools, residential, commercial, industrial) including details on enforcement mechanisms if in place;
2. Stakeholder involvement;
3. Communication with citizens;
4. Preservation and improvement of good acoustic urban environments such as quiet areas;
5. Noise reduction measures that influenced the current situation;
6. With respect to the adopted action plans, what is the percentage of the plan effectively implemented (e.g. overall amounts already paid for actions versus overall amounts initially committed).

(max. 1200 words)

6C. Future Plans

Describe the short and long term objectives for quality of the acoustic environment and the proposed

approach for their achievement. Emphasise to what extent plans are supported by commitments, budget allocations, and monitoring and performance evaluation schemes.

Make reference to:

1. Stakeholder involvement;
2. Consultation with the population including noise perception survey;
3. Actions to reduce the impact of noise from roads, railways, industrial areas and air traffic (Noise plan);
4. Foreseen reduction in the share of population exposed to noise values of Lden (day-evening-night) above 55 dB(A) and in the share of population exposed to noise values of Lnight (night) above 45 dB(A), mention targets;
5. Actions to maintain, extend, or improve urban quiet areas;
6. Holistic/qualitative approaches to the acoustic environment (e.g.: with soundscapes approaches).

(max. 800 words)

6D. References

List supporting documentation, adding links where possible. Further detail may be requested during the clarification phase. Documentation should not be forwarded at this stage.

(max. 400 words)

7. Waste production and management

Refer to Section 2.7 of the Guidance Note

7A. Present Situation

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

Include details on:

1. Waste Strategies or Plans in place;
2. Waste Prevention Measures;
3. Amount of waste household and municipal generated per capita;
4. Proportion of total waste sent to landfill;
5. Proportion of biodegradable waste sent to landfill;
6. Existing thermal treatment or similar: localisation and energy recovery;
7. Percentage of recycled municipal waste;
8. Recycling and/or recovery rates for Packaging waste;
9. Types of waste collected separately and extent of roll-out (% coverage) of source separated collection systems;
10. How separately collected waste is treated;
11. Application of the “polluter pays” principle, including “pay as you throw” (PAYT) initiatives.

(max. 600 words)

7B. Past Performance

Describe the measures implemented over the last five to ten years for improving waste management.

Comment on which measures have been most effective.

Make reference to:

1. Measures or programmes which have promoted waste prevention;
2. Reduction of the amount of waste produced;
3. Type and scale of infrastructure put in place to manage waste;
4. How residual waste is managed including the amount of waste sent to landfills, particularly biodegradable waste.

(max. 1200 words)

7C. Future Plans

Describe the short and long term objectives for waste production and management and the proposed approach for their achievement. Emphasise to what extent plans are supported by commitments, budget allocations, and monitoring and performance evaluation schemes.

Make reference to:

1. Constraints – economic, scale, institutional;
2. Measures to improve statistical data on waste collection & treatment;
3. Waste prevention and awareness initiatives;
4. Quality of recycling, and by type i.e. glass, paper etc.;
5. Waste collection charges;
6. Measures to promote public participation;
7. Measures to meet EU legislation.

(max. 800 words)

7D. References

List supporting documentation, adding links where possible. Further detail may be requested during the clarification phase. Documentation should not be forwarded at this stage.

(max. 400 words)

8. Water management

Refer to Section 2.8 of the Guidance Note

8A. Present Situation

Describe the present situation in relation to water management, including any relevant disadvantages or constraints resulting from historical, geographical and/or socio-economic factors which may have influenced this indicator area, including the situation of your river basin (e.g. if you are regularly experiencing droughts, scarcity and/or floods and expected future trends). Where available, information/data should be provided from previous years (5 – 10) to show trends.

Detail the present situation regarding water demand of different sectors and describe plans currently in place to reduce water consumption.

