An initiative of the European Commission

EUROPEAN GREEN CAPITAL AWARD 2018
TECHNICAL ASSESSMENT SYNOPSIS REPORT
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1. Introduction

The EU Urban Agenda

Europe's cities are the engines of the European economy, providing jobs and services, and serve as hubs that catalyse creativity and innovation. Almost 70% of the EU population now lives in urban areas. However, they are also home to some of our greatest challenges: economic, social, environmental and demographic, which are often interrelated.

That is why a growing numbe r of voices - at EU, national and local level - argue that an EU Urban Agenda is needed so that cities can provide their expertise in developing and putting EU policies into practice and, in turn, that these are better adapted to urban realities.

As a response, the European Commission adopted a Communication in July 2014 and launched a public consultation on an EU Urban Agenda[1]. The results show a clear demand by stakeholders for more coordination between all of the EU policies with an urban dimension. The Commission is therefore proposing the following approach:

- Focusing on specific priorities able to deliver and show results, such as smart cities; in particular when it comes to the low-carbon economy, climate-resilient cities and social inclusion.
- Applying better regulation tools effectively, with reinforced urban impact assessment and stronger stakeholder involvement.
- Better coherence and coordination of EU policies relating to cities, such as the European Innovation Partnership on Smart Cities (EIP-SCC), the Urban Innovative Actions or the European Climate Adaptation Platform (Climate ADAPT); assessing, revisiting, simplifying, streamlining and better focusing existing initiatives, making them more user-friendly, more efficient and with more synergies between them.
- Improved urban intelligence, benchmarking and monitoring: this means developing new data while also continuing to consolidate and harmonise the knowledge base of existing data sources, making them more complementary and more readily available.

7th Environmental Action Programme (EAP)

In 2013 the Commission commenced the 7th Environmental Action Programme (EAP), which sets out a strategic agenda for environmental policymaking with nine 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 (EGCA) 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 safeguard the 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.

[1] http://europa.eu/rapid/press-release_IP-15-5096_en.htm

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, greenhouse gas (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.

The 7th EAP sets the target of meeting local, regional and global challenges by enhancing the sustainability of cities throughout the European Union and 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 (EGCA) 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 and 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 that 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, Copenhagen in 2014, Bristol in 2015, Ljubljana in 2016 and Essen in 2017. 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 ongoing and ambitious goals for further environmental improvement and sustainable development;
c) Provide a role model to inspire other cities and promote best practice and experiences in all other European cities.

The overarching message that the award scheme aims to communicate to the local level is that Europeans have a right to live in healthy urban areas. Cities should therefore strive to improve the quality of life for 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. Since then the 2014 European Green Capital Copenhagen, 2015 European Green Capital Bristol, 2016 European Green Capital Ljubljana and 2017 European Green Capital Essen have all been annually awarded. This annual cycle continues on to find the 2018 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.

During the 2016 EGCA cycle the competition was opened for the first time to applications from cities with a population of over 100 000 inhabitants, as the limit for previous cycles was over 200 000 inhabitants. This remained the case for the 2017 and 2018 EGCA competition cycles. In addition to this the competition was opened for the first time to applicant cities from Switzerland. In June 2014 the 2017 EGCA call opened to over 500 cities from EU Member States, and Candidate Countries (Albania, FYROM, Montenegro, Serbia, Turkey); as well as Iceland, Liechtenstein, Norway and Switzerland.

This year the Expert Panel has carried out a technical assessment of each of the 12 environmental indicator areas 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 and information presented to the Jury, the Jury made the final decision and selected Essen to be awarded the title of European Green Capital 2017. The same process is being followed to select the city to be awarded the title of European Green Capital 2018. Applicant cities for the 2018 Award are as follows: Arad,

Romania; Ghent, Belgium; Nijmegen, The Netherlands; 's-Hertogenbosch, The Netherlands; Tallinn, Estonia; Umeå, Sweden, and Warsaw, Poland.

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 seven 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 each indicator. Ideally these reports should be read in tandem.

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

2. Technical Assessment Procedure

2.1. Applicant Cities for the 2018 European Green Capital Award

Seven cities from six EU countries are applying for the 2018 EGC Award. Details of the 2018 applicants are included within the map and table below.

Of the seven cities to be evaluated, six are signatories of the Covenant of Mayors (CoM). The smallest city by population is Umeå in Sweden with a population of 117 500, whereas Warsaw in Poland has the largest population of 1 680 000.

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

	City	Country	Inhabitants	Signatory of the CoM
1	Arad	Romania	172 827	Yes
2	Ghent	Belgium	253 266	No
3	Nijmegen	Netherlands	170 739	Yes
4	's-Hertogenbosch	Netherlands	136 499	Yes
5	Tallinn	Estonia	413 727	Yes
6	Umeå	Sweden	117 500	Yes
7	Warsaw	Poland	1 680 000	Yes

For the 2017 Award, s-Hertogenbosch (Netherlands), Nijmegen (Netherlands) and Umeå (Sweden) were also shortlisted. The technical ranking of all shortlisted cities (including the winner, Essen) for the European Green Capital Award 2017 title can be found in Appendix C: Technical ranking for 2017 shortlisted cities.

Figure 1: Map of European Green Capital 2018 Applicant Cities

2.2. Twelve Indicator Areas

The selection of the European Green Capital 2018 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. Wastewater treatment
10. Eco-innovation and sustainable employment
11. Energy performance
12. Integrated environmental management

For the 2018 cycle, the 12 indicators areas have been retained as they were for the previous cycles but some changes were made to the requirements in the application form (i.e. requests for statistical data).

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 Performance and Future Plans' underpinned by the Environmental Management System (EMS) principles of 'Plan, Do & Check and Act'. This was found to be successful and was retained for the 2018 award cycle. A copy of the 2018 EGCA Application Form is attached in **Appendix A**.

The Guidance Note was revised for the 2017 award cycle to provide a policy background and further relevant information to shape applicant cities' responses. For this award cycle some modifications were made to the indicator structure, allowing for a more consistent document across the 12 indicators.

The 2018 Award Application Form has four 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 EGCA Application Form introduced a new section at the start of the application form 'City Introduction & Context'. This section was retained for the 2018 EGCA Cycle as it is considered to provide valuable insight and context to the Expert Panel. A legislative non-compliance background check of applicant cities was also conducted as part of the 2018 award technical assessment.

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	F. Javier González Vidal	Atmospheric pollution technical advisor. Regional Government of Valencia – D.G. Environmental Quality, Spain.
2	Local transport	Ian Skinner	Director, Transport and Environmental Policy Research, London, United Kingdom.
3	Green urban areas incorporating sustainable land use	Annemieke Smit	Senior researcher on Nature Based Solution for Society at Alterra (part of Wageningen University and Research), the Netherlands.
4	Nature and biodiversity	Jake Piper	Associate and Senior Research Fellow, Faculty of Technology, Design and Environment, Oxford Brookes University, United Kingdom.
5	Ambient air quality	Christer Johansson	Professor at the Atmospheric Science unit of the Department of Environmental Science and Analytic Chemistry, Stockholm University and air quality expert at the Environment and Health Administration of the city of Stockholm, Sweden.
6	Quality of the acoustic environment	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	Warren Phelan	Technical Director, Waste, Energy & Environment Division, RPS Group, Dublin, Ireland.
8	Water management	Giulio Conte	Project Manager of Natural Resources Area, Ambiente Italia, Rome, Italy.
9	Wastewater treatment	Ana Lončarić Božić	Associate Professor, Faculty of Chemical Engineering and Technology, University of Zagreb, Croatia.

10	Eco-innovation and sustainable employment	Stefan Ulrich Speck	Project Manager of environmental economics and policies, European Environment Agency (EEA), Copenhagen, Denmark.
11	Energy performance	Manfred Fischedick	Vice President of the Wuppertal Institute and Professor at the Schumpeter School of Business and Economics, Wuppertal, Germany.
12	Integrated environmental management	Jan Dictus	UNIDO Eco-City expert and founder of GOJA Consulting for Environment and Sustainable Development, Vienna, 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 which are taking account in the evaluation: 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 for clarifications (mainly concerning technical data) from the applicant cities. Clarifications were provided to the experts during the technical assessment phase.

2.5.3. Ranking Criteria

Experts use a defined ranking system. Under this ranking system a position of 1st, 2nd, 3rd, etc. is applied to each city per indicator. Since there are seven applications to be evaluated, each city must be ranked from 1st as the best to 7th 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 as part of 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.

Table 3: Indicators and corresponding Primary Expert & Peer Reviewers

	Indicator	**Primary Expert**	**Peer Reviewer**
1	Climate change: mitigation and adaptation	F. Javier González Vidal	Manfred Fischedick ***Indicator 11***
2	Local transport	Ian Skinner	Jan Dictus ***Indicator 12***

3	Green urban areas incorporating sustainable land use	Annemieke Smit	Jake Piper ***Indicator 4***
4	Nature and biodiversity	Jake Piper	Annemieke Smit ***Indicator 3***
5	Ambient air quality	Christer Johansson	Diogo Alarcão ***Indicator 6***
6	Quality of the acoustic environment	Diogo Alarcão	Christer Johansson ***Indicator 5***
7	Waste production and management	Warren Phelan	Stefan Ulrich Speck ***Indicator 10***
8	Water management	Giulio Conte	Ana Lončarić Božić ***Indicator 9***
9	Wastewater treatment	Ana Lončarić Božić	Giulio Conte ***Indicator 8***
10	Eco-innovation and sustainable employment	Stefan Ulrich Speck	Warren Phelan ***Indicator 7***
11	Energy performance	Manfred Fischedick	F. Javier González Vidal ***Indicator 1***
12	Integrated environmental management	Jan Dictus	Ian Skinner ***Indicator 2***

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 EGCA 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 three experts involved. No conflicted applications were reported in the 2018 EGCA cycle.

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 applicant cities to identify if any applicant is in breach of environmental legislation or is not meeting European reporting requirements.

3. Technical Assessment: Results for shortlisted cities by indicator

	's-Hertogenbosch	Nijmegen	Umea
Climate change: mitigation & adaptation	1	4	2
Local transport	3	1	2
Green Urban Areas	2	1	4
Nature & Biodiversity	1	2	4
Ambient air quality	1	4	3
Quality of the Acoustic Environment	3	2	1
Waste Production & Management	4	1	2
Water Management	1	2	3
Waste water treatment	3	1	2
Eco-innovation & sustainable employment	3	2	1
Energy performance	3	2	1
Integrated Environmental Management	3	1	2

Please note that the ranking of non-shortlisted cities is not made public.

4. Technical Assessment of Shortlisted Cities

4.1. Shortlisted city summaries: ’s-Hertogenbosch, Nijmegen and Umeå

The following sections present selected text from the applications of each of the three short-listed cities:

's-Hertogenbosch

Population 2015	150.999 Inhabitants
Area 2015	118.07 km^2
Population density 2015	1279 Inhab./km^2
GDP 2014	38.862 €/Capita
Climate classification	Cfb

* The village of Nuland joined the Municipality 's-Hertogenbosch on 1-1-2015. This has added 21 km2 green countryside and an additional 7,000 residents to the municipality.

's-Hertogenbosch is the capital of the Province Noord-Brabant and is situated on an important motorway intersection between Amsterdam and the South and the cities of Antwerp, Breda and Tilburg with the Ruhr area in Germany. 's-Hertogenbosch was granted city rights in 1184. The city endured heavy flooding from the rivers Maas, Aa and Dommel, but water also contributed to the city’s power as a historic fortress able to fend off invasions using a network of dykes and inundations. Building outside the walls was only possible after 1874, enabled through the National fortress law and due to improved water management. 's-Hertogenbosch now has 151,000 inhabitants and 65,000 residential buildings in an area of 118 km^2. An economic motor for the greater North Brabant region with 93,000 jobs, with 50% of employment in trade, business services and healthcare, 's-Hertogenbosch has been recognised as a top economic location for several years by the Dutch magazine, Elsevier.

's-Hertogenbosch is an innovative city investing in distinctive and sustainable urban development projects, like the Paleiskwartier with the Paleisbrug and St Jan parking garage as part of the fortifications. These striking and sustainable architectural designs receive international interest. The city ensures attractive and sustainable embedding of buildings and redesigning old industrial sites and monumental buildings for new use, focusing on sustainability and energy-efficient renovation.

The city has the right scale and attitude to test innovations. Heineken has their experimental production line in 's-Hertogenbosch and Heymans is testing the feasibility of solar panels in sound barriers along the roads. 20% of employment is related to the agri-food chain. In 2013 the municipality established the AgriFood Capital organisation: a catalyst for innovation in the agri-food sector with regard to sustainability, nutrition and health.

's-Hertogenbosch is expected to grow to 162 000 residents by 2030. To ensure the quality of life and attractiveness the city involves residents and businesses wherever possible. The city works on a daily basis with companies, schools and other organisations towards a stronger

and more sustainable city. A good example of the natural sustainable approach is the development of the tourist potential of the historic fortress walls and waterways in the historic city.

Smart spatial planning helps reduce the environmental impact of new developments. To improve air quality, 's-Hertogenbosch restricts traffic in the inner city. The city has created a low emissions zone for lorries in the city centre and encourages the use of electric vehicles by developing infrastructure for vehicle charging. An extensive cycling network makes exercising and commuting by bike possible and pleasurable.

Combating climate change is crucial, especially given the floodplain location. 's-Hertogenbosch is striving to be a carbon-neutral city by 2050. Together with residents, businesses, housing associations and institutions, the city is transitioning to a sustainable energy supply. This includes the Bossche Energy Covenant, in which 53 companies work together towards a carbon neutral 's-Hertogenbosch. The city is on track to making its municipal property carbon-neutral by 2020.

Some key statistics for ’s-Hertogenbosch are outlined in table 4-3 below.

Table 4-3: ’s-Hertogenbosch

CO_2 emissions (tCO_2 / capita)	5,4 t CO_2/capita
Percentage of the population living within 300m of a public transport line (%)	90%
Percentage of people living within 300 m of green urban areas => 5000 m^2 in overall city area (%)	89%
Percentage of recycled household waste (%)	39%
Domestic water usage (Litres per capita per day)	125 l/c/d
Wastewater load (population equivalent)	283.000 p.e.
Energy usage/capita	23,6 MWH/capita

Nijmegen

Population 2015	170.774 Inhabitants
Area 2015	57 Km^2
Population density 2015	3000 Inhab./km^2
GDP 2010	28.100 €/Capita
Climate classification	Cfb Climate Relatively mild winters and summers, precipitation all year round

The location at the river Waal, between hills, polders and forests, has made Nijmegen an attractive place for more than 2 000 years. As the Netherlands’ oldest city, it cherishes its history, while also realising that a sustainable future for its inhabitants is at least as important. Nijmegen cooperates on a regional, national and a European level. The development of a circular economy is increasingly taking shape in a number of initiatives of

universities, companies and cities. Also, because Nijmegen has relatively high unemployment (12%), this subject is very important to the city. In 2015 Nijmegen has 171 000 inhabitants, 75 000 houses, 80 000 cars and 250 000 bicycles.

