Air Quality Management in European Cities
– Good Practices from European Green Capital Award

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Presentation

› Brief intro to European Green Capital Award
› Good practices from European cities applying for the European Green Capital Award
   › Air quality assessment
   › Information and awareness raising
   › Objectives and action plans
   › Measures related to different emission sources
European Green Capital Award

- Award by EU Commission rewards cities that have achieving high environmental objectives
- Encourage cities to commit to ambitious future environmental goals
- Provide a role model to inspire other cities to promote good practices
- Cities more than 100,000 inh. can apply (target 500 in EU*, about 80 applications 2010-2016)
- Technical assessment and Jury assessment
Indicators for environmental performance

1. Climate change: mitigation and adaptation
2. Local transport
3. Green urban areas incorporating Sustainable Land Use
4. Nature and biodiversity
5. Ambient air quality
6. Quality of the acoustic environment
7. Waste production and management
8. Water management
9. Waste water treatment
10. Eco-innovation and Sustainable Employment
11. Energy Performance
12. Integrated Environmental management

Indicators carry equal weight in technical assessment

| Past achievements + | Present initiatives + | Future commitments |
7 winning cities so far

Stockholm - Sweden (2010)

Hamburg - Germany (2011)

Copenhagen - Denmark (2014)

Bristol – United Kingdom (2015)

Nantes – France (2013)

Ljubliana – Slovenia (2016)

Vitoria-Gasteiz - Spain (2012)

Jury has only mentioned good air quality once as one of the reasons for selecting a winning city (Bristol)

Only Vitoria-Gasteiz and Nantes had no exceedances of EU air quality limit/target values
Urban air quality

- street increment
- urban increment
- regional background

Concentration

Local increment

Street level concentrations

Urban background concentrations

distance

city
Typical air quality problems in the cities

- One or more exceedances of EU air quality limit/target values ($\text{NO}_2$, $\text{PM}_{2.5}$, $\text{PM}_{10}$ and ozone) in almost all cities
- Local sources mainly traffic but also contributions from residential heating/wood combustion, industry and energy
- Few odour problems and usually from industry
- Large contribution of “imported air pollution” to the city - regional background of $\text{PM}_{2.5}$ and $\text{PM}_{10}$ or ozone is high
- Meteorological constrains
  - low wind speed
  - inversion during winter
Air quality assessment in the cities

- All cities measure indicator pollutants at fixed monitor stations under the EU clean air directive ($\text{NO}_2$, $\text{PM}_{2.5}$, $\text{PM}_{10}$ and ozone)
- Few cities have supplementary monitoring e.g. passive sampling at many sites for mapping air quality (e.g. Bristol, Glasgow)
- Some cities demonstrate emission and air quality modelling for mapping and decision-support (e.g. Dublin, Ljubljana, Kaunus)
- Few cities have good source apportionment (knowing the contribution of sources to concentrations) (e.g. Essen)
Source apportionment for NO$_2$ in Essen
Source apportionment for PM$_{10}$ in Essen

(share of road traffic in urban background)
Information and awareness raising

- All provide AQ measurement information and other relevant information on the web
- History of air quality on a large wall (Ljubljana)
- Displays inform drivers about high concentrations in city centre and proposes more sustainable routes for them to drive (Umeå)
- Open Data Platform for free air quality data aiming companies and others to create new applications and services to the public (Dublin)
- Health based air quality index (Ljubljana)
- Interactive information for awareness raising and behaviour change (Umeå)
Health based air quality index

- air quality index provides an easy-to-understand interpretation of measured concentrations for health risk to the general public (Ljubljana)

![chart and table]

Figure 14: Air quality index – on the basis of measurements of three pollutants (SO2, NO2 and PM10) at several points which have been continuously monitored for several years. The index helps define the limits at which potential health impacts can occur, particularly in more susceptible subjects such as asthmatics and cardiovascular disease sufferers. The health risk levels (low, medium, high, very high) are the result of monitoring the incidence of illness in a sample that included more than 30 million people across 26 European countries.
Air quality demonstrator

▶ inform about current air quality
▶ video game teaches user about how sustainable transportation can improve air quality

Umeå, Sweden
Air quality objectives and plans

› Cities good at setting objectives, identify focus areas and describe measures
  › Most cities obviously aim to comply to EU limit/target values
  › Zaragoza has objectives for 2020 beyond EU directive (equivalent to WHO more stringent standards for PM$_{2.5}$, PM$_{10}$ and ozone)

› Cities generally poor in providing quantified impact assessment of plans and measures
  › source contribution important to be able to identify focus areas and measures
  › quantification of impacts of policy measures important to assess if future objectives are likely to be achieved

› Specific air quality plans
Integrated plans for co-benefits

› Individual plans
  › Air quality, mobility, climate and energy can be managed by individual action plans
  › target each of these challenges separately