Make reference to:

1. Total water consumption (in cubic meters/year and litres/capita/year) including a breakdown for different sectors (households, industry, energy, agriculture, small business, tourism, public sector);
2. Proportion of urban water supply subject to water metering, both for domestic and non-domestic metering;
3. Source of water (surface water, groundwater) – make reference to aquifers and river basin

- management;
4. Quality of drinking water (e.g. how many days of non-compliance with the Drinking Water Directive);
 5. Water loss in pipelines, leakage management and network rehabilitation;
 6. Storm water management;
 7. How the links between water and energy consumption (water-energy nexus) (e.g. through pumping, treatment, heating) is taken into account;
 8. Water recycling initiatives (grey water);
 9. Compliance with the EU Water Framework Directive and other EU/national/regional legislation applicable at the city level.

(max. 600 words)

8B. Past Performance

Describe the measures implemented over the last five to ten years for improving water management. Comment on which measures have been most effective.

Make reference to:

1. Technical, economic and institutional measures adopted and their effectiveness in achieving reduction of total water consumption;
2. Byelaw implementation in relation to efficiency in water usage, tariff and metering systems;
3. Awareness raising campaigns.

(max. 1200 words)

8C. Future Plans

Describe the short and long term objectives for water management and the proposed approach for their achievement, including how they are influenced by the expected impacts from climate change and other long-term trends. Emphasise to what extent plans are supported by commitments, budget allocations, and monitoring and performance evaluation schemes.

Place particular emphases on key water saving and reuse targets for the future and the proposed approach to achieve these, including measures incorporating water infrastructure to deal with future impacts of climate change.

(max. 800 words)

8D. References

List supporting documentation, adding links where possible. Further detail may be requested during the clarification phase. Documentation should not be forwarded at this stage.

(max. 400 words)

9. Waste water management

Refer to Section 2.9 of the Guidance Note

9A. Present Situation

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

Describe the current general features of waste water management according to national requirements and the requirements of the Urban Waste Water Treatment Directive (UWWTD, 91/271/EEC).

Include data for the following specific indicators:

1. Total annual generated waste water load of the city (in p.e.) and provide indication of the fraction (%) coming from population and from industry (also specifying type of industry, when information is available);
2. Proportion (%) of total annual generated waste water load, connected to a) waste water collecting systems (only) and b) waste water collecting system + urban waste water treatment plants (UWWTPs), specifying the most advanced treatment level (primary treatment, secondary treatment, tertiary treatment);
3. Proportion (%) of total annual generated waste water load, not connected to waste water collecting systems, and explanation of the type of waste water treatment applied to this fraction;
4. If the city is located in an EU Member State include data on waste water treatment obligations according to the UWWTD (based on city's size and nature of the area of discharge);
5. Waste water collecting systems: main type of collecting system (combined/separated) and annual proportion (%) of COD-loads discharged via storm water overflows;
6. UWWTPs: Organic design capacity (p.e.), most advanced treatment level, annual incoming and discharged loads (t/a) of BOD5, COD, Ntot and Ptot and treated waste water amounts (m³/a) of all UWWTPs serving the city. If the city is located in an EU Member State, indicate whether the UWWTP complies with the treatment requirements under the UWWTD;
7. Annual amounts of generated sewage sludge (t/a) and description of treatment/disposal pathways (% of total amount).

Further information (e.g. on energy efficiency at UWWTPs, treated waste water re-use, economic sustainability) is highly appreciated.

(max. 600 words)

9B. Past Performance

Describe the measures implemented over the past five to ten years to improve waste water treatment. Comment on which measures have been most effective. If the city is located in an EU - Member State special reference should be given to non-expired deadlines for compliance with the UWWTD, when applicable.

Particular reference should be given to capacity building, measures for maintenance, management and restoration of waste water collecting systems and UWWTPs.

A description of further measures for improving waste water treatment (e.g. pollution prevention efficiency, improvement of energy efficiency) is highly appreciated.