Since 1923 Nijmegen has accommodated Radboud University. Together with the HAN University of Applied Sciences it educates 40,000 students, which is very important for a youthful, modern culture in the city. Nijmegen is still growing. North of the Waal the city is developing a new district: 14,000 houses, energy efficient, largely connected to the residual heat network. In 2016 the civilian cooperative WindpowerNijmegen will be building four wind turbines.

The care sector (University Medical Centre Radboud, St.Maartens clinic and Canisius-Wilhemina hospital) is the main employer in Nijmegen. Health & innovation are high on the municipal agenda, explicitly linked to a healthy and sustainable living environment. Nijmegen also organises many runs. Culture is also buzzing with the brand-new pop stage "Doornroosje", concert hall "De Vereeniging'' (restored to its former glory in a sustainable manner) and the municipal theatre. In addition, Nijmegen has a versatile film culture and a major music scene, such as the "Music Meeting" (world music) in Park Brakkenstein and large pop concerts in park De Goffert. The knowledge institutes and the Regional Training Centre (ROC) attract many youngsters, also from abroad.

Nijmegen bases its development on the Ecopolis concept, based on three pillars: streams, areas, participants, coinciding with a responsible, living and participating city. All residential areas are limited traffic and traffic safe (maximum speed 30 km/h). Most residents go to work by bike or public transport. All city/regional buses ride on green gas. Houses alongside arterial roads are extra (sound) insulated. In districts built after 1965 rain and drainage water remain separated. Households separate a very high amount of their waste, which becomes raw material. The gradual development of the urban residual heat network is supplying an increasing number of houses and is thus reducing the use of fossil energy. The 'Groen Verbindt' campaign links social cohesion to green districts: residents present projects, design and help to maintain these.

Some key statistics for Nijmegen are outlined in table 4-1 below.

Table 4-1: Nijmegen

CO_2 emissions (tCO_2 / capita)	5,88 t CO_2/capita
Percentage of the population living within 300m of a public transport line (%)	88,7%
Percentage of people living within 300 m of green urban areas => 5000 m^2 in overall city area (%)	96%
Percentage of recycled household waste (%)	67%
Domestic water usage (Litres per capita per day)	130 l/c/d
Wastewater load (population equivalent)	275.000 p.e
Energy usage/capita	19.236 kwh/capita

Umeå

Population 2015	120.000 Inhabitants
Area 2015	2331 Km^2 (without water)
Population density 2015	51 Inhab./km^2
GDP 2012	40.100 €/Capita
Köppen climate classification	Dfc

Umeå, with 120 000 inhabitants, is the centre of growth in northern Sweden, doubling its population over the last 50 years and making it one of Europe's fastest growing cities in an otherwise sparsely populated region. One of the City Council's seven strategic long-term objectives states that Umeå's growth is to be achieved with social, ecological and economic sustainability, aiming towards the vision of 200 000 citizens in 2050. Thus, sustainable growth is both the challenge and the opportunity for Umeå. The selection of Umeå as European Capital of Culture in 2014 and the city's highly renowned gender equality work are good examples as well as Umeå's active participation in the coming UNESCO Vindelälven biosphere reserve and monitoring work of public health among teenagers.

The city's growth took off in the 1950s and 1960s, with one key element being the establishment of Umeå University. Parallel to this growth, the city made systematic investments in sustainability; both long-term socio-cultural investments in areas such as culture, gender equality and public health promotion, but also in green infrastructure such as a city-wide co-generation district energy system, co-owned hydro-electric power plant, green infrastructure, clean water supply, etc. These investments were key to the city-owned utility company Umeå Energi establishing 2018 as the year when Umeå, to our best knowledge, will be Europe's first climate neutral energy system.

The award-winning plan includes six sustainable development strategies, infrastructural planning, focus on progress monitoring and a holistic approach to all aspects of comprehensive planning and major environmental challenges. Transport CO_2 emissions and air quality in the city centre are two of Umeå's major environmental challenges. Implementing the comprehensive plan, finalising the new city infrastructural setup and working with mobility management and eco-friendly transports are key to meeting these challenges. Umeå´s Action plan for decreasing greenhouse gases and Air Quality Management Plan are developed and adopted to handle the challenges.

As an international centre for research and education, Umeå boasts a highly educated and skilled population and, as such, the culture of cooperation has generated a number of high profile innovative green initiatives.

There are several platforms stimulating **innovation** in the Umeå region. These platforms complement/cooperate, with incubators supporting promising entrepreneurs to develop business ideas. Each sustainability platform has a different focus, but all with triple- or quadruple-helix setups to stimulate innovative and sustainable approaches – a European/international connection and based in local/regional development strategies. Three examples are Be Green Umeå, Technical visits – Sustainable Umeå and BioFuelRegion.

Some key statistics for Umeå are outlined in table 4-2 below.

Table 4-2: Umeå

CO2 emissions (tCO_2 / capita)	4,5 tCO_2/capita
Percentage of the population living within 300m of a public transport line (%)	78%
Percentage of people living within 300 m of green urban areas => 5000 m^2 in overall city area (%)	58 %
Percentage of recycled household waste (%)	42%
Domestic water usage (Litres per capita per day)	128 l/c/d
Wastewater load (population equivalent)	100 973 p.e.
Energy usage/capita	42.150 Kwh/capita

4.2. 's-Hertogenbosch Technical Assessment

4.2.1. Climate change: mitigation and adaptation

Main Evaluator: Javier González Vidal
Co-Evaluator: Manfred Fischedick
Ranking: 1st

Comments:

The city has provided the emissions for the period 2008–2013 where no reduction trend can be observed. The sectoral breakdown is provided for the period 2010–13 but the methodology description could have more detail.

The city chooses to monitor measures rather than carbon emissions due to the number of factors over which they have no influence and to better assess the impact of their policies. Nevertheless, the inventory is also used to determine priorities.

The targets set by the city are very ambitious in the short, mid and long term, creating a path until the final vision that consists on being a climate neutral city by 2050. Specific targets are set also for the municipal organisation.

The strategic framework set up by the Energy and Climate Program has been implemented focused in the energy performance of buildings and businesses with relevant investments. But it also covers transport (electric vehicles and park & ride facilities), renewable energies and public lighting. However, considering the important role of transport as major source for GHG emissions, more specifc measures for that specific sector would have been expected.

There are a number of initiatives in the city that prove the level of engagement of both citizens (Energy Cooperation 073 non-profit) and private companies (Bossche Energy Covenant) in the fight against climate change. Both approaches show the advantages of energy saving measures and renewable energies from a competitive and economic perspective and tend to promote innovative projects (solar panels in noise barriers, geothermal in combination with soil decontamination).

The future plans stress the need for a transition and a change in the current energy system. Aware of the difficulty of the challenge the city is involving all the city actors in the elaboration of a 'map towards climate neutrality', installing wind turbines, and commiting to

being a climate-neutral organisation by 2020. In addition, the municipality assumes the role of facilitator to promote and accomodate initiatives from other members of the city.

Adaptation is mainly focused on water management to prevent floodings, with specific and significant projects in place and the policy to set new constructions in existing urban space to preserve nature and enhance the blue-green framwork. The main plans are to make room for the river by relocating dikes, constructing large water storage areas, and keep promoting green roofs.

4.2.2. Local transport

Main Evaluator: Ian Skinner
Co-Evaluator: Jan Dictus
Ranking: 3rd

Comments:

A 'Direction Note' sets out the framework for 's-Hertogenbosch's main infrastructure, which is consistent with a SUMP. Actions on transport are prioritised within a framework that promotes action on spatial planning and sustainable modes, ahead of infrastructure improvements or construction. While it was not clear whether stakeholders were involved in the development/application of these, regular consultation with stakeholders takes place. Car use has been reduced; a new note will be developed, which will reduce car use further.

There is an extensive network of cycle routes in 's-Hertogenbosch, including bicycle fast lanes, and nearly 2 000 bicycle parking spaces. Shuttle buses take people between important locations, while there is a small public transport system in the city itself. The city centre is largely traffic-free. More fast cycle lanes will be constructed and cycle spaces provided, while a new railway station will be constructed.

The city's parking route information system and traffic flow systems have been optimised for all modes. The city will develop a system to provide customer-focused, timely and multi-modal travel information to visitors and residents. The introduction of a public bike sharing scheme is planned, while next year four pilot projects for shared cars will begin.

'Of the applicant cities, 's-Hertogenbosch has the joint cleanest bus fleet, and compares favourably with other applicants with respect to access to public transport and cycling modal, although is ranked less well for modal share of car traffic.

It is stated that the city is exploring how to supply freight sustainably to its city centre, although no further detail is given. Only electric buses will operate on the shuttle routes in the city from 2015. Trials with smart charging of electric cars have been undertaken. Where electric driving is not possible, green gas will be used, e.g. the city's waste management vehicles will run on biogas from 2020.

4.2.3. Green urban areas incorporating sustainable land use

Main Evaluator: Annemieke Smit
Co-Evaluator: Jake Piper
Ranking: 2nd

Comments:

's-Hertogenbosch's vision of green urban infrastructure consists of three layers, the Green Delta, the tree plan and recreational parks and lakes. But there is also a policy to enhance

green and blue spaces at a micro-scale, in the form of green roofs, green walls and ecological management of greenery contributing to a rich biodiversity. At the higher level, the urban green infrastructure fits within the ecological corridors surrounding the city.

The spatial structural plan appears in all parts of the application, telling a story of a city that has a clear vision for spatial planning. This also is described in the priorities for building: building within the city is the first priority, then building near the city and only as a last resort, around the edges of the city. The railway zone is a good example of densification through reconstruction: resulting in a high-quality living and working environment. The lay-out of the Haverleij is unusual: residential areas are concentrated in a fortress and castles, surrounded by an area that has been transformed into a scenic, ecologically managed estate, accessible to the public, with park gardens, ponds, reed beds, an orchard, an 18-hole golf course and recreational woodland.

's-Hertogenbosch clearly recognises the relevance of green spaces as an important aspect of water management within and around the city. The green-blue infrastructure plays a role in peak water storage, a diversity of rain water measures within the urban tissue of the Groote Wielen shows that 's-Hertogenbosch has integrated its plans on water and green spaces. It is not explicitly mentioned whether the rain water measures are also implemented in other parts of the city.

In the application, the engagement of citizens seems only marginally explored and implemented, except for playgrounds. Fortunately, the 'Future plans' section states that the ambition within the Green Delta programme is to get more 'green' involvement and participation by citizens, social organisations and companies. The city will invest in collaboration with stakeholders.

's-Hertogenbosch presents a clear vision of a robust green-blue framework and densification in existing urban areas. All plans, both restructuring old parts of the city and expansion at the outer zones of the city, fit within this framework, thus creating a true blue-green network veining through the urban tissue. The integration of green spaces with the (storm) water management and tourism and recreation is already very strong; the connection with public health is supposedly also there, but could be emphasised more.

4.2.4. Nature and biodiversity

Main Evaluator: Jake Piper
Co-Evaluator: Annemieke Smit
Ranking: 1st

Comments:

's-Hertogenbosch is in the fortunate position of being well supplied with semi-natural protected areas, but nevertheless it is attempting to improve the situation further. The city is expecting significant population growth in the next decades (from 0.15 to 0.16 million) and is preparing for this with a strategy that aims to ensure the city remains attractive to its residents and visitors – biodiversity's role in this is recognised.

's-Hertogenbosch has good information on its biodiversity – it has in place a biodiversity Action Plan for 2015–2018, together with management plans for its various protected sites, which are being further enhanced. Recently it has undertaken mapping of the city's 'ecological vision' with residents and others, mapping the opportunities and obstacles for nature – this should be an excellent foundation for future work. There is active work in the Green Delta, which reduces pressures on protected areas and provides better access for residents to open and semi-natural areas and wildlife.

In partnership with citizens and organisations, 's-Hertogenbosch is actively extending its green areas, consulting and involving citizens in working towards objectives. There is good communications work in many forms, involving not only schoolchildren but also wider groups in society.

's-Hertogenbosch appears to have close control over likely future success for biodiversity planning: it has the necessary plans in place, a good idea of sites and of citizens' wishes. Moreover, the city already has a strong staff of ecologists working with it, and has committed finance across a range of prospects and projects.

What will be important for the future will be to ensure continuing monitoring and evaluation of work undertaken, to guarantee efficient use of resources and that any trends (whether positive or negative) are acted on in good time. Scanning other indicators, it is not clear that the role of biodiversity in some other indicator is recognised – though nature is mentioned under water management. An integrated approach may prove useful in future.

4.2.5. Ambient air quality

Main Evaluator: Christer Johansson
Co-Evaluator: Diogo Alarcão
Ranking: 1st

Comments:

Since 2009 nitrogen dioxide (NO_2) is measured at 55 locations and particulate matter (PM_{10}) at six locations. The city suffers from the high regional background concentrations (60%–80% of the total concentrations) due to surrounding industrial areas, traffic emissions on the highway and possibly also the emissions from ships on the North Sea. Despite this, the air quality is rather good with no exceedances at monitoring stations. Of the regulated pollutants, NO_2 is the main problem and highest concentrations are estimated close to the A2 motorway, but concentrations are decreasing and calculations indicate no exceedances for 2015.

The city has an air quality action plan from 2008 with a budget of EUR 5 million. The plan has the main objectives of meeting European air quality standards everywhere, achieving the lowest possible concentrations especially in areas with elderly and young children.

The city has a low emission zone (LEZ) since 2007. From July 2014 only Euro IV and cleaner lorries are allowed in the zone. This has led to a cleaner truck fleet than the national average. In the past, a large investment has been made in biking infrastructure and electric vehicles, with 140 charging points and electric scooter bikes for employees. In 2013, 's-Hertogenbosch won the national E-Award for its innovative approach. One example is the electric car-share project in the Paleiskwartier. The city's 1600 employees can access a car pool. Park and Ride facilities with connection to electric shuttle buses are used by around 40% of visitors to the city.

Future plans focus on sustainable transport including more electric vehicles and increased charging infrastructure, a zero emission city fleet by 2020, increased compliance in the LEZ, and sustainable supply of goods into the city centre. Promoting public transport and cycling are also part of the future plans.

A very good practice is that the effects on air quality of each spatial plan are calculated in detail even when there is no question of exceedance of standards. Research has shown that the local traffic policy (not specified exactly what) yields a 3–6% improvement in lung

function, similar to the benefit of not smoking. Such comparisons can be very important to motivate policy makers and the public to understand effects of actions.

With the extensive plans presented, the city could consider having more ambitious goals for air quality than just achieving the limit values, for example having as a long term goal to achieve the health-based guideline values recommended by WHO. And even investigate what further actions would be needed to reach such a goal.

Actions are focussed on transport, which is likely the most important source of exposure to locally emitted pollutants, but there is no mention of whether actions are needed to reduce emissions from other sources like residential wood burning.