› Integrated plans
  › recent good practice is to manage these in an integrated manner with larger chance to harvest co-benefits
    › e.g. electric cars reduce CO₂ and improve air quality while maintaining mobility
    › e.g. cycling reduce CO₂ and improve air quality and also reduce congestion
  › e.g. Air-Climate-Energy Integrated Plan of Brussels
National and local co-operation

- **National Air Quality Management combined with local effort in UK**
  - Air Quality Management Areas and Air Quality Action Plans
  - Joint Local Transport Plans
    - e.g. Bristol demonstrates many measures within traffic management and congestion management

- **Low Emission Zones (LEZ) in Germany**
  - National regulation that allows cities to establish LEZ with regulation of vehicle emissions
    - e.g. Clean Air Plan for the Rhine-Main conurbation includes one of the largest LEZ in Germany
    - Frankfurt has LEZ that progressively tightens access criteria
Measures related to emission sources

» Transportation
» Residential heating
» Industry
» Energy production
Transportation

- Promote walking (e.g. Ljubliana)
- Promote cycling (e.g. Amsterdam, Copenhagen)
- Promote public transportation
  - Good overall systems (e.g. Vienna, Brussels)
  - Light rail (e.g. Vitoria-Gasteiz, Nantes, Zaragoza, Oslo)
  - Metro (e.g. Copenhagen)
- Congestion charging to reduce car use (Stockholm)
- Low Emission Zones (e.g. Essen, Malmö)
- Greening public transportation
  - Require stringent emission classes (many cities)
  - Promoting low and zero-emission technologies for public bus company and all city taxis in 2020 (Oslo)
- Promote alternative fuels
  - biogas busses (e.g. Malmö), hydrogen busses (Oslo)
  - electric cars (e.g. Oslo)
Low Emission Zones

- German LEZ are good practices and efficient
- Depends on Euro emission classes in 3 progressive classes
- Includes both petrol and diesel vehicles, and light and heavy-duty vehicles
- Implemented in many German cities (e.g. Essen, Frankfurt)
- Example of good national regulatory framework for flexible use by cities
Alternative fuels for public transportation

Malmö
- Green public procurement of municipal vehicles aims to build a fleet comprised 100% of clean vehicles in 2015 (of which 75% biogas/hydrogen/plug-in hybrid/electric)
- 50% of Malmö city buses run on a mixture of locally produced biogas from waste and sewage treatment plant

Oslo
- Biogas buses (currently 87 buses)
- Diesel-hybrids (18 buses)
- 5 hydrogen buses on trials
- Municipal cars will use zero emission technology (electric vehicles) in 2015
- Ambitious plans for promoting low and zero-emission technologies for Oslo public bus company and all city taxis by 2020
Electric cars

- Oslo probably the European city with most electric cars per capita
- Combination of strong national and city incentives
- City incentives:
  - 1,000 charging points established
  - free parking in municipal car parks
  - access to driving in bus lanes
  - exemption from toll charges
Residential heating

- Targeting classic PM$_{10}$ air pollution problems from residential heating with traditional measures in Eastern European cities (e.g. Ljubliana, Dabrowa Gornicza)

- Thermomodernization
  - insulation of buildings
  - modernisation or replacement of local boilers
  - connecting more buildings to district heating or gas networks
  - shift from solid fuels (coal, wood) to natural gas
    - ban of solid fuels where there are district heating or natural gas network (Ljubliana)
Industry

› Particle and smell reduction (Zaragoza)
› Particle emissions reduced by 95% in the industrial district during 2002-2007
› About 90% reduction of smell nuisances from 1996 to 2005
Energy production

- Renewable energy production (Copenhagen)
  - Climate Plan with 20% CO₂ emission reduction from 2005-2015
    - 50 initiatives
    - From coal to biomass, wind turbines, cycling, public transportation, electric cars, insulation, behaviour, densification etc.
  - Objective to be carbon neutral in 2025
Summary of good practices

› Sufficient information about air quality and contribution from different sources based on monitoring and modelling
› Provide information to the public and awareness raising using different approaches
› Have specific short- and long-term AQ Objectives
› Have specific AQ Action Plans with quantified impacts of measures
› Integrate plans for mobility, air quality and climate to obtain co-benefits
› Work together at state, regional and local level
› Reduce car use and promote walking, cycling and public transportation, and green transportation and shift to renewable fuels
› Promote insulation of buildings, district heating and renewable fuels
› Control emissions and odour from industry
› Shift to renewable energy for energy production
More info and acknowledgement

› Download from EGCA website:
  › Application Form and Guidance Note
  › Technical Assessment Reports
  › Good Practice Reports
  › Jury Assessment Reports

› European Green Capital Award website
  www.europeangreencapital.eu
Thank you for your attention