(max. 1200 words)

9C. Future Plans

Describe the future short and long term objectives for waste water management and the proposed approach for their achievement. Emphasise to what extent plans are supported by commitments, budget allocations, and monitoring and performance evaluation schemes.

Refer to:

1. Improvement / maintenance / management of collecting systems;
2. Improvement of connection to collecting systems;
3. Improvement of design capacity, treatment level and treatment performance of UWWTPs;
4. Improvement of connection to UWWTPs;
5. Improvements of further environmental and economic aspects of waste water treatment (e.g. removal of micropollutants, energy efficiency at UWWTPs, sludge treatment and disposal, treated waste water re-use).

Emphasise to what extent plans are triggered by the demands of EU and national regulations.

(max. 800 words)

9D. References

List supporting documentation, adding links where possible. Further detail may be requested during the clarification phase. Documentation should not be forwarded at this stage.

(max. 400 words)

10. Eco-innovation and sustainable employment

Refer to Section 2.10 of the Guidance Note

10A. Present Situation

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

Make reference to:

1. Innovations that address material / resource use, (substitution, minimisation of material use, closing loops, etc.) and reduce environmental impacts, i.e. measures to improve resource efficiency;
2. Awareness raising and training to encourage the development and take-up of environmentally friendly technologies, particularly through training in industrial and business settings. Make reference to the authority launching the initiative as well as its target audience;
3. Efforts to promote green skills, or green jobs;
4. Efforts to promote Green Public Procurement (GPP);
5. Social innovation/stakeholder participation, including for example community programmes, that shows entrepreneurship and new ways of organisation that promote sustainable development and protect the environment locally and globally;
6. Share of the city budget dedicated to support environmental R&D (with particular reference to eco-innovation) by public and private entities;
7. Number of jobs created in green sectors in total, as a share of total jobs in the city and as total jobs created during a period of one year;
8. Share of hybrid or fully electric cars in total stock of vehicles owned by the city. Number of charging outlets available for the cars owned privately.

(max. 600 words)

10B. Past Performance

Describe the measures implemented over the last five to ten years concerning eco-innovation and sustainable employment. Comment on which measures have been most effective.

Make reference to:

1. Initiatives aimed at increasing eco-innovation and sustainable employment, e.g. projects under Cohesion Policy funds, LIFE, Environmental Technologies Action Plan (ETAP), Green Public Procurement (GPP), as well as national policy initiatives;
2. How European and national policies have been transferred into policy action at the city level;
3. The publication of reports, such as green accounts, revealing the timely implementation of planned initiatives.
4. Any action which the city is taking in order to develop the urban tissue/infrastructures in an

innovative/sustainable way
(max. 1200 words)

10C. Future Plans

Describe the future short and long term objectives to promote eco-innovation and sustainable employment and the proposed approach for their achievement. Emphasise to what extent plans are supported by commitments, budget allocations, and monitoring and performance evaluation schemes.

Make reference to:

1. Plans to establish eco-innovation clusters, strategies and initiatives to attract public-private partnerships for further developing eco-innovation and sustainable employment;
2. Future targets of how eco-innovations can be applied by the city, e.g. make reference to share of hybrid or fully electric cars in total stock of the public fleet, or plans to support the infrastructure development for electric cars in public areas (i.e. increase the number of charging points for electric cars in public car parks);
3. Participation at green business networks or partnerships and covenants and cooperation with knowledge institutions, such as universities;
4. Programmes to reach the population and industries promoting green economy thinking.

(max. 800 words)

10D. References

List supporting documentation, adding links where possible. Further detail may be requested during the clarification phase. Documentation should not be forwarded at this stage.

(max. 400 words)

11. Energy performance

Refer to Section 2.11 of the Guidance Note

11A. Present Situation

Describe the present situation and development in relation to housing over the last five to ten years, using quantitative data. List any disadvantages resulting from historical, geographical and/or socio-economic factors which may have influenced this indicator area.