4.2.6. Quality of the acoustic environment

Main Evaluator: Diogo Alarcão
Co-Evaluator: Christer Johansson
Ranking: 3rd

Comments:

The strategic noise map completed in 2012 (available online) shows that road traffic noise is the main noise source. It also shows that 46.5% and 9.2% of the people are exposed respectively to values of total $L_{den} \geq 55$ dB and total $L_{den} \geq 65$ dB, while 28.2% and 9.9% are exposed respectively to values of total $L_n \geq 50$ dB and total $L_n \geq 55$ dB. These are fairly acceptable exposure percentage values, especially the ones corresponding to higher noise classes. No quantitative trends are provided, but based on traffic behaviour it is believed that noise nuisance in the last years has not increased (in percentage). More than 8% of the population lives within 300m of 3 large quiet areas (‘Zuiderpark’, ‘Westerpark’ and ‘Fort Orthen’). These quiet areas are formally defined (road and industry noise levels < 50 dB(A); rail noise < 55 dB(A) area ≥ 0.5 ha), mapped and protected. The share of population living within 300m of other potential quiet areas is certainly greater than 8%, as judged by the pictured probability map for quiet areas, a fact which is very positive.

Acoustic zoning has been undertaken, following nine types of land use areas and considering different noise source type dependent classes. This is an interesting approach, although complex to manage, and it is not clear how the upper noise limits are to be enforced. It is also not clear which noise indicator is used in these limits.
The city developed a Noise Reduction Plan for areas lying above 60 dB road noise (L_{den} indicator), which amounts to approximately 47% of the homes. The primary measures of the Plan consist of the maintenance and improvement of roads (through low noise pavements, if necessary) and in traffic management and urban planning (special policy for building residential homes in locations with high noise levels – sheltered façade, courtyard). Overall, stakeholder interaction and involvement by the city is considered good.

Noise reduction measures implemented contemplate subsidised improvement of façade insulation and installation of barriers along railway lines, as well as policies for limiting entertainment noise where the levels are monitored by the municipality. Other measures include traffic rerouting and banning cars from the inner city giving priority to public transport, pedestrians and cyclists, optimised parking systems (park and ride, with electric buses connecting them and the inner city), pedestrianisation of areas and stimulating electric vehicles (e.g. pool of electric cars shared by different companies, development of a wirelessly rechargeable electric bus).

Future plans include the continuation of these measures and the creation of a new Action Plan (2018), but no indication of the percentage of implementation of the current one is provided. This information would have been welcome. Information about budgets is also not provided. A survey done every two years about the annoyance and effects of noise (traffic, events and neighbours) on the citizens is also carried out, which is a positive example of a good practice.

4.2.7. Waste Production and Management

Main Evaluator: Warren Phelan
Co-Evaluator: Stefan Ulrich Speck
Ranking: 4th

Comments:

The waste management system in 's-Hertogenbosch is well established, performing strongly in certain areas. However, improvements in the collection system are required to improve the recycling rate.

The city demonstrated a good range of awareness and education initiatives on waste, particularly in the recycling area. Prevention measures are implemented although these are not as comprehensive as other cities. Citizens pay for the non-recyclable waste although the charging scheme could be more effective.

The city is working in partnership with industry to develop innovative and integrated solutions to the management of waste. A project involving the city water board, city waste management company and Heineken demonstrates a commitment to integrate infrastructure and identify valuable solutions to facilitate the sustainable use of waste resources and products.

The recycling rates of the city are less than the average across European Member States as published by the European Commission. The rate of recycling is less than other cities (39% in household waste) and a limiting factor has been a long-term contract with the regional incinerator. This will end in 2016 and the city aims to improve its recycling rate.

The city has in place an impressive network of waste treatment facilities including a biomass plant, a waste to energy facility, sorting facility and public recycling centre. The city's waste management centre has been designed to be as sustainable as possible with many environmental and energy-efficient features, and demonstrating the city's commitment to lead by example.

4.2.8. Water management

Main Evaluator: Giulio Conte
Co-Evaluator: Ana Lončarić Božić
Ranking: 1st

Comments:

Urban and domestic per capita consumptions (urban 166 l/day, domestic 126 l/day) are very good, compared to the EU average, even though not the best among the 2018 candidate cities. In terms of water losses 's-Hertogenbosch shows the best performance among candidates.

Drinking water quality is very good and the city shows great care in keeping its groundwater clean, by using minimum levels of pesticides in public areas (the city got the Silver certificate from the National Sustainable Grounds Management Barometer in 2012, 2013 and 2014).

The ‘s-Hertogenbosch region is particularly sensitive about water management, as many severe floodings occured in recent decades. An innovative strategy for rainwater management and flood protection has been set up in the past – (specially after a flood occurred in 1995) and is a main issue for future plans. The strategy is quite ambitious and very well oriented towards the valorisation of ecosystem services, the integration with open spaces and urban biodiversity strategy and the use of nature-based solutions and SUDS.

Energy-water nexus has been considered even though the performance is not excelling. Specific actions have been taken and are envisaged in the future to contribute to improving the ecological status of water bodies (Meuse river and Dommel canal).

4.2.9. Wastewater treatment

Main Evaluator: Ana Lončarić Božić
Co-Evaluator: Giulio Conte
Ranking: 3rd

Comments:

The total wastewater load of ‘s-Hertogenbosch generated in 2014 equals the total load received by three WWTPs serving the city and operating in compliance with the UWWTD.

A high percentage (99.9%) of the population is connected to the wastewater sewerage system and three WWTPs while for the rest, a plan for connection has been made but not specified in the application.

Generated sludge undergoes digestion with biogas recovery, dewatering and incineration by the central Sludge Incinerator while the application indicates that the opportunities for supercritical gasification of sludge will be explored.

The municipality documented awareness and benefits of separating the rainwater and wastewater collecting system, reducing the energy for transporting sewage and increasing the efficiency of wastewater purification.

Future plans include the renovation of WWTP based on the Energy Factory Concept, utilising energy from wastewater, as well as production and agreed supply of biogas to Heineken brewery and the car fleet of the waste management service.

4.2.10. Eco-innovation and sustainable employment

Main Evaluator: Stefan Ulrich Speck
Co-Evaluator: Warren Phelan
Ranking: 3rd

Comments:

It is mentionned that 's-Hertogenbosch plays a central role in the agri-food sector, which is important for the city development. Discussion shows innovative and promising developments, such as the 'Agri-Food Capital' or 'Agri-food campus' initiatives.

Good information on financial support for eco-innovation processes is provided.

The city provides a comprehensive track record in past innovation in many eco-innovation areas (waste, lighting, etc), although some information is missing, i.e. there is nothing on green reporting by the city. The city's flagship in eco-innovation is the building for waste management as it is carbon neutral and sustainable. In addition, the waste management services collaborate with an adjacent company (Heineken brewery) and services (water board) in a form of industrial symbiosis.

The flagship eco-innovation 'SPARK' is a very interesting and encouraging approach to promote eco-innovation involving a whole range of different stakeholders. This is an interesting project for the future.

4.2.11. Energy performance

Main Evaluator: Manfred Fischedick
Co-Evaluator: Javier González Vidal
Ranking: 3rd

Comments:

's-Hertogenbosch demonstrated notable improvements in energy performance in recent years, particularly regarding improvements of energy performance in municipal property (expressed as energy labels) and energy use for public lighting (LED and dimmable lights). Renewable energies were increased by 16% compared to last year's application. However, a detailed discussion of the renewable vs. non-renewable mix of energy sources is missing.

's-Hertogenbosch plays a strong role as facilitator and supports a broad portfolio of stakeholder-specific projects fostering processes towards a sustainable city, including cooperative efforts for home owners, companies, housing associations and citizens (for example Energy Zero73, Deal 'Zero Energy Homes', 'Smart neighbourhood').

In 2008, 's-Hertogenbosch set the targets to achieve a carbon-neutral municipal organisation by 2020, a carbon-neutral built environment by 2035 and a carbon-neutral city by 2050. In that context the city can be seen as a forerunner and set very early, quite ambitious targets. However, it still remains unclear how the targets will be reached. The city mentioned in the application that at the moment, no clear strategy can be described. In general, notwithstanding the complexity, dynamics and uncertainties that have to consider when developing the right long-term strategies, there should at least be an idea about how to transform, for instance, the huge amount of monumental buildings from label B to carbon neutrality. In addition, the financial basis for supporting the ambitious target is

not clear (the amount of EUR 230 000 per annum seems to be quite low with respect to the ambitious target level).

The broad portfolio of stakeholder-specific actions and mutual efforts is absolutely commendable (including cooperative efforts with the business sector and large housing associations). The city understands itself as facilitator for implementation projects and processes. In that context, it has to be highlighted that the city is conducting several innovative approaches and projects (particularly in the building sector like Energy Zero 73, smart neighbourhood). Another commendable participatory approach is the Bossche Energy Convenant, an exchange and cooperation-orientied initiative comprising city administration, companies and educational institutions.

It is commendable that 's-Hertogenbosch has started drafting a 'Roadmap to carbon neutrality' for 2050 in 2015 in a participatory process with companies, institutions and residents. Five meetings were held. It remains to be seen which results can be achieved for the implementation plan 2016–2020 and how the approach will be continued.

4.2.12. Integrated environmental management

Main Evaluator: Jan Dictus
Co-Evaluator: Ian Skinner
Ranking: 3rd

Comments:

The city has an urban planning vision for the whole city development and an integrated environmental policy. Both the vison and strategy are from 2003. The spatial plan was updated in 2013 and is now part of a structural urban vision. Sustainable development is a basic principle of that vision.

The city has several leading environmental projects for its own administration. Some of these projects are connected with big investments. It is not clear how and whether the results are being multiplicated.

When preparing and implementing environmental policies, the municipality of 's-Hertogenbosch aims for a maximum participation of residents, businesses and non-governmental organisations.

Paleiskwartier, as flagship for integrated environmental policy, is a mixed area, with housing, work and recreation. It serves as an experimental area for planners and demonstration area for developers.

The choice for a simple but comprehensive approach (Compact, Complete, Contrast, and Sustainable) is good for communication purposes and serves as a clear guideline for all policies.

4.3. Nijmegen Technical Assessment

4.3.1. Climate change: mitigation and adaptation

Main Evaluator: Javier González Vidal
Co-Evaluator: Manfred Fischedick
Ranking: 4th

Comments:

The city provides emissions data and some trends for the last seven years with an overall good quality, but more detail on the analysis of those trends at sectoral disaggregation level would be useful.

Nijmegen has a clear vision for the future and has committed to very ambitious targets of climate and energy neutrality (this includes not only the general goal for the city to become energy neutral by 2045, but also a clear goal for the city adminstration to achieve energy neutrality already by 2030). The implication of all the city actors is considered key to success, and the general level of implication and participation of both businesses and citizens is commendable. In addition, the municipality leads by example in key sectors (buying green electricity and using a biogas car fleet, electric bikes and e-scooters).

The city has made use of effective partnerships (energy covenant and Power2Nijmegen) and EU projects (**Interreg IVB-project Future Cities**) to develop a very clear and well-structured strategy for sustainable policy with a remarkable and commendable focus on the economic opportunities, but more detailed information about specific actions implemented, investments and the monitoring system would have been welcome.

A few but impressive projects (e.g. the redevelopment of GDF-Suez coal plant, where a mix of low-carbon energy carriers will be implemented, or the Room for the River project) are highlighted as flagships on both mitigation and adaptation to shape the future of the city, the budget on climate and energy is showed until 2018, and some information about the long-term energy transition path that involves regional cooperation is mentioned. More details and timing of other future actions (e.g. transport) is encouraged to have a whole picture of the plans. A follow-up of the regional cooperation approach would be very much apprectiated as synergy effects could be achieved and facilitate the attainment of ambitious future goals.

Adaptation is definitely a key issue for Nijmegen, and it is very active in this area (spatial adaptation, water plan, and flood risk assesment). Some good examples are the ‘Room for the river’ project that implies a replacement of the Waal dike, and the construction of a secondary channel in the floodplain. This creates a unique urban river park in the heart of the city with space for living, recreation, water and nature.

4.3.2. Local transport

Main Evaluator: Ian Skinner
Co-Evaluator: Jan Dictus
Ranking: 1st

Comments:

Mobility is a pillar within Nijmegen’s sustainability agenda. The city is planning to involve its citizens with respect to sustainable mobility; it will take the opportunity of a revitalisation of a bridge to do this. It would have been good to know more about how citizens have been engaged in the development of existing plans.

Nijmegen has an extensive cycling network, including cycle superhighways, which link to surrounding towns, and thousands of bicycle parking places, some of which have dynamic referral systems. There is a clear categorisation of urban roads as 'access roads', where cycle lanes are separated from motorised traffic, and 'traffic limited roads', on which speeds are limited to 30 km/h. There is an evolving urban rail system, while there is also a rapid bus transport system linking important locations and neighbouring Arnhem.

The ring road has taken traffic out of the city centre and has allowed priority within the ringroad to be given to public transport and bicycles. Traffic lights are adjusted to the situation on the road to minimise braking and acceleration. There is a dynamic referral system for car parking, and drivers approaching the city on motorways are provided with real-time driving advice. It was noted that parking policy supports sustainable mobility, but it was not clear how this is achieved.

Future plans include investing in rail stations and lines, expanding the referral system to 10 000 bicycle parking spaces, expanding bus rapid transport and looking for sustainable ways of procuring transport services for those who cannot use buses. More cycling superhighways will be constructed.

Of the applicant cities, Nijmegen has the joint highest share of clean public transport vehicles (100%) and the highest modal share for cycling; the city also ranks well for modal share of car traffic and access to public transport, although ranks relatively poorly with respect to its public transport modal share. All of the city's buses run on natural gas, most of which is generated in fermentation plants in the region. There is a Green Hub at which goods for the city are brought together and then distributed within the city using clean vehicles.

4.3.3. Green urban areas incorporating sustainable land use

Main Evaluator: Annemieke Smit
Co-Evaluator: Jake Piper
Ranking: 1st

Comments:

Nijmegen shows that former industrial sites (brown fields) and old, uniform and dull residential areas can be transformed into diverse, green and multifunctional areas offering a high quality environment to different groups of citizens.

The involvement of residents, entrepreneurs and institutes is thorough and appears in past and present developments as well as the connection to maintenance of the existing green areas. A strong relation between the green areas and the people using them may both increase satisfaction with the areas and the joint efforts to preserve the quality of the Green Urban Areas.

The disconnecting of rain water from the sewer system and the subsidies for green roofs may work very well to adapt to intensive rainstorms. Apart from that, additional measures to counteract soil sealing may be useful in this rather densely built (and paved) inner city.

The high (green) ambitions Nijmegen presents both in the City Vision 2020 and the Sustainability Agenda are very promising for further development of the city. It is to be hoped that the economic crisis and a decreased housing market will not lower the sustainablilty standards and may even improve the connection with collective private commissioning and innovative entrepreneurs, artists and all organisations transforming the few industrial complexes into thriving places.

Nijmegen clearly connects the green and blue spaces to a healthy living environment, social cohesion, sports facilities, climate change adaptation and the green allure of the city. With this vision, the green urban areas are clearly presented as an asset to the city and not as a pressure on the city's budget.