Make reference to:

1. Energy consumption & performance of municipal buildings (in KWh/m²) according to your current Development or Action Plan;
2. The development so far and the current strategy of the renewable vs non-renewable mix of energy sources during the past 10 years (for both heat and electricity; expressed in KWh, MWh or GWh);
3. The current plan for integration and performance of renewable energy technology in municipal buildings and homes compared to the total energy use, (in KWh/m²);
4. The current plan of compatible and integrated district heating energy and of combined heat and power energy consumption compared to the total energy use, (expressed in KWh, MWh or GWh);
5. The current plan for increasing energy efficiency and decreasing the use of energy in municipal buildings and homes, expressed as energy saved (in KWh/m²);
6. The current plan for increasing the use of LED lamps in public lighting.

(max. 600 words)

11B. Past Performance

Describe the measures implemented over the last five to ten years concerning energy, as a qualitative

narrative. Comment on which measures have been most effective.

Make reference to:

1. Attempts to improve the energy performance of municipal buildings above national requirements;
2. Maximising and prioritising the use of renewable energy technology in municipal buildings and homes;
Measures to improve the City's overall energy demand performance preferably including both local government institutions, local market actors and citizens;
3. Measures to facilitate integrated district systems and a more sophisticated city-wide control.

(max. 800 words)

11C. Future Plans

Describe the future short and long term objectives for energy plans and the proposed approach for their achievement. Include measures adopted, but not yet implemented, and details for future measures already adopted. Emphasise to what extent plans are consolidated by commitments, budget allocations, and monitoring and performance evaluation schemes.

Make reference to:

1. The city's strategy to achieve goals by 2030 and 2050 (% of renewable energy share of the total energy supply);
2. The city's strategy regarding renewable vs non-renewable energy mix, as well as of the renewable energy mix per se (the percentage of different renewable energy sources). Describe the dynamics of energy mixes for at least the coming two decades, preferably add diagrams to describe this dynamic development;
3. Other measures affecting the total energy use in the city, e.g. changes in transport and communication systems, industrial practices, food and commodities production and consumption, urban morphology and import and export chains.

(max. 800 words)

11D. References

List supporting documentation, adding links where possible. Further detail may be requested during the clarification phase. Documentation should not be forwarded at this stage.

(max. 400 words)

12. Integrated Environmental Management

Refer to Section 2.12 of the Guidance Note

12A. Present Situation

Vision, Strategy:

Describe if the city has a clearly defined, widely understood and supported environmental vision for the municipality, for example as part of a broader commitment to urban sustainability.

Is this vision reflected in different strategies and action plans, which include objectives and targets for individual sectors? Please list the most important strategies and plans and indicate their relationship to the overall vision.

Have your vision and the corresponding strategies been endorsed and implemented by the city council?

Is there a dedicated budget for implementing the environmental vision?

Management, monitoring and evaluation:

Which stakeholders have participated in the development of the city's environmental vision and associated strategies and action plans? (e.g. contribution of civil society and citizens). What have been the practical arrangements for this?

How are the management structures of your city organised, and what management tools are used, to achieve your environmental objectives and targets? For example management circles, obligatory sustainability impact assessments of policy proposals, project structures, skills promotion, periodic evaluations, etc.

Describe the system of monitoring and reporting.

Leadership

Is the city (administration) leading by example in environmental behaviour? Describe your activities regarding environmental management systems, green public procurement, skills development, etc.

Does your city cooperate with other authorities at different levels or other organisations (regional, national, EU, international) on environmental issues? Which of these cooperation activities or projects has your city initiated or acted as leading partner? Please also refer to your participation in European funded projects and to your commitment to international initiatives, charters, etc. (Agenda 21, Aalborg Commitments, Covenant of Mayors, C20, Climate Alliance, ICLEI, EUROCITIES, etc.)

List any disadvantages resulting from historical, geographical and/or socio-economic factors which may have influenced this indicator area.

(max. 1000 words)

12B. Implementation

Describe the organisational structure of the city administration and show how the environmental strategies are embedded in the organisation. Please include an organogram.

Which department or political body is the driving force behind the environmental vision?

What is the total budget of your city for the current financial year and how much is allocated for environmental activities? Is this budget increasing or decreasing?

Innovative instruments

Does the city use, in its environmental policy, innovative instruments like 'nudges':- citizen participation in environmental enforcement, awareness-raising through social media, innovative financing, etc. ?

To what extent do you evaluate the progress of your policies / strategies / projects and do you adopt them according to findings?

(Max. 400 words)

12C. Future Plans

Describe the short and long term objectives for the integrated management of environmental policy and the proposed approach for their achievement.

Describe present and future flagship projects that demonstrate your commitment to an integrated management of the urban environment.

Demonstrate Public Awareness of this bid i.e. public consultation, available to read etc.

(max. 800 words)

12D. References

List supporting documentation, adding links where possible. Further detail may be requested during the clarification phase. Documentation should not be forwarded at this stage.

(max. 400 words)

APPENDIX B

Experts Pen Profiles

Indicator No. 1 – Climate Change: Mitigation and Adaptation

Expert: Mr. F. Javier González Vidal, Atmospheric pollution technical advisor, Regional Government of Valencia – D.G. Environmental Quality, Spain

F. Javier González Vidal is an Industrial Engineer by the Polytechnic University of Valencia. Throughout his professional career he has always focused on the promotion of environmental respect, both at the regional and international level.

For the last 13 years he has been working for the Regional Government of Valencia in the D.G. Environmental Quality, where the activities and responsibilities of the job have provided him with a wide view of the situation related to the intensive use of energy, climate change, polluting emissions and air quality.

The development and implementation of policies to fight air pollution and climate change have been one of his priorities, having used emissions inventories as a key tool to assess effectiveness. During this period some of the main tasks he has been involved in have been the development, implementation and monitoring of the policies included in the regional Climate Change Strategy and the implementation of the EU ETS, the management of the PRTR register, and the air quality network analysis and subsequent development of air quality actions plans.

He was a member of the Climate Change Committee of the European Commission as a representative of the regional governments of Spain in order to express their opinion during the negotiations of the European policies.

Since 2005, as a member of the Roster of Experts of the United Nations Framework Convention on Climate Change, Javier contributes to the review of national communications and inventories, focusing in the energy chapter, according to the Kyoto Protocol commitments. He has cooperated actively with D.G. Enlargement providing technical support to EU partner countries with regard to the approximation, application and enforcement of EU environmental legislation through the Technical Assistance and Information Exchange instrument.

During 2013 he has worked with the Ministry of Environment of Brazil, in the context of the sectorial dialogues between the EU and Brazil, on the Climate Change and Energy Efficiency Chapter."



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 an Environmental planner and has a PhD from Copenhagen Business School. His main area of research is sustainable transport governance and policy analysis, including the use of knowledge and indicators in the design, implementation and monitoring of transport 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 four major research projects on transport policy and planning. 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

Expert: Ms Ir. Hedwig van Delden, Director, Research Institute for Knowledge Systems (RIKS), Maastricht, The Netherlands & Associate Professor, the University of Adelaide, Australia



Hedwig van Delden is the Director of the Research Institute for Knowledge Systems (RIKS) in Maastricht, the Netherlands and Associate Professor at the University of Adelaide, Australia. After graduating from the University of Twente as a Civil Engineer in Water Engineering and Management, she started working at RIKS as a Policy Analyst and in the following years rose to the position of Director. Over the years she has taken on many roles ranging from Researcher to Project Manager and Project Leader in projects worldwide working on integrating models from a broad range of fields such as land use change, hydrology, economics and transport and making them applicable for policy support.