4.3.4. Nature and biodiversity

Main Evaluator: Jake Piper
Co-Evaluator: Annemieke Smit
Ranking: 2nd

Comments:

Aspects of Nimegen's geographical context that are of particular relevance to biodiversity include the proximity of the Waal river, its floodplain and other landscape types. From its historical context, the city highlights past environmental damage and dense population within a compact city. Very important regionally is the National Ecological Structure which links in to local biodiversity sites and promotes connectivity within and around the city.

Nijmegen clearly values concepts associated with a green, healthy, biodiverse environment, and seeks to achieve sustainability. Whilst nature conservation around Nijmegen is very strongly affected by national structures and actions, and is in the hands of others, an array of measures is being undertaken that support biodiversity locally, especially green planning approaches including the Groene Draad and the development of the Oij polder for nature conservation and leisure. The application makes reference to a number of species of interest in the city, though there is no population or habitat trend data included.

Rehabilitation of natural areas has been in progress for some time, and planning and design of some newer suburbs has emphasised providing green semi-natural areas within urban zones. The city has maps and plans of structures and landscape types, though perhaps not of detailed habitats. There has been good work on controlling invasive species, and adherence to a pesticide reduction policy.

Given that Nijmegen makes good reference to social indicators benefitting from and associated with biodiversity, and together with the planning for green structures in place, it would seem that biodiversity has an assured role in and around this city. Factors that will help with this include the number of partnerships and the recognition of their importance, the strength of participation with the public and the means of communication/awareness-raising in place.

More detailed mapping of habitats and continuing monitoring and data collection (for species and habitats) would enable trends to be identified and analysed. Species and habitat action plans, backed by financial commitment and strengthened with well-chosen targets, could also be helpful in further improving Nijmegen's already good record on biodiversity.

4.3.5. Ambient air quality

Main Evaluator: Christer Johansson
Co-Evaluator: Diogo Alarcão
Ranking: 4th

Comments:

The city is located in an area with high regional background concentrations due to surrounding emissions from industrial areas, traffic, ships and agriculture. Despite this Nijmegen meets the air quality limit values since 2012 and measurements show steadily decreasing trends of both $PM_{2.5}$, PM_{10} and NO_2. Road traffic is the most important local source inside the city, but there are also important contributions from inland navigation and residential wood burning.

The first action plan is from 2005 and the current plan covers the period 2010 to 2017. The city is part of an advisory body (the Kronenburger forum) for discussions regarding environmental quality and cooperation between all stakeholders around the industrial estate, such as neighbours, business associations and environmental organisations. This is a very good way to promote public and stakeholder engagement and knowledge-raising.

The city has ambitious plans to reduce air pollutant emissions despite having relatively good air quality. The closing of a large coal-fired power station in January 2016 is expected to reduce total emissions of NOx and PM_{10} by 30%. The use of residual heat from waste incineration in district heating has reduced emissions from the energy sector. To reduce emissions from shipping Nijmegen stimulates use of LNG, implements shore power for cruise ships and promotes stricter standards for inland shipping. The finalisation of the ring road in 2013 reduced NO_2 concentrations in the city.

The whole city fleet uses biogas, and electric bikes and scooters are also available for civil servants. Buses are also biogas or natural gas, and plans are to further increase the number of biogas vehicles and biogas filling stations. Taxi and truck companies can receive subsidies when switching to gas. The electric charging infrastructure is being extended and organisations and private persons can receive subsidies for electric scooters replacing combustion motor vehicles. The city promotes clean goods transports to the inner city.

For the future, the aim is to continue to meet NO_2 norms and to implement its own soot norm for the city to keep better track of the impact on air quality and health of local particle emissions. Main focus areas are extended shore power and e-driving. Plans also include improving Park and Ride transport and bicycle traffic and to stimulate clean goods transports.

In addition to the national air quality monitoring network, the city is involved in a ‘Smart emissions project’ aiming at mapping out the local variability in air quality in areas where residents and workers spend much time every day, and involving interest groups and locals to raise awareness.

Considering the ambitious plans, the city could have more ambitious goals for air quality than just continuing to meet the NO_2 norm, for example having as a long-term goal to achieve the health-based guideline values recommended by WHO.

It would be helpful to make calculations to assess the contributions from the different local sources to the air quality in the city. For example, to see if actions are needed to reduce emissions from other sources like industry or residential wood burning. The city could possibly also consider introducing a low emission zone to divert traffic (especially high emitting vehicles) from the city centre to the ring road.

4.3.6. Quality of the acoustic environment

Main Evaluator: Diogo Alarcão
Co-Evaluator: Christer Johansson
Ranking: 2nd

Comments:

In Nijmegen, environmental noise is almost entirely due to road traffic noise. 35.0% and 6.8% of the population is exposed to road noise values L_{den} ≥ 55 dB and ≥ 65 dB, respectively. Regarding night period exposure, approximately 20.0% and 7.0% of the population are exposed to road noise values L_{den} ≥ 50 dB and L_n ≥ 55 dB. These are rather low share values and thus the actual situation seems to portray a good overall quality of the acoustical environment. No trends are however provided.

No formal quiet areas are defined in the city, but it is reported that the municipal area with noise impact lower than 45 dB L_{den} is accessible to 98% of the inhabitants in the immediate proximity of their houses. The province of Gelderland does possess formal quiet areas (green, agricultural areas) on the outskirts of the city. Although the reported municipal areas having noise levels lower than 45 dB L_{den} cannot be automatically deemed to be quiet areas, the 98% figure is pretty high, and thus this could be a good starting point for the formal definition of Nymegen's quiet areas (to be defined in a Noise Action Plan).

No comprehensive information is provided in terms of acoustic zoning although reference to an industrial zone with a noise buffer zone (until the 50 dB noise contour) is made. The 'higher values policy' carried out by the city should only be used in consolidated areas and not in new planned residential areas. In the last case, urban planning approaches such as the mentioned use of noise shielding buildings (which have no sensitive uses) should be encouraged, or noise levels at the sources should be reduced.

Implementation of interesting and relevant noise reduction measures contemplate 30 km/h speed limit zones in local residential streets (630 km out of a total of 700 km), 50 km/h speed limit zones on 70 km of main roads, resurfacing with low noise asphalt (currently 25 km), dynamic traffic control on arterial roads, subsidised improvement of façade insulation along busy roads and railways, installation of barriers along one railway line, events policy for reducing noise nuisance, as well as policies for limiting construction noise where the parties responsible can be required to offer affected residents an alternative place to stay. A strong municipal engagement is seen and the involvement of different stakeholders (for example 'Kronenburger Forum') is also carried out with noise monitoring actions and communicating findings with the citizens. A survey done every two years about the effects of noise (traffic, events and neighbours) on citizens is also carried out, which is a good practice.

Future actions consider additional noise reduction measures (30 km/h speed zones, low noise asphalts on 20 km of roads – detailed road network is provided, façade insulation subsidization – EUR 3 million for 550 houses), but specific short- and long-term objectives concerning the quality of the acoustic environment should be described better, with specific actions concerning the definition, management and protection of quiet areas.

Important actions included in the city's sustainability agenda such as encouragement of cycling (with new and renovated bicycle superhighways – budget EUR 19.2 million, promoting electric mobility (70 charging points in total in the next years) and increasing the railway transport share (budget EUR 80.5 million) are also contemplated. A quantification of the foreseen reduction in terms of people exposed to noise should be provided since it would show higher coherence with envisaged actions.

4.3.7. Waste production and management

Main Evaluator: Warren Phelan
Co-Evaluator: Stefan Ulrich Speck
Ranking: 1st

Comments:

Nijmegen has a high performing waste management system in place and was ranked in the top position for this indicator. The application demonstrates that the city has a strong vision for waste management demonstrated by a long-term commitment to achieving challenging recycling performance targets. The current rate is 67% and the city is committed to increasing this level to 75% by 2020.

The city has comprehensive measures in place to raise awareness, prevent, and reuse, and the application shows that waste generation has continually been reduced each year between 2010 (474 kg/inhabitant) and 2014 (409 kg/inhabitant). Implementing the polluter pays principle though incentivised waste charging has helped the city and its citizens to reduce waste generation.

The city has a strong commitment to public awareness and information on waste, with a focus on specific streams each year under a consistent campaign heading (for example: waste = resources). The city recognises the value of engaging with citizens and taking on board their views to ultimately change the behaviours of consumers and in doing so improve the waste system.

The city does not landfill any domestic waste and is focused on reducing the quantity of residual waste produced by citizens by reversing collections, with more kerbside collections of recyclables and less for residual waste. The city's strategy is to reduce residual waste to less than 100 kg per citizen.

The city has established a robust network of treatment infrastructure to manage its waste including collection systems, sorting facilities, anaerobic digestion and a regional waste-to-energy facility. A regional district heating system is being put in place with 14 000 households connected, with more to be added. By implementing this project, the city is focused on capturing and putting to better use the heat generated from the thermal treatment of its waste.

4.3.8. Water management

Main Evaluator: Giulio Conte
Co-Evaluator: Ana Lončarić Božić
Ranking: 2nd

Comments:

Urban and domestic consumption are very good, compared to the EU average, but the perfomance of Nijmegen with an urban consumption of 178 litres/day per person and a domestic consumption of 126 litres/day per person is not so good among the 2018 candidate cities.

The city is active in promoting sustainable water use; unfortunately, greywater reuse on a large scale is not allowed by Dutch law, hindering the opportunity to use such a sustainable solution in new sustainable urban settlements (such as Waalsprong, Ecopolis).

Contamination of groundwater occurred in the past that cannot be remediated: that's why most urban wells will be abandoned for new wells in better preserved areas. Apparently, however, there is room to decrease non domestic water use, which could allow a reduction of water needs from new wells.

Actions in the past have been mainly oriented to improve potable water quality, reduce consumption, disconnect rainwater from sewerage system, prevent flooding. Apparently past strategy has been quite effective, but the application should provide some details on the results (e.g. pictures of innovative solutions, such as SUDS, natural water retention measures, etc.).

According to the application, 132 hectares of the urban area served by combined sewers have been disconnected by rainwater: some information in additional information could help: e.g. what is the destination of diverted water (white water network pipeline discharging into existing water bodies or infiltration in the upper layer of soil or groundwater)?

Plans for the future concern mainly adaptation to climate change and flood protection, mostly using green infrastructure and Natural Water Retention Measures approach. One weak point concerns the plan to replace the 4.4 million m^3/year of the Nieuwe Markt wells with a conveyor bringing water from far away, while apparently there is room for a certain reduction of consumption. A strategic objective in terms of water consumption could be expected. The possibility could be envisaged of influencing the state policies on greywater reuse, as has already happened in other fields.

4.3.9. Wastewater treatment

Main Evaluator: Ana Lončarić Božić
Co-Evaluator: Giulio Conte
Ranking: 1st

Comments:

Nijmegen is served with two WWTPs complying with the requirements of UWWTD. The high proportion of wastewater load from households and companies (99,95%) is connected to the sewer system (collection + WWTP). The remaining 0,05% that is currently discharged untreated to surface water or soil should be connected to the sewer system within 5 to 10 years.

Nijmegen documented continuous effort in improvement of collection and treatment of sewage and rainwater runoff. Monitoring of sewer systems is improved and 97,5% of the sewers has recently been inspected by video to determine the urgency of repair and renovation.

Recent floods triggered development of rainwater risk management, which includes usage of simulation models, identification of risk areas, drainage and gradual disconnection of the rainwater from the sewer system.

With the aim of protecting public health, improving the living environment and protecting the environment, Nijemgen's 'Municipal Sewage Plan Nijmegen 2010–2016' contains a strategy on effective cleaning, inspection, repairs, renewal and improvements budgeted from the sewage charges.

According to the future plan 'Vision for sustainable and efficient purification', sewage is no longer seen as waste, but as a potentially valuable source of raw materials, energy and reusable water; WWTP measures planed by 2021 are outlined accordingly.

4.3.10. Eco-innovation and sustainable employment

Main Evaluator: Stefan Ulrich Speck
Co-Evaluator: Warren Phelan
Ranking: 2nd

Comments:

Nijmegen is an active leader in eco-innovation (for example, green public contracts) and higher education is also actively involved in this area. The future mission of the city, 'Always Nijmegen', addresses the idea of being socially inclusive and wants to boost the circular economy via existing eco-innovation clusters, but also by supporting new business ideas including bio-based economy.

The city gives great attention to its public transport (green hub) and the output of the waste processing company is used for local transport. The area has a regional cycle superhighway

The city has an impressive track record on reporting (annual environment report since 2002) including information on budget allocation.

The application is let down slightly when it comes to emphasising green jobs and their promotion; the application highlights cycling as the flagship eco-innovation, which is a bit surprising considering other eco-innovation activities mentioned in the application

Public participation and raising awareness on the green economy take place to a certain degree. There is a rather low number (and share) of electric vehicles owned by the municipality.

4.3.11. Energy performance

Main Evaluator: Manfred Fischedick
Co-Evaluator: Javier González Vidal
Ranking: 2nd

Comments:

Positive developments can be seen for the time period 2008–2014 in terms of energy use of buildings (15% decline despite an increase of 7,000 residents), specfic energy demand of municipal buildings (decrease from 145.3 to 138.4 kWh per m^2), business sector (-17.3%) and private persons (-7%). However it is not clear and explained why such a decrease could be achieved (may be partly through the wam winter in 2014).

Nijmegen improves energy performance by integrating locally produced sustainable energy in municipal buildings and in the city's real estate and by having cooperations and agreements with housing cooperations, companies and neighbouring municipalities. In March 2015, Nijmegen's district heating was opened, connecting 4 000 houses. 'The aim is to extend district heating in the city and to connect it to the district heating of Arnhem. By 2020, district heating will provide 3.4% (now 0.8%) of the total Nijmegen energy requirement.' In that context, it is important to be transparent about the energy carrier basis of the cogeneration systems. If waste plays a significant role, it should be guaranteed that

sustainability issues are reflected properly. The transformation of the coal-fired power plant of GDF Suez into a 'Green Energy Delta of Nijmegen' is a remarkable project.

The section 'Past Performance' highlights various measures to achieve the goal of being a climate-neutral municipal organisation by 2015 (and energy neutral by 2045). The amount and intensity of measures as well as the type of meausures (e.g. revolving fund) is absolutely commendable. However, it remains unclear to what extent the goal is realistic.

On the aggregated level the objective is to make Nijmegen an energy-neutral city by 2045, i.e. 15 years later than the municipal organisation. Amongst other means, the targets will be reached by producing 15% sustainable energy by 2020 and 67% by 2045. 'The rest of the required energy can be generated sustainably on a regional level' (even having no specfic explanation about the underlying regional renewable energy sources, the general tendency of Nijmegen to make use of regional cooperation is convincing and commendable; there are several other examples of regional cooperation in the strategy). Energy consumption will be reduced by 50% by 2045. Intermediary objectives are the achievement of 12% energy savings by 2015 and 22% energy savings by 2020 (compared to 2008).

The target to be an energy-neutral city in 2045 is without any doubt ambitious. However, it remains unclear to what extent the overall goal and associated sub-goals is realistic. Particularly with regard to the long-term strategy, the concrete role of the City of Nijmegen in supporting initiatives and processes remains sometimes unclear. On the other hand, there are various concrete businesses or cooperative-driven measures and plans mentioned that are planned or already in the implementation phase. In addition, the participatory co-creation process, 'Power2Nijmegen', for creating a road map until 2045 is commendable. Further information about whether the process from 2012 will be continued in a new format would be desireable.

4.3.12. Integrated environmental management

Main Evaluator: Jan Dictus
Co-Evaluator: Ian Skinner
Ranking: 1st

Comments:

The Sustainability Agenda is in fact the leading document. It represents a logical step in a continuous and broadly supported process since 1992.

Citizens seem not to be strongly involved in the strategy development. The city works mainly with companies, stakeholders and NGOs in targeted cooperation actions.

All relevant council decisions must have an 'environmental paragraph'. There is annual environmental reporting. The sustainability agenda has a four-year cycle. There is a sustainability council/board in which all relevant aldermen have a seat. This means that coordination already takes place on the highest political level.

The sectoral plans all relate as much as possible to the five main themes of the City Vision 2020. Beyond that, the city has also committed to a long-term vision (2045) as for Water and for Energy.

4.4. Umeå Technical Assesment

4.4.1. Climate change: mitigation and adaptation

Main Evaluator: Javier González Vidal
Co-Evaluator: Manfred Fischedick
Ranking: 2nd

Comments:

Umeå has proved to have a good monitoring system providing information on emissions trends by sector. Besides, changes in trends have been reasonably explained based on the effects of implemented actions.

The targets of the city are ambitious in the medium term (50% reduction by 2025). The holistic approach of the climate action plan (2009) that complements both the energy and air quality action plans, the progressive role model of the city at EU and international level, the active involvement and participation of all the city actors and the spirit of innovation create a great context for the fight against climate change.

The city started implementing measures to improve district heating sustainably decades ago. There have been interventions in all the relevant sectors and they seem properly monitored, but more information on the investments would be welcome.

Some innovative schemes are commendable and worth mentioning: Sustainable Alidhem (a pilot project for a sustainable urban development including social, technical, environmental and economic aspects that won the European Sustainability Award 2013) and the green parking payoff (a scheme that aims to encourage employers to reduce the number of parking spaces available for employees and to encourage the use of more sustainable modes).

Future plans are based on the action plans mentioned that complement each other (energy, air quality and GHG contribution of the municipality), and town planning is key to reduce the city impact in the long term (Comprehensive Plan 2011).

Aware of its potential for renewable electricity, the city sees many opportunities for electric vehicles and has the objective of having a climate-neutral energy system by 2018 and becoming the world leader in sustainable construction in a cold climate by 2020 (a vision that has been developed with all stakeholders and shows the will for leadership). These and other circular economy initiatives are commendable.

In recent years the city has developed a number of measures related to adaptation. These include detailed comprehensive plans of the river and the coastline (including guidelines for future land use according to high water flows and landslide), assessments of vulnerability, identification of ongoing adaptation work, analysis and identification of the need for adaptation and recommended action.

To identify and improve the adaptive capacity and its vulnerability a ‘Risk and vulnerability analysis’ was made and adopted by the city council in 2012.

One concrete area of climate proofing relates to the Ume River running through the city centre. To prevent flooding and landslides on the river banks, safeguard measures and risk assessments are included in relevant planning processes.

4.4.2. Local transport

Main Evaluator: Ian Skinner
Co-Evaluator: Jan Dictus
Ranking: 2nd

Comments:

A SUMP is integrated into Umeå's comprehensive plan, which sets out a strategy for sustainable growth. The majority of growth will be within a 5 km radius of the city centre and along the main public transport lines. There are other relevant plans, e.g. for cycling and parking. The objective is to increase the modal share of public transport, cycling and walking to 65% (from the current 49%) by 2022. There was no explicit mention of stakeholder engagement in the development of the SUMP.

The city has well developed bus and cycle networks. A developing railway network is contributing to the development of a commuter rail system. Cycle parking facilities have been built at relevant locations to facilitate multi-modality. Bus priority at junctions and dedicated bus lanes, as well as increased service frequencies, all aim to improve the attractiveness of public transport. The bicycle network and bike parking faciltities will be expanded.

Car traffic will be reduced in the centre, which will allow for the transformation of streets into those that prioritise public transport and other modes. The completion of the ring road in 2021 will be taken as an opportunity to completely redesign what were previously the main arteries. The city is actively trying to reduce workplace parking, e.g. through its green parking payoff, and will explore expanding this scheme to residential property.

In spite of its approach and policies, Umeå has the highest modal share of car traffic of all of the applicant cities and does not compare well to other applicants with respect to access to public transport. However, it has one of the cleanest bus fleets, with plans to equal the best of the other applicants in 2016, and has the second highest modal share for cycling.

There is a low emission zone for freight vehicles in the city, and a multimodal logistics centre has been developed. Opportunities to shift freight to rail and sea are being facilitated. Cargo bikes will be made available to public users and taken account of in planning. The city is investing in fully electric buses and ultra-fast charging stations. The number of electric buses will increase from the current two to 24 by 2020, which would be nearly half its fleet. More charging points for the public will be added.

4.4.3. Green urban areas incorporating sustainable land use

Main Evaluator: Annemieke Smit
Co-Evaluator: Jake Piper
Ranking: 4th

Comments:

Umeå obviously acknowledges the downsides of being a city with a growing population, such as urban sprawl, soil sealing, reduced access to green areas and increased vulnerability to storm water events. The six strategies in the comprehensive plan regarding the municipality's sustainable development, all based on Umeå's agreement with the Aalborg Commitments, form a base to recognise, prevent and counteract the negative impacts of a growing city.
The design and improvement of green urban areas place a strong emphasis on lived experience, thus ensuring that all residents can find a satisfactory environment for

recreation, sports, playing or finding quiet spaces. The urban forest has not only been connected to the city by building a pedestrian bridge, but is also accessible to disabled citizens. Accessibility to green areas is important, both in summer and winter, thus enabling citizens to play sports and exercise in natural surroundings all year, thus improving public health.

As a city with a relatively young and - due to the university – probably highly educated population, Umeå aims to be a city where everybody is included. The city implements co-creation and citizens' dialogue in several urban planning processes, to enhance inhabitants' commitment, both in newly designed (green) areas and in the improvement and maintenance of those areas. The application shows very inspiring examples of co-creation. The application however doesn't explain how the city ensures that not only well-informed, highly educated or active citizens are heard and included, but also less advantaged groups.

Experience of green urban areas and the ability to perform outdoor activities are an important factor in designing a sustainable city and improving overall public health. Other advantages of green, like cooling and cleaning the air, providing buffer zones during storm weather events or playing a role in connectivity for biodiversity are also mentioned. However, a more integrated vision of the benefits of green areas (ecosystem services) for different actors in the city seems to be less well developed.

Umeå shows that a comprehensive plan for sustainable development of the city can indeed lead to a green, inclusive, attractive and healthy living environment. The combination of densification of the urban fabric and increasing the green areas within the city limits by tranforming former industrial areas, results in diverse land use with a wide range of outdoor posibilities for all residents. The strong influence of citizens in planning processes not only improves the design but also ensures future use and maintenance of the public green areas.

4.4.4. Nature and biodiversity

Main Evaluator: Jake Piper
Co-Evaluator: Annemieke Smit
Ranking: 4th

Comments:

Umeå has a small population at present but the Comprehensive Plan calls for a very significant increase over the next 35 years. The urban area of the municipality is set within a coastal region of rural area of forests, wetlands and lakes, a good proportion of which is within either N2000 or nationally protected biodiversity sites. There are city objectives and guidelines for the protection and increase of biodiversity, with two large protected sites within the urban area. The city's climate is unlike that of other applicants. Of the total municipality area, 13.1% is protected semi-natural/green space.

Much of the biodiversity data mentioned in the application relates to bird species, with brief mention of other life forms. Mapping of biotopes and also ecological services provision is currently in progress. Public awareness of biodiversity is a major objective of policy. A green infrastructure system has been mapped. Whilst objectives and guidelines have been put in place, strategy and planning are not yet finalised. A nature conservation foundation with significant funding has been set up as part of a compensation scheme. The restoration of N2000 sites is an important part of the municipal strategy for nature enhancement.

The city points to its work in raising the status of nature conservation, and to the monitoring in place for certain favoured species. There are various programmes for consulting and educating the public, including Nature Schools work. Importantly, there is also induction on sustainability for new recruits to the city administration. Various monitoring programmes are mentioned.

A five-year horizon is used in planning Umeå's green structure. The city is conscious of the role of the region's rich natural resources in enhancing lives and livelihoods. There is some indication of funding plans for the future (EUR 75 000 for the green structure), and there is an offsetting/compensation scheme where biodiversity will be affected by infrastructure development (railway); a MAB biosphere project is also in planning. Umeå's plans to integrate assessment of ecosystem services into planning projects sounds like a promising development.

There is some mention of biodiversity integrated into policy on climate change and water policy, but there does not appear to be a strong statement of ambition and target for the local biodiversity within the city boundaries and for its enhancement, perhaps because this is not seen as a priority, given the existing wildlife situation.

4.4.5. Ambient air quality

Main Evaluator: Christer Johansson
Co-Evaluator: Diogo Alarcão
Ranking: 3rd

Comments:

Umeå has relatively clean air, and concentrations have decreased. The daily PM_{10} limit value was only exceeded in one year (2013) during the period 2006–2014. The hourly NO_2 limit value was exceeded in 2011, but not in 2012–2014. The annual mean value for NO_2 is just below the limit value and seems not to be decreasing despite a large reduction in the number of cars. The highest concentrations depend on unfavourable meteorological conditions during winter. Temperature inversions and low wind speed are common during winter and this can lead to very high concentrations even if the local emissions are rather low. The local contribution to NO_2 is 72% of the total level, and for PM_{10} local sources contribute 25–30%.

The first air quality management plan was adopted in 2009. This focused on reducing NO_2 concentrations. A low emission zone was introduced in 2014. Prohibition for passage of heavy duty vehicles was introduced in 2013 and it contributed to a 25% decrease in heavy duty diesel traffic on the main road passing through the inner city. In 2013 and 2014 binding of road dust was carried out to reduce suspension of road dust and thereby reduce exposure to PM_{10}.

The city has established a car pool that can be utilised by employees as well as citizens. Ultra-fast charging systems for two electric buses have been put in operation.
The public is informed about the air quality on large interactive screens in the city. Signs with information on the air quality have been placed along the major city entrances. The purpose is to divert traffic to the ring road when air quality is poor in the city centre. Impact on air quality of different plans is evaluated using GIS-based forecasting calculations.

Umeå has very ambitious action plans that are beneficial for air quality, noise and climate. A new plan adopted in 2015 has the reduction of NO_2 emissions as its main aim. The long-term objective is to have the best public health in Sweden by 2020. Part of this is expected to be achieved by the completion of the ring road in 2021. With this in place, the highway passing through the city centre will become a local city street with far fewer traffic

emissions and densification of the city will be enabled. Other plans to reduce city traffic emissions are by increased possibilities to walk, cycle and use public transport, introduce electric vehicles in the car pool and establish new car pools. Nine more ultra-fast charged electric buses will become operational in 2016 and the vision is to add another 24 by 2020. The rest of the bus fleet should be Euro VI.

An interesting good practice is the so-called 'green parking payoff', where property owners get reduced requirements for providing parking spaces for employees. In return, property developers provide sustainable mobility services, such as providing bicycle facilities, connecting the property to a carpool or allocating resources to mobility management funds.
All actions focus on local transport, but it is not clear if there are there other sources such as wood burning that need to be considered to secure clean air.

4.4.6. Quality of the acoustic environment

Main Evaluator: Diogo Alarcão
Co-Evaluator: Christer Johansson
Ranking: 1st

Comments:

The main noise sources are derived from road traffic, and to a much lesser extent from railway sources. Noise exposure from air traffic and from industrial activities is negligible. Reported shares of the population exposed to L_{den} values ≥ 55 dB and ≥ 65 dB are very low, 28.0% and 3.7% respectively. No data for exposure to L_n values ≥ 45 dB is provided, but population shares of 14.0% and 4.8% respectively exposed to L_n values ≥ 50 dB and ≥ 55 dB are also pretty low. It is reported that 88% of the population lives within 300m of quiet areas, such as parks and recreation areas, in which low noise levels are situated in the interval 35–40 dB LAeq.

Acoustic information is given on various existing quiet areas (parks, recreation areas) through noise levels mapping (down to 35 dB). These quiet areas with impressively low noise levels (< 45 dBA, or even < 40 dBA LAeq (24 h)) are distributed around the city and it is stated that in central Umeå there are parks that have noise levels of about 50 dBA on half their surface or more. This information is the starting point for the formal definition, management and protection of quiet areas.

Although not using any specific acoustic territory classification, the long-term goals in the Noise Action Plan adopted in 2013 focus particularly on three categories: residential areas, schools and parks, and recreation areas (quiet areas). In this regard, the city adopted urban planning and building development guidelines in order to improve the urban sound quality. The preservation, extension and improvement of existing (and envisaged) quiet areas is considered in the city's noise action plan and comprehensive plan. Overall, stakeholder interaction and involvement by the city are considered good (projects like the downtown located 'Seasons Park'/'Peace and Quiet' park – cost about EUR 3.6 million, and Umeå Urban Forum).

Specific road noise reduction measures such as noise barriers, speed reduction, traffic rerouting in major thoroughfares, through-traffic ban of heavy vehicles in the city centre and mobility planning and regulations have been implemented. The world's first ultra-fast charged electric buses with hybrid backup in the city public transport bus fleet (9 buses as per 2016) is noteworthy, and will have a considerable effect on reducing noise levels (as well as air pollution) in the city. Façade insulation improvement was done along the renovated Bothnia railway line, but also in other noisy zones and financial contributions to high noise insulation windows were provided by the city.

Various communication actions with the citizens are detailed, such as the online noise map, regular media advertisements, web page information, direct mailing and information on the potential financial contributions for noise prevention measures given to relevant house-owners. Novel approaches, such as a soundscape-like installation (natural sounds, bird-songs), inspired by the works of the well-known Swedish author Sara Lidman, developed at Umeå central train station, are noteworthy and should be further adopted in future actions.
An annual municipal budget is allocated to noise prevention measures for property owners in residential areas (EUR 131 000). In 2013, the costs related to the improvement of indoor noise levels in schools and outdoor noise prevention measures, such as noise barriers was EUR 283 000. Eight electric buses were ordered and an additional subsidy of EUR 175 000 was provided by the city.

Significant long-term objectives are detailed in the Noise Action Plan 2013–2018. In order to reach these ambitious objectives, various actions to reduce impact from noise and to maintain and extend quiet areas are defined. The fleet of electric buses will have 33 buses by 2020. Stakeholder and citizen involvement by the city will continue, such as within the scope of the comprehensive plan for 'Röbäck' and of the renewed playground in 'Park Hedlundadungen' (budget EUR 1.4 million). The city has allocated EUR 105 000 per year during 2016–2018 for maintenance operations in existing noise barriers and EUR 5.2 million for the building of the bridge connecting the city to the new park and quiet area 'Bölesholmarna'.