Her academic work focuses on issues relating to land use change modelling, integrating socio-economic and bio-physical processes, bridging the science-policy gap and scenario studies. In this capacity she has authored or co-authored a long list of peer-reviewed journal articles and book chapters. She recently gave a keynote lecture at the 20th International Congress on Modelling and Simulation in Adelaide, Australia on integrated modelling for policy support.

Indicator No. 4 - Nature and Biodiversity

Expert: Dr Jake Piper, Associate and Senior Research Fellow, Faculty of Technology, Design and Environment, Oxford Brookes University, United Kingdom.

Jake Piper has worked as a researcher and lecturer at Oxford Brookes University for the past twelve years, following on from an earlier career in environmental consultancy. Her academic background includes forestry and land management, and environmental assessment.



In recent years she has contributed to and managed studies of policy development and spatial planning, frequently as related to biodiversity protection and enhancement in circumstances of climate change, as part of EU programmes (MACIS, BRANCH), and she has been a peer reviewer of the C-Change project which promotes community engagement and behaviour change as well as creating multi-functional spaces. She has also worked on studies preparing guidance for projects affecting Natura 2000 sites, and projects concerned with rural development.

Issues around biodiversity, water resources, flooding and sustainable drainage have been a particular interest – as demonstrated in her recent book *Spatial Planning and Climate Change* (with Elizabeth Wilson). Other project work has involved the economic and environmental assessment of many forms of development, including offshore wind, water resources, railway infrastructure, forestry and leisure.

Indicator No. 5 – Ambient Air Quality

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 Environmental Science, Section for Atmospheric Modelling, Aarhus University in Denmark. He is department Coordinator of the Science Program for Sustainable Energy and Environment.



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).

Indicator No. 6 – Quality of the Acoustic Environment

Expert: Prof Dr Diogo Alarcão, Specialist in Acoustic Engineering. Principal Researcher and Professor at Instituto Superior Técnico University of Lisbon, Portugal & the Polytechnic Institute of Lisbon, Portugal.

Diogo Alarcão is a Physics Engineer with a PhD in Acoustics. He is Principal Researcher and a Professor in the scientific area of Acoustics at Instituto Superior Técnico, University of Lisbon, Portugal.



He is a Chartered Acoustical Engineer, member of the board of the Portuguese Acoustical Society and member of the executive commission for the Specialization in Acoustic Engineering of Ordem dos Engenheiros.

He has been responsible for major projects in Environmental Acoustics and Noise Control, including Noise Mapping and Action Plans for large urban areas in various Portuguese cities and for many large transport infrastructures. He has also been responsible for various projects in the area of Room Acoustics and Virtual Acoustics including real time simulation and auralization of sound fields in enclosures.

Indicator No. 7 - Waste Production and Management

Expert: Mr. Larry O'Toole, Regional Director, Waste Energy & Environment Division, RPS Group Ltd., Dublin, Ireland.

Larry O'Toole is Director of the Waste, Energy and Environment Division of RPS Group Ltd. He is a Chartered Civil Engineer with 26 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 policy and infrastructural projects and is currently responsible for a team of engineers, scientists and waste planners providing services to both the public and private sectors in UK and Ireland. These include national strategic studies, policy reviews, 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. Clients include the EPA, DELCG, numerous Local Authorities and semi-State bodies.

He is a Chartered Member of the Institution of Engineers of Ireland and a Registered Consulting Chartered Engineer with the Association of Consulting Engineers of Ireland. He has presented widely on waste management including at the EU-Asia Solid Waste Management Conference, Malaysia in 2008 and on "Integrated Waste Management and Climate Change" at International Conference on Cities and Climate Change, New Delhi, India, Feb 2011.

Indicator No. 8 - Water Management

Expert: Mr. Shailendra Mudgal, Executive Director, Bio Intelligence Service (BIO), Paris, France.



Shailendra Mudgal is a civil-environmental engineer with 19 years of experience in environmental consulting and has a specific expertise in water management.