4.4.7. Waste Production and Management

Main Evaluator: Warren Phelan
Co-Evaluator: Stefan Ulrich Speck
Ranking: 2nd

Comments:

Umeå has prepared a high quality application in response to the waste management indicator, demonstrating that the city has a sophisticated waste system in place, with investments made at all levels including a robust network of treatment infrastructure such as a biogas plant, composting plant, waste to energy facility, recycling centres and bring bank facilities.

The city has a specific waste plan, which sets out a framework for the management of waste by 2020 and is being evaluated regularly. There are other city plans in place that have measures related to waste management also. The city has a clear vision for its waste systems demonstrated through its high quality data systems which help to measure progress and inform future decisions.

Prevention and enforcement measures are features of the waste system of the city, with the objectives of informing, educating and engaging citizens. The city has in place an effective waste charging system, which rewards citizens who prevent and divert waste from the residual bin. The city also has comprehensive actions to promote and facilitate the reuse of materials by its citizens with the ambition of improving activities even further by 2020.

The city has almost eliminated the landfilling of municipal wastes, with thermal treatment used to treat residual waste. Thermal treatment has been in place since 1970 and the current rate of incineration is higher when compared to the rate of recycling. The city has invested in the thermal treatment facility, which is highly efficient at generating electricity and heat, which is connected to a district heating system.

The city has a source-separate kerbside collection system that targets specific streams, food and residual wastes, although these systems are currently not as developed as in other cities. The city intends to improve the collection system with future targets in place to roll out out more kerbside systems, thereby improving collection of specific streams. Umeå plans to continue to build on its well established systems with a strong list of short- and long-term objectives, actions and targets set out in the city's waste management plan.

4.4.8. Water management

Main Evaluator: Giulio Conte
Co-Evaluator: Ana Lončarić Božić
Ranking: 3rd

Comments:

Per capita water consumption in Umeå (urban consumption 175 litres/day, domestic consumption 128 litres/day) is good compared to the European average but does not excel among the 2018 candidates. Water losses could still be improved, being the second worst among the candidates. The use of greywater for non-potable purposes is also practised, though not on a large scale.

Rainwater management appears to be well oriented towards the diffusion of natural infiltration and storage systems. It's also clear from the application that the issue of flood prevention is not a high priority, due to the city's favourable conditions in terms of flood risk.

The water-energy nexus has been carefully considered, even though the performance is not that good due to the specific climatic conditions. The nexus is quite interesting – in a water-rich environment, less consumption means less wastewater to treat, which has been used for an awareness-raising campaign.

Past actions have been aimed at providing good quality drinking water, an efficient distribution system and a tariff scheme able to favour rational use. The 'echolog' experience for awareness raising is a very interesting good practice to be disseminated throughout Europe.

Future plans aim at improving the water-energy nexus, finding alternative water sources, reducing leakages and facing climate change, with an overall ambitious and integrated view.

4.4.9. Wastewater treatment

Main Evaluator: Ana Lončarić Božić
Co-Evaluator: Giulio Conte
Ranking: 2nd

Comments:

Umeå documented good wastewater performance of the city, successfully dealing with the challenges of the Nordic weather and sparse population.

100% of the total wastewater load generated annually is treated whereas 90.6 % of the population is connected to the collection system and WWTP. For the rest, separate wastewater treatment solutions are provided. The complete collection system is separated, which stands out as a positive example.

Umeå municipality is served by 19 WWTPs. 90% of total generated wastewater load is treated at the largest UWWTP, complying with the requirements of the UWWTD. This UWWTP has recently been expanded to meet expected requirements for 2030.

Umeå is a positive example of putting effort into public awareness-raising campaigns, education, cooperation projects, information leaflets and brochures aimed at minimising the presence of unwanted substances and improving the quality of incoming wastewater.

Current sludge management practice includes usage of dewatered sludge as a sealing material in the landfill. As the landfill capacity is expected to be reached by 2020, the need for a new sludge management strategy is recognised but the operational plans are yet to be developed. The action plan to expand monitoring and improve control of overflow is in place and the budget allocated.

4.4.10. Eco-innovation and sustainable employment

Main Evaluator: Stefan Ulrich Speck
Co-Evaluator: Warren Phelan
Ranking: 1st

Comments:

The city follows a broad approach of eco-innovation in all environmental areas (waste, energy, transport, etc) and information on budget allocation is provided.

The city is involved in promoting green skills/green jobs (Cleaner Growth, BIC Factory and Uminova Innovation). It is done with the goal of involving the broader public.

The planning is done in a systematic way with a clear strategy: 'comprehensive planning/ systemic thinking'.

Future plans including some target setting (10.C) but are lacking some information on future budget allocations.

Few initatives are mentioned in relation to the promotion of green skills or jobs, mostly related to entrepreneurs. Something could be done (or mentioned) about reaching the general population as well.

4.4.11. Energy performance

Main Evaluator: Manfred Fischedick
Co-Evaluator: Javier González Vidal
Ranking: 1st

Comments:

Umeå is a fast growing city (120 000 inhabitants today, 200 000 in 2050) that aims to develop sustainably regarding social, ecological and economic criteria. Umeå can be characterised as an innovation (knowledge) driven city with already outstanding characteristics: climate-neutral energy system by 2018 (without industry and transport), 80% covergage of district heating, 100% renewable energy-based electrictity generation, participatory development of strategies.

Umea demonstrates positive developments with regard to several indicators; the development of the renewable vs. non-renewable energy mix is clearly documented (since 2003/2009) and some data reaches back to 1990. Total energy use 'has remained constant since 1990, a de facto 22% city-wide reduction of energy use/capita' as population grew in that timeframe. Total heating has a share of 79% renewables, electricity 99% and energy demand of municipal buildings is covered by 87% by renewables. Energy use in municipal buildings could be reduced by 20% since 2001; 'the city monitors energy performance in all municipal buildings'.

Umeå follows a strong cogeneration approach with a city-wide district heating network. 'Today 80% of the buildings in Umeå are connected and nearly all municipal buildings are connected to district heating, buildings located outside the network use bioenergy or heat pumps. Renewable energy application shall be increased in district heating system over the course of the coming years'. Sustainability criteria are applied for biofuels.

'Umeå Energi, the municipal utilities company, offers 100% renewable electricity to its customers, with guarantees of origin. Umeå is a net exporter of renewable electricity.'

'Sustainable Alidhem', a national pilot project focusing on large-scale sustainable renovation of 1960s and 1970s buildings and the construction of new low-energy buildings, demonstrates impressively an energy reduction of more than 40% in five years.

Umeå serves as a cutting-edge city in the country due to its standard, set to improve energy perfomance above national requirements: 'The municipality and Bostaden, a municipality-owned housing company have both decided that energy use in new buildings shall not exceed 65kWh/m^2/year, compared to national guidelines for northern Sweden 130kWh/m^2/year, as contributions to EPB Directive (2010/31/EU).' In Umeå there is 'the world's northern-most and northern Sweden's first certified public passive house', a pre-school using less than 15kWh/m^2/year for heating. Umea drives forward sustainable business opportunities e.g. via a network for sustainable construction (cooperation of 50 companies) or demonstration projects (e.g. 3D printing of house components).

Umeå has targets that are in line with national level (-20% energy use by 2020 compared to 2008, 49% renewable energy of total energy by 2020, -40% GHG emissions by 2020 compared to 1990, net zero GHG emissions by 2050, fossil fuel independent vehicle fleet by 2030). Furthermore, Bostaden, the municipality-owned housing company managing 1.3 milllion rented apartments, has a target of a 20% reduction in overall energy use by 2020 compared to 2007.

To reach these goals, promising measures are planned and a 'green' scenario demonstrates possible developments in contrast to a 'Business as Usual' pathway. However, a concrete strategy or roadmap for future development is missing.

4.4.12. Integrated environmental management

Main Evaluator: Jan Dictus
Co-Evaluator: Ian Skinner
Ranking: 2nd

Comments:

The City Vision 2050 is broadly accepted and integrated in all policy fields.

Stakeholders and civil society are being involved in strategic planning. In some cases, Umeå has gone further. A targeted dialogue was set up with specific interest groups, and

involvement of the wider public was initiated. The dialogue is becoming more and more structured and part of common work procedures.

The result from monitoring the strategies in the comprehensive plan is used in the current process of updating the comprehensive plan. Also studies have been made on the process of participation. Evaluation of the effect of policies is taken very seriously.

The national Swedish project for schools and schoolteachers is very well implemented in Umeå.

The future plans of the city regarding integrative environmental policy may not be very ambitious or innovative, but merely a continuation of the present way of working.

5. APPENDICES

5.1. Appendix A: Application Form for EGC 2018

Application Form for the European Green Capital Award 2018

City Introduction & Context

Give an overview of the city and a general background to the application, including examples of social and economic sustainability in the city.

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

Provide a description of the key environmental challenges which the city faces including historical, geographical and/or socio-economic factors which have influenced the cities development.

The city's infrastructure plan should be briefly explained.

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

Please also complete the following table:

Indicator		Units	Year of data
Population		Inhabitants	
Area		km2	
Population Density		Inh/km2	
GDP		€/Capita	
Köppen climate classification			

(max. 1000 words & 5 graphics, images or tables)

Application Form for the European Green Capital Award 2018

1. Climate change: Mitigation & Adaptation

Refer to Section 2.1 of the Guidance Note

1A. Present Situation

Please complete the following table:

City Reduction Targets (add rows if needed for further commitments)	**Base Year**	**Target Year**	**% Reduction**
C02 Emissions / capita	**t CO2/inh - Total**	**Transport t CO2/inh**	**Total (less transport) t CO2/inh**
Total CO_2 emissions (tonnes) per year		Tonnes	Please insert year of data here
Total CO_2 emissions per MWh electricity consumed		Tonnes	Please insert year of data here

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.

Give details of any Baseline Emission Inventory prepared by the city, mentioning the baseline year and the applied methodology (direct/indirect emissions, data collection process, monitoring system), as well as the competent department. Provide a breakdown of the main sources of emissions.

Where available, information/data on the inventory and on the following indicators should be provided from previous years (5 – 10) to show trends, together with an explanation of the evolution.

Scientific grounds should be provided for any claimed reduction in CO_2 emissions. Describe how the inventory system and information is integrated in the design of policies and measures.

Provide figures (in the table above), and comment on, the following specific indicators for the city:

1. Total CO2 emissions (tonnes) per year;
2. CO2 emissions per capita (tonnes) per year;
3. CO2 emissions 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 compared to 1990).

Please also state clearly what year the data provided relates to.

Mention any target(s) adopted specifically for the municipal administration (e.g. carbon neutral municipality by 2020, adaptation measures set on municipal level).

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Regarding adaptation to climate change, please mention if your city has developed a comprehensive local adaptation strategy and/or integrated adaptation to climate change into existing relevant plans. (eg if your city has joined or is planning to join the Mayors Adapt initiative)

(max. 600 words & 5 graphics, images or tables)

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 and how the implementation and impacts have been monitored.

Make reference to:

1. An overall strategy for climate change or any other strategy or action plan to reduce emissions, and allow adaptation 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.
4. Measures against the heat island effect in urban areas based on nature-based solutions/Green Infrastructure

Describe the city's approach to adaptation to the impacts of climate change, including the works performed to identify and improve the adaptive capacity of the city and its vulnerability and on adaptation plans.

Provide details on the monitoring system (frequency, responsibility, outcomes) and how lessons learned have been used.

(max. 1200 words & 5 graphics, images or tables)

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 and staff allocations, and monitoring and performance evaluation schemes.

Make reference to any long-term strategy employed and how it integrates other environmental areas.

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

(max. 800 words & 5 graphics, images or tables)

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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)

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2. Local transport

Refer to Section 2.2 of the Guidance Note

2A. Present Situation

Please complete the following table providing the most recent data that is available:

Indicator	Data		Units	Year of data provided
Proportion of population living within 300 metres of an hourly (or more frequent) public transport service			%	
For all journeys under 5km, proportion of these journeys undertaken by: i) car, ii) public transport, iii) bicycle, iv) by foot and v) other	Car		%	
	Public Transport			
	Cycling			
	Foot			
	Other			
Proportion of buses operating in the city that are low emission (at least Euro V)			%	

In relation to the above, please state:

- For the "Proportion of population living within 300 metres of an hourly (or more frequent) public transport service": The data and calculation method of the figure.
- For public transport, please include journeys by any type of public transport present in the city (e.g. buses, trams, trolleybuses, light rail, and other rail services) even if these are privately-operated.
- For 'other' in the table above please state what is included by any figure presented for as 'other'

The remainder of the text in this section should describe the present situation for both local passenger transport and urban freight transport. This should include qualitative and quantitative information on:

- **Transport infrastructure,** i.e. that in place for public transport (e.g. rail, trams, trolley buses, buses and any water-based transport), cyclists (e.g. cycle lanes, bicycle parks, etc) and pedestrians (i.e. the extent of pedestrianisation).
- **Vehicle numbers**, i.e. for different public transport types.
- **Mobility flows,** both within the city and to and from the surrounding region.
- **Infrastructure management tools,** including, for example, the use of ITS to optimise infrastructure use and to prioritise public transport, cycling and walking.
- **Existing model shares** in the city for both local passenger and urban freight transport.
- **Alternative mobility schemes**, including public bicycle sharing schemes, car clubs, car pooling.
- **Use of alternatively-fuelled vehicles**, both in the city generally, and by the city authorities (including public transport operators) in particular. Information on the number of vehicles and the relevant infrastructure should be provided for gas (particularly biogas), biofuels, electricity and hydrogen, including the extent to which these fuels are renewable and sustainable.
- **Any relevant disadvantages or constraints of relevance to transport**, including those resulting from historical, geographical and/or socio-economic factors.
- **Governance arrangements and responsibilities**, including how the city works with any private (bus and freight) transport operators.
- **Improved spatial planning** including how it has led to the development of more environmentally-friendly transport models.
- **Sustainable Urban Mobility Plans (SUMP)** – Confirm if there is one in place for the city,

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(provide refences where possible) and provide relevant details.

(max. 600 words & 5 graphics, images or tables)

2B. Past Performance

The aim of this section is to make clear how the situation described in Section 2A has been achieved. Where available, quantitative information and data should be provided for the previous 5 to 10 years in order to show recent trends.

The section should describe the **strategies and plans** that have been implemented over the last 5 to 10 years (including any SUMP or equivalent) to ensure that the development of transport in the city was undertaken in an integrated manner. This should include both integration between the different modes of transport and also the integration of transport and land use planning in order to avoid unnecessary travel, to limit urban sprawl and to stimulate the use of public transport, cycling and walking. Refer to the way in which the city authorities involved stakeholders in the development of these plans.

Describe the **measures** implemented over the last 5 to 10 years. Particular reference should be given to measures that have helped to deliver:

- Increased use of public transport, cycling and walking;
- Decreased, and more efficient, car use, including measures to reduce congestion;
- Modal shift, i.e. from transport by private car to public transport, cycling and walking;
- Improvements in the environmental performance of urban freight, including cleaner vehicles, freight consolidation and bicycle deliveries; and
- Increased use of alternatively-fuelled vehicles, using renewable and sustainable fuels.
- Spatial planning approaches which have led to more environmental-friendly transport models.

Comment on which measures have been most effective and lessons learned. Emphasise involvement in and possible benefits from the city's participation in national or European networks and programmes.

(max. 1200 words & 5 graphics, images or tables)

2C. Future Plans

Describe the short and long term **objectives** for local transport (both passenger and freight) and how you plan to achieve these. Outline the **plans and strategies** in which these objectives are found, and the extent to which these are supported by political commitments, budget allocations, and monitoring and performance evaluation schemes. Refer to integrated transport, land use planning, stakeholder involvement and the use of a SUMP or equivalent. Set out the **measures**, including those adopted but not yet implemented, that contribute to the delivery of the objectives, including:

- Increased use of public transport, cycling and walking;
- Decreased, and more efficient, car use;
- Modal shift;
- Improvements in the environmental performance of urban freight; and
- Increased use of alternatively-fuelled vehicles.

(max. 800 words & 5 graphics, images or tables)

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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)

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3. Green urban areas incorporating Sustainable Land Use

Refer to Section 2.3 of the Guidance Note

3A. Present Situation

Please complete the following table providing the most recent data that is available:

Land use within the city (this will provide important background information on the character of the city and is not an evaluation criterion itself)				
	Inner City	Overall City	Unit	Year of data provided
Public Green Area			%	
Private Green Area				
Blue				
Residential				
Industrial/economic				
Mixed				
Brownfield				
Other				
Total	100	100		
	Inner city	Overall city	Unit	Year of data provided
Percentage of people living within 300 m of green urban areas >= 5000 m2			%	
Percentage of people living within 300m of green urban areas of any size in inner city			%	

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.

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

1. New developments: relative proportion of greenfields, natural and semi-natural areas, and brownfield sites, where the construction of new buildings and/or commercial and industrial areas has taken place in the last 10 years
2. Evaluation of the densification in the inner-city or urban cores;
3. Population density (inhabitants per hectare) in built-up areas (city area minus green and blue areas);
4. Population density (inhabitants per hectare) for new developments;
5. Quality of green and blue areas;
6. Investments in green infrastructures (e.g. sustainable urban drainage, green rooftops, vertical

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gardens, high-quality business parks and public spaces, biodiversity-rich communal gardens, green belts and metropolitan park systems).
7. Use of permeable or semi-permeable materials and surface areas covered by them

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 in the table above 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.

Provide maps of the location of brownfield sites that have been regenerated in the past 10 years.

(max. 1100 words & 5 graphics, images or tables) plus requested 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 (share of brownfields used for new housing or business etc.); 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. Measures to promote the use of permeable or semi-permeable materials, where appropriate;
7. Integrating current and future changes such as economic growth, demographic or climate change through sustainable land use planning;
8. Monitoring the effectiveness of management measures.
9. Quality of green and blue areas
10. Instruments used to promote the use of green infrastructure (tax reductions for green roofs, building permits, funding schemes for green roofs or biodiversity-rich communal gardens)
11. Rehabilitation of derelict zones or housing areas which were in poor state by using green infrastructure

(max. 1200 words & 5 graphics, images or tables)

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.

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

1. People's quality of life, public health and recreation;
2. Additional ecosystem functions and services such as regulating water balance, balancing climate extremes, filtering air pollution, education, pesticide risk and use reduction etc.;
3. Rehabilitation of brown field sites, derelict and/or contaminated land; both for new development and/or desealing measures for environmental purposes.

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

(max. 800 words & 5 graphics, images or tables)

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)

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4. Nature and biodiversity

Refer to Section 2.4 of the Guidance Note

4A. Present Situation

Please complete the following table providing the most recent data that is available:

Indicator	Number	Total area (ha)	Year of data provided
Number and total area of Natura 2000 sites that are located in the city or nearby (i.e. within 10 km)			
Number and total area of designated sites of **national** biodiversity importance within the city (habitat/species management areas)			
Number and total area of designated sites of **local (city)** biodiversity importance within the city (habitat/species management areas)			
Date and time horizon of your city's Biodiversity Action Plan			

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.
Please provide details of the following:

1. Sites protected for nature and biodiversity (Natura 2000 sites, national and local sites) located in and around the city, showing habitat, ecosystem or biotope mapping;
2. Date of management plans for these sites;
3. How the city confirms that designated habitats and/or species are in good conservation status, and what the principal challenges are.
4. Information on any other wild native species of interest in the city (e.g. species that are rare, endangered or iconic) and how they are managed.

Other topics to be covered are: the management of any invasive species, activities designed to raise public awareness of biodiversity, action on reducing pesticide use (see Guidance Note), and work to promote and manage natural/wildlife parks and gardens as well as green roofs and walls for biodiversity.

(max. 600 words & 5 graphics, images or tables)

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:

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1. Managing and increasing sites protected for nature and biodiversity (Natura 2000 sites, national and local sites) as described above, located in and around the city.
2. Dedicated conservation actions to manage and restore the sites and species numbers;
3. Monitoring work: where possible, show trends in biodiversity data and management over the past 5-10 years.
4. Protecting nature in other open spaces; survey and mapping work.
5. Communication activities to promote awareness of nature and biodiversity generally and in the protected area network among the public, particularly among young people.
6. Monitoring the effectiveness of management measures.
7. Innovative approaches, e.g. shared management of sites, the role of the public.
8. Developing and implementing new measures to enhance biodiversity.
9. Integration of the economic, health and job benefits of biodiversity protection into strategic and finance planning and communication to citizens.

(max. 1200 words & 5 graphics, images or tables)

4C. Future Plans

Describe the short and long term objectives for nature and biodiversity and how these proposals will be achieved. Indicate strategic and policy commitments, budget allocations, and monitoring and performance evaluation schemes. Demonstrate how this work coincides with the EU 2020 Biodiversity Strategy, Nature Directives and other relevant Directives such as sustainable use of pesticides, and complementary national strategies.

(max. 800 words & 5 graphics, images or tables)

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)

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5. Ambient air quality

Refer to Section 2.5 of the Guidance Note

5A. Present Situation

Please complete the following table providing the most recent data that is available :

Indicator		Unit	Year of data
Max Number of days per year on which EU target value for ozone was exceeded (8h mean);		Days	
Number of ozone monitoring stations		No of monitoring stations	
Max Number of days per year on which EU target value for PM_{10} was exceeded (8h mean);		Days	
Number of PM_{10} monitoring stations		No of monitoring stations	
PM_{10} - Max concentration recorded		ug/m3	
Number of NO_2 monitoring stations		No of monitoring stations	
NO_2 - Max concentration recorded		ug/m3	
NO_2 - Annual Average concentration		ug/m3	
Number of $PM_{2.5}$monitoring stations		No of monitoring stations	
$PM_{2.5}$- Max concentration recorded		ug/m3	
$PM_{2.5}$- Annual Average concentration		ug/m3	

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, the use of green areas to improve air quality and risk reduction for the urban heat island effect should also be mentioned where relevant. Where available, information/data should be provided from previous years (5 – 10) to show trends.

Make reference, providing data in the table above, 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 PM_{10} (daily mean);
3. Number of hours per year on which EU limit values were exceeded for hourly NO_2 (hourly mean)
4. Annual mean concentration of NO_2, PM_{10} and $PM_{2.5}$;
5. Assess the contribution from local sources and from long-range transport for annual mean concentration of NO_2, PM_{10} and $PM_{2.5}$.

(max. 1,000 words & 5 graphics, images or tables)

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.

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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* & 5 graphics, images or tables*)

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 & 5 graphics, images or tables)

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)

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6. Quality of the Acoustic Environment

Refer to Section 2.6 of the Guidance Note

6A. Present Situation

Please complete the following table providing the most recent data that is available :

Indicator		Unit	Year of data
Share of population exposed to total noise values of L_{den} above 55 dB(A)		%	
Share of population exposed to total noise values of Lden above 65 dB(A);		%	
Share of population exposed to total noise values of L_n (night noise indicator) above 45 dB(A)		%	
Share of population exposed to total noise values of Ln (night noise indicator) above 55 dB(A)		%	
The percentage of citizens living within 300m of quiet areas.		%	

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.

Additional figures for noise exposure to individual noise sources (road, rail, air, industry, and leisure/entertainment) can also be included.

(max. 800 words & 5 graphics, images or tables)

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. 1000 words & 5 graphics, images or tables)

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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 L_{den} (day-evening-night indicator) above 55 dB(A) and above 65 dB(A) and in the share of population exposed to noise values of L_n (night indicator) above 45 dB(A) and 55 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, using green infrastructure solutions).

(max. 800 words & 5 graphics, images or tables)

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)

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7. Waste production and management

Refer to Section 2.7 of the Guidance Note

7A. Present Situation

Please complete the following table providing the most recent data that is available for your city. If city data is not available, please provide a short explanation and use regional or national data.

Indicator	Type of Data (City/Regional/ National)	Unit	Year of data
Percentage of household waste sent to Landfill		%	
Percentage of household waste sent for Thermal Treatment or similar recovery		%	
Percentage of organic waste collected separately Please indicate what is included within the organic waste collected ie food waste only or food and garden waste		%	
Percentage of recycled household waste		%	
Percentage of recycled packaging waste		%	
Percentage of recovered packaging waste		%	
Amount of Household Waste generated per capita		kg/capita	
Amount of Municipal Waste generated per capita		kg/capita	

Describe the present situation in relation to waste production and management by responding to each of the questions below. In your response include any relevant disadvantages or constraints resulting from historical, geographical and/or socio-economic factors which may have influenced this indicator area.

Include details on:

1. Waste Strategies or Plans in place;
2. Waste Prevention Measures, including food waste and packaging waste;
3. Reuse and/or repair initiatives/partnerships currently in the city; Include an example of such initiatives describing the types and quantities of materials reused;
4. Describe current waste collection system including the types of waste collected separately and

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the extent of roll-out (% coverage) of the collection systems;
5. Provide details of the treatment of the separately collected wastes;
6. Proportion of organic waste collected separately. Please provide details of the type of treatment and the capacity of the facilities
7. If thermal treatment operations are in use, describe the scale of the facility, the type of energy recovered, including the energy performance, and the number of households who are part of the facilities energy network;
8. Proportion of biodegradable waste sent to landfill
9. Application of the "polluter pays" principle, including "pay as you throw" (PAYT) initiatives.
10. Describe briefly how the city enforces waste regulations in the city; please provide some brief examples;

(max. 800 words & 5 graphics, images or tables)

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.

Include details on the following;

1. Historical trends in the amount of household waste produced per capita in the city
2. Trends in waste treatment in the city over the last 5-10 years; for example how have rates of recycling, recovery and disposal changed over this period;
3. Evolution of source segregated collection systems in the city;
4. Provide a brief description of the collection market in terms of the role of municipal (public) authorities and/or private waste companies;
5. Measures or programmes which have promoted waste prevention and recycling;
6. Use of instruments (economic or regulatory) applied in the city to effect the management of household and or municipal wastes
7. Type and scale of infrastructure put in place to manage waste including the approach to managing residual waste and progress to date;

(max. 1000 words & 5 graphics, images or tables)

7C. Future Plans

i. Describe the short and long term objectives/targets for the management of waste and the approach the City's propose to take to ensure these are achieved?

ii. Emphasise to what extent plans are supported by commitments, budget allocations, and subject to monitoring and performance evaluations?

iii. How is the city taking account of EU policy on waste management and its place within a wider resource efficiency and low carbon growth framework?

Make reference to:

- Constraints – economic, scale, institutional;
- Measures to improve statistical data on waste collection & treatment;
- Waste prevention and awareness initiatives;

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- Quality of materials collected for recycling;
- Waste collection charges;
- Measures to promote public participation;

(max. 800 words & 5 graphics, images or tables)

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)

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8. Water management

Refer to Section 2.8 of the Guidance Note

8A. Present Situation

Please complete the following table providing the most recent data that is available :

Indicator		Unit	Year of data
Domestic usage - Litres per capita per day		litres/capita/day	
Total Usage - Litres per capita per day		litres/capita/day	
Water loss in pipelines, leakage management and network rehabilitation		%	

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 water bodies are in good status, 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 and to improve water status.

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; please provide data on total unaccounted water in percentage and whereas available, in specific losses (m^3/km/day) and info on leakage management and network rehabilitation;
6. Storm water management and use of natural water retention measures;
7. Compliance with the Floods Directive and link to the relevant Flood Risk Management Plans;
8. How the links between water and energy consumption (water-energy nexus) (e.g. through pumping, treatment, heating) is taken into account; if available provide data on yearly energy consumption (Kwh/m^3 of distributed water)
9. Use of "non conventional resources" and water recycling initiatives (rain water use and grey water or wastewater reuse);
10. Compliance with the EU Water Framework Directive and other EU/national/regional legislation applicable at the city level indicating status of water bodies relevant for the urban area within the city limits and relevance of measures enshrined in the applicable river basin management plans.
11. The scale of River restoration projects planned –e.g. for resurfacing (lost) rivers, naturalising previous channelised rivers
12. Projects to reconnect citizens with waterbodies – eg creation of wetland parks, cleaning up water quality such that swimming is possible.

(max. 800 words & 5 graphics, images or tables)

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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 and what progress has been achieved.

Make reference to:

1. Technical, nature-based, economic and institutional measures adopted and their effectiveness in achieving reduction of total water consumption or improvement of water status;
2. Byelaw implementation in relation to efficiency in water usage, tariff and metering systems and water quality;
3. Awareness raising campaigns.
4. Actual and projected improvements (in %) of water status/potential compared to 2009, when the 1st river basin management plans were to be in place.

(max. 1000 words & 5 graphics, images or tables)

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 water quality goals and on key water saving and reuse targets for the future and the proposed approach to achieve these, including technical and nature-based measures incorporating water infrastructure to deal with future impacts of climate change.

(max. 800 words & 5 graphics, images or tables)

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)

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9. Waste water management

Refer to Section 2.9 of the Guidance Note

9A. Present Situation (max. 600 words)

Please complete the following table providing the most recent data that is available :

Indicator		Unit	Year of data
Percentage (%) of total annual generated waste water load, connected to waste water collecting system + urban waste water treatment plants (UWWTPs)		%	
No of wwtp			
Total Design Capacity (p.e)		p.e	
Total Load Received by WWTP (p.e)		p.e	
Total annual generated waste water load of the city (in p.e.)		p.e	
Treatment level which is applied in each uwwtp: secondary or more stringent; in this case, type of treatment: nitrogen and/or phosphorus removal, disinfection etc.			

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 treatment according to national requirements and the requirements of the Urban Waste Water Treatment Directive (UWWTD, 91/271/EEC).

Include data and a short explanation for the following specific indicators. Provide explanation in the case of missing information.