He has worked on a range of projects in India dealing with leak detection in water supply networks, river basin action plan, stormwater management, and water quality and quantity modelling.

During last 10 years, he has worked on water policy sector in France and Europe. He led several studies for the European Commission on Water Efficiency Standards and the Water Performance of Buildings (<http://www.waterefficiency.eu>) and also contributed to studies for the European Parliament.

He contributed to the 2011 UNEP Green Economy Report and also supported the EEA on two chapters dealing with social and technological megatrends of the European Environment State and Outlook Report (SOER) 2010. Recently, he advised the UNFCCC on the methodology for evaluating the water saving devices in the context of the clean development mechanism.

Indicator No. 9 – Waste Water Treatment

Expert: Dr Ana Lončarić Božić, Associate Professor, Faculty of Chemical Engineering and Technology, University of Zagreb, Croatia



Ana Lončarić Božić is an associate professor involved in teaching and research in the field of Chemical and Environmental engineering. Ana holds a PhD in Chemical Engineering. Her research interests include advanced technologies for water and wastewater treatment, advanced oxidation technologies, photocatalysis, degradation of recalcitrant pollutants and contaminants of emerging concern and ecotoxicity.

She participated in 5 national and international research projects with academia and industry in the field of advanced wastewater treatment. She is the author/co-author of more than 30 scientific papers published in peer-reviewed journals (cited over 500 times, *h*-index 12). Ana sits on 3 editorial boards and is a regular reviewer for more than 20 scientific journals. She is also an Environmental Management System Auditor.

With a background in Chemical and Environmental Engineering and the expertise in the wastewater treatment and water management, Ana was involved as an evaluator for FP7-ENV-2012, FP7-ENV-2013 and NCBR-Core 2012 calls.

Indicator No. 10 - Eco-innovation and Sustainable Employment

Expert: Dr Stefan Speck, Project Manager environmental economics and policies at the Integrated Environmental Assessments Programme at the European Environment Agency.



Stefan Speck is an environmental economist with a PhD in economics. His main area of research is the application of market-based instruments for environmental policy, environmental fiscal reform, and green economy.

Prior to his current position, he was employed as a senior consultant at Kommunalkredit Public Consulting in Austria and as a senior project scientist at the National Environmental Research Institute/University of Aarhus in Denmark within the EU-funded project 'Competitiveness effects of environmental tax reforms' (COMETR). He also contributed to the research project 'Resource Productivity, Environmental Tax Reform and Sustainable Growth in Europe' funded by the Anglo-German Foundation.

He has implemented projects for a range of clients including the Danish Environmental Protection Agency (DEPA), European Commission (EC), Organisation of Economic Co-operation and Development (OECD), United Nations Development Programme (UNDP), United Nations Environmental Programme (UNEP), German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, and the UK Department for International Development (DFID). He has carried out research projects in Africa and Asia, and has published widely on economic instruments and environmental financing and recently co-edited the book *Environmental Tax Reform (ETR) A Policy for Green Growth* (Oxford University Press, 2011).

Indicator No. 11 - Energy Performance

Expert: Prof Dr -Ing. Manfred Fishedick, Vice President of the Wuppertal Institute and Professor at the Schumpeter School of Business and Economics, Wuppertal, Germany



Manfred Fishedick is the Vice President of the Wuppertal Institute, an international well known think tank investigating transformation processes to a sustainable development. With particular reference to the areas of climate, energy, resources and mobility, the institute is looking for technical, infrastructure and social innovations supporting the transition to sustainable structures. Special focus is given on the transition process of the energy system and cities.

Manfred Fishedick is also leading the research group "Future Energy and Mobility Structures" of the Wuppertal Institute and is professor at the Schumpeter School of Business and Economics at the University of Wuppertal. He has been working for more than 20 years in the field of energy system analysis (including sustainable urban infrastructure analysis). He is adviser to the German government as well as the Bundesland of North Rhine-Westphalia, author of various publications and peer reviewed articles. Manfred Fishedick is coordinating lead author for the IPCC (responsible for the chapter industry in the upcoming 5th assessment report), member of several national and international scientific boards and advisory councils.

Manfred Fishedick has been intensively working in the context of sustainable urban infrastructures and energy efficient cities. His project experience comprises among others the development of long

term concepts for the German cities of Munich and Düsseldorf and the Chinese city of Wuxi. For the Innovation City Ruhr Bottrop, which is kind of a real-term laboratory in the Ruhr Valley aiming for an emission reduction by 50% between 2010 and 2020 he is leading the scientific accompaniment process.

Indicator No. 12 - Integrated Environmental Management

Expert: Jan Dictus, Founder of GOJA Consulting for Environment and Sustainable Development, Vienna, Austria

Jan Dictus (nationality Dutch, living and working in Austria since 2000) is an expert on sustainable development of cities. He has provided services to a wide range of clients at international, European, regional and local levels on environmental and sustainable development issues.



He was involved in several EcoCity projects: For the City of Vienna Jan has led the development of the Environmental Vision of Vienna and is presently supporting the network Cities for a Nuclear Free Europe CNFE. Also for Vienna he was technical chair of the EUROCITIES Environment Forum.

As a UNIDO expert Jan has been involved in the organisation and reporting of conferences in Jordan and Bahrain on EcoCities in Middle-East and North Africa (MENA Region). Also for UNIDO and the Government of Japan he is presently setting up a network of Eco-Cities in South East Asia, introducing the instrument of Peer Review for Cities. Together with Astronaut Marcos Pontes Foundation and UNIDO he is preparing the development of an Eco-State in Roraima, Brazil. In the past Jan worked on Green Industry and the promotion of Eco-Business projects in e.g. India and Thailand, and on the development of a Green Award mechanism in Cambodia.

Jan is a member of the Expert Evaluation Panel for the European Green Capital Award since 2012, acted as Lead Expert for URBACT-II and is a member of the expert group for the "UNEP-JCEP Sustainable Urban Development and Liveable Garden Community - China Programme" in China.

APPENDIX C

Technical Ranking of 12 Applicant Cities for the European
Green Capital Award 2016 Title

Technical Ranking of 12 Applicant Cities for the European Green Capital Award 2016 Title

Indicator / Applicant City	Climate change: Mitigation & Adaptation	Local transport	Green Urban Areas incorporating Sustainable Land Use	Nature & biodiversity	Ambient Air Quality	Quality of the acoustic environment	Waste Production & management	Water Management	Waste water treatment	Eco-innovation & sustainable employment	Energy Performance	Integrated Environmental Management
Dabrowa Gornicza	9	10	10	9	11	10	8	7	8	11	9	11
Essen	2	6	4	1	3	1	3	2	2	2	4	4
Larissa	11	11	9	11	12	11	9	8	3	10	10	9
Ljubljana	5	2	2	4	4	4	5	3	4	5	6	1
Nijmegen	4	4	3	5	8	6	4	5	1	4	2	3
Oslo	1	1	1	3	1	2	1	4	6	1	3	2
Pitesti	10	12	12	12	9	7	12	11	12	12	12	12
Reggio Emilia	8	7	6	7	7	9	6	10	10	7	8	7
Santander	12	9	11	10	10	12	11	12	11	9	11	8
Tours	7	8	8	8	5	5	10	9	9	8	7	10
Umeå	3	3	7	6	6	3	2	6	5	3	1	6
Zaragoza	6	5	5	2	2	8	7	1	7	6	5	5

Final Combined ranking by the EGC Secretariat

City	Final Ranking
Oslo	1
Essen	2
Ljubljana	3
Nijmegen	4
Umeå	5
Zaragoza	6
Reggio Emilia	7
Tours	8
Dabrowa Gornicza	9
Larissa	10
Santander	11
Pitesti	12