1. Provide an indication of the fraction (%) of the total annual generated waste water load of the city coming from population and from industry (also specifying type of industry, when information is available);
   The most advanced treatment level at UWWTPs (primary treatment, secondary treatment, tertiary treatment
2. 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 (reference to individual or other appropriate systems, i.e., IAS);;
3. 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);
4. Waste water collecting systems: main type of collecting system (combined/separated) and annual proportion (%) of COD-loads discharged via storm water overflows;
5. 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 (m^3/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;
6. Annual amounts of generated sewage sludge (t/a) and description of treatment/disposal pathways (% of total amount).
7. Provide data on annual energy consumption for wastewater treatment in Kwh/year/p.e., if available

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Further information (e.g. on energy efficiency at UWWTPs, treated waste water re-use, economic sustainability, use of integrated constructed wetlands or other GI/nature-based solutions) is highly appreciated.

(max. 600 words & 5 graphics, images or tables)

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 (reference to Accession Treaties or sensitive areas under transitional period).

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

(max. 1200 words & 5 graphics, images or tables)

9C. Future Plans

Describe the future short and long term objectives for waste water treatment 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. Emphasise to what extent plans are triggered by the demands of EU and national regulations.

Refer to:

1. Improvement / maintenance / management of collecting systems;
2. Improvement of connection to collecting systems (*inter alia*, additional % of p.e. forecasted to be connected);
3. Improvement of design capacity, treatment level and treatment performance of UWWTPs ;indicate if these go beyond the requirements in the Directive;;
4. Improvement of connection to UWWTPs (*inter alia*, additional % of p.e. forecasted to be connected);
5. Improvements of further environmental and economic aspects of waste water treatment (e.g. removal of micropollutants, pollution prevention, energy efficiency at UWWTPs, sludge treatment and disposal, treated waste water re-use , use of integrated constructed wetlands).
6. Other improvements

(max. 800 words & 5 graphics, images or tables

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)

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10. Eco-innovation and sustainable employment

Refer to Section 2.10 of the Guidance Note

10A. Present Situation

Please complete the following table providing the most recent data that is available :

Indicator		Unit	Year of data
Number of electric vehicles owned by the municipality		number	
Number of electric vehicles owned by the municipality (in % of all cars owned by the municipality)		%	
Number of charging outlets available for the cars owned privately.		number	

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; new business models (sharing schemes), including actions inspired by circular economy thinking;
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 & 5 graphics, images or tables)

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, Eco-Innovation Action Plan (EcoAP), 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;

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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 including actions inspired by circular economy thinking.
5. Name/describe what you consider the flagship of eco-innovation in your city.

(max. 1200 words & 5 graphics, images or tables)

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), sharing economy schemes (i.e. bike sharing) use of public procurement of innovation;
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.
5. Identify the key future plan which is considered as the flagship of eco-innovation in your city.

(max. 800 words & 5 graphics, images or tables)

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)

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11.Energy performance

Refer to Section 2.11 of the Guidance Note

11A. Present Situation

Please complete the following table providing the most recent data that is available :

Indicator		Unit	Year of data
Final Energy Consumption		MWh	
Final Energy use/capita		kWh/capita	
Final Energy usage /sector			
Ag & Fisheries		%	
Industry & Commercial			
Transport			
Domestic			
Services			
Other			
Total	100		

Describe the present situation and development (particularly in relation to the building sector), using quantitative data and figures. Where available, information/data should be provided from previous years (5-10) to show trends. List any disadvantages resulting from historical, geographical and/or socio-economic factors which may have influenced this indicator area.

1. Present total final energy consumption by sectors (structure of energy consumption);
2. Past development of energy consumption and current plan for future energy efficiency improvements and decreasing the use of energy, particularly for
   - energy performance of municipal buildings (in KWh/m2) with specific reference to city owned buildings and
   - important developments related to other end-use sectors besides the building sector (e.g. transport, industry production, services, public, lighting, electrical appliances food);
3. Present situation, development and current plan for the energy supply mix, particularly regarding the renewable vs non-renewable mix of energy sources during the past 10 years (for both heat, electricity and transport; expressed in KWh, MWh or GWh);
4. The current plan for integration and performance of renewable energy technology in municipal buildings and homes compared to the total energy use;
5. The development so far and 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);
6. Application of innovative technologies (e.g. current plan for increasing the use of LED lamps in public lighting and use of green roofs/walls for energy saving).

(max. 600 words & 5 graphics, images or tables)

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.

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Make reference to:

1. Attempts to improve the energy performance (i.e. i.e. energy efficiency standards particularly of municipal buildings) above national requirements;
2. Maximising and prioritising the use of renewable energy technology (particularly in municipal buildings);
3. Measures to facilitate integrated district system solutions (e.g. cogeneration) and a more sophisticated city-wide control.
4. Measures to trigger stakeholder engagement in the City's to improve overall energy demand performance preferably including local government institutions, local market actors and citizens; mention existing co-operations.

(max. 800 words & 5 graphics, images or tables)

11C. Future Plans

Describe the future short and long term objectives for sustainable 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, what potential there is and what kind of barriers you might expect in the implementation phase. Express and explain if and how far the strategies and targets go beyond national ambitions.

Make reference to:

1. The city's strategy to achieve goals by 2030 and 2050 (e.g. energy efficiency improvement. % 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 systems, industrial practices, food and commodities production and consumption, urban morphology and use of Green Infrastructure, consumer behaviour and import and export chains.

(max. 800 words & 5 graphics, images or tables)

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)

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12.Integrated Environmental Management

Refer to Section 2.12 of the Guidance Note

12A. Present Situation

Please complete the following table providing the most recent data that is available :

Indicator	Yes/No	Date from:
Signatory of CoM		
Aalborg Signatory		

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) How was the participation organised?

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, management groups of different departments, skills promotion, periodic evaluations, etc.

Describe the system of monitoring and reporting. What is generally reported to whom in what frequency?

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 and sustainability 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, C40, Climate Alliance, ICLEI, EUROCITIES, etc.)

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

Engagement with citizens

Describe your activities and engagement with the different communities within your city with particular attention for youth participation.

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Please reference any structures/projects/programmes that you have in place i.e. youth council, elderly citizens, disabled, socially deprived citizens; number of activities that were completed with different groups, the reach and objectives/impacts of these activities. **(max. 1000 words & 5 graphics, images or tables)**
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 and indicate which department or political body is the driving force behind the environmental vision? Is the budget that is allocated for environmental activities each year increasing or decreasing? <u>Innovative instruments</u> 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.? Above the level of basic monitoring, do you periodically evaluate the progress of your policies / strategies / projects and do you adopt them according to findings? **(Max. 400 words & 5 graphics, images or tables)**
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 & 5 graphics, images or tables)**
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)**

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Good Practices

Please provide details of at least one exemplary practice which your city has implemented in this indicator area. This should be supported by a maximum of 2 graphics or images.

Please summarise up to six good practices, in any six different indicators, that demonstrate how your city is improving its environment record.

Please identify to which categories your good practice is relevant
Good practices should be taken from information already provided within the application form

Each good practice should be supported by a maximum of 3 graphics or images.
(max 300 words per good practice)

***(max. 300 words & 3* graphics, images or tables)**

Good Practice 1

***(max. 300 words & 3* graphics, images or tables)**

Indicator:

Good Practice 2

***(max. 300 words & 3* graphics, images or tables)**

Indicator:

Good Practice 3

***(max. 300 words & 3* graphics, images or tables)**

Indicator:

Good Practice 4

***(max. 300 words & 3* graphics, images or tables)**

Indicator:

Good Practice 5

***(max. 300 words & 3* graphics, images or tables)**

Indicator:

Good Practice 6

***(max. 300 words & 3* graphics, images or tables)**

Indicator:

5.2. Appendix B: Expert Profiles

Indicator No. 1 – Climate Change: mitigation and adaptation

Expert: 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 who graduated from 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 broad overview 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 worked with the Ministry of Environment of Brazil, in the context of the sectoral dialogues between the EU and Brazil, on the Climate Change and Energy Efficiency Chapter.

Indicator No. 2 - Local Transport

Expert: Ian Skinner, Director of Transport and Environmental Policy Research, London, United Kingdom.

Ian Skinner is an independent researcher and consultant with over 20 years of experience in undertaking research and consultancy projects focusing on the environmental impacts of transport.

His PhD from University College London was on the implementation of sustainable transport policies in South East England and he has also undertaken research at the University of Kent on the marginal cost pricing of transport.

Since his PhD, Ian has worked at the Institute for European Environmental Policy (IEEP) and AEA (now Ricardo-AEA) before co-founding TEPR in 2009. Ian's work focuses on the implementation and evaluation of sustainable transport policies for national and international organisations. Much of Ian's

work has been undertaken at the European level for the European Commission, which has involved impact assessments and evaluations of various EU transport and environmental policies.

He has also worked for UNEP, including in support of their EST goes EAST project, and been an independent evaluator for the European Commission. In 2013, Ian was invited to draft the chapter on European transport policy for the Edgar Elgar book, Research Handbook on Climate Change Mitigation Law (2015, Van Calster and Vandenberghe, eds).

Indicator No. 3 - Green Urban Areas incorporating Sustainable Land Use

Expert: Annemieke Smit, Senior researcher on Nature Based Solution for Society at Alterra (part of Wageningen University and Research)

Annemieke Smit is a Physical Geographer with a PhD in Ecology. In 2001 she started working at Alterra with a focus on Sustainable Soil and Land Use. She is an expert on sustainable land use management, both in urban, peri-urban and rural areas. She was one of the core team members of the Dutch Community of Practice CoP Sustainable land use management in spatial planning.
For the past two years she has been involved in the Alterra Green Cities programme, combining ecological, social and economic knowledge about the multiple benefits of Green Infrastructure to the urban public and private stakeholders. She specialised in multi-stakeholder projects and is often involved in national of EU assessments on sustainable development. She is part of the Dutch advisory board for the development of BREEAM-Community.
With a focus on good and clear communication, Annemieke always keeps in mind that experts tend to go deep into the subject, while policy makers or non-scientific partners want to know about the impact of the research on their world, work and options.

Indicator No. 4 - Nature and Biodiversity

Expert: 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 12 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 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: Christer Johansson, Department of Environmental Science and Analytic Chemistry, Stockholm University and air quality expert at the Environment and Health Administration of the city of Stockholm, Sweden.

His focus area during the past 25 years has been on urban air pollution. This includes anthropogenic emissions, air pollution monitoring, atmospheric dispersion modelling, chemical reactions, population exposure and air quality and health impacts.

He has been working closely with epidemiologists, atmospheric scientists as well as urban planners in many national and international research projects. At Stockholm University he is also supervising PhD and Masters students and is responsible for a Masters course on 'Air Quality Outdoors and Indoors', which deals with emissions, air quality management and health risk assessments as well as cost-benefit analyses of air pollution.
At the Swedish National Air Quality Reference Laboratory, he has been advisor to the Swedish Environmental Protection Agency and collaborating with other reference laboratories mainly in Nordic countries.
In the city he works closely with local and national authorities on air quality issues. His unit at the Environment and Health Administration in Stockholm is responsible for operating an air quality management system not only for the city, but for an association that includes 50 municipalities, energy production companies and regional governmental agencies. The system includes monitoring stations, emission inventories and dispersion models and is also used in urban planning to analyse, for example, impacts on air quality and health of future planning scenarios.

Indicator No. 6 – Quality of the Acoustic Environment

Expert: 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 auralisation of sound fields in enclosures.

Indicator No. 7 - Waste Production and Management

Expert: Warren Phelan, Technical Director, Waste, Energy & Environment, RPS Group Ltd., Dublin, Ireland.

Warren Phelan is a Technical Director with the Waste, Energy and Environment Section of RPS. Warren is a Chartered Waste Manager and a Chartered Civil Engineer with a Master's degree in Engineering Science from University College Dublin.

Since joining RPS in early 2001, Warren has worked in the resource and waste management sector developing specialised skills in policy and legislation, strategy and planning, stakeholder consultations, data analysis and collation methodologies, waste prevention and online resource applications.

Warren has extensive knowledge and experience in the strategic approach to managing waste at a city, regional and national level. Warren is currently the project manager for the development of the waste management plans covering the Irish State including the preparation of strategic environmental assessment and appropriate assessment documentation supporting the plans.

The ability to source, compile, analyse and present data is essential for the development of robust waste management systems and plans. In recent years Warren has led a team appointed by the Irish Environmental Protection Agency required to collate and analyse data gathered from all of the major waste treatment facilities in Ireland. Warren has also prepared data for the Irish government benchmarking Ireland's performance in the sector against comparable international countries.

Warren has applied his waste management skills and developed waste management plans for large infrastructure projects, international airports, industrial operations and university campuses. Clients have included INTEL and Aeroport de Paris.

Warren has worked on waste projects in the UK, across Europe and in the Middle East. Warren's clients include the European Commission and the World Bank, among others. Warren is currently acting as the Irish country agent on a European Commission Horizon 2020-funded project on Sustainable Innovation (CASI project).

Warren has also worked on the design of many waste facilities including baling stations, transfer stations, material recovery facilities and recycling centres and is currently he is working for WRAP on the redesign of a waste facility in Wales.

Indicator No. 8 - Water Management

Expert: Giulio Conte, Project Manager of natural resources area at Ambiente Italia and water policy expert at IRIDRA.

Giulio Conte 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 the last 10 years, he has worked in water policy sectors in France and Europe. He led several studies for the European Commission on Water Efficiency Standards and the Water Performance of Buildings 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 – Wastewater Treatment

Expert: 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 has participated in five 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: 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: Manfred Fischedick, Vice President of the Wuppertal Institute and Professor at the Schumpeter School of Business and Economics, Wuppertal, Germany

Manfred Fischedick is the Vice President of the Wuppertal Institute, an internationally 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, infrastructural and social innovations supporting the transition to sustainable structures. Special focus is given to the transition process of the energy system and cities.
Manfred Fischedick 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 advisor to the German government as well as the Bundesland of North Rhine-Westphalia, author of various publications and peer reviewed articles. Manfred Fischedick 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 Fischedick 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, UNIDO Eco-City Expert, 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 Eco-City 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 Eco-Cities in the Middle-East and North Africa (MENA Region).

Also for UNIDO and the Government of Japan he is currently 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.

Jan has started a project in Morocco to develop a reference framework of sustainability for the new-to-build Eco-City Zenata. In the past Jan worked on Green Industry and the promotion of Eco-Business projects in India and Thailand, for example, 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.

5.3. Appendix C: Technical ranking for 2017 shortlisted cities

	Essen	's-Hertogenbosch	Nijmegen	Umea
Climate change: mitigation & adaptation	1	3	5	2
Local transport	7	5	2	3
Green Urban Areas	2	3	1	4
Nature & Biodiversity	2	1	3	5
Ambient air quality	2	4	3	1
Quality of the Acoustic Environment	2	4	3	1
Waste Production & Management	2	5	1	3
Water Management	2	1	3	7
Waste water management	2	3	1	5
Innovation & sustainable employment	2	3	4	1
Energy performance	2	4	3	1
Integrated Environmental Management	2	3	1	4