Improving local ambient air quality

In a nutshell

SUMMARY

It is best practice to have a structured plan to improve air quality with regularly updated goals, both short-term and long-term, set in advance and going beyond the target and limit values set in the Air Quality Directive (Directive 2008/50/EC). The plan needs to encompass all aspects starting with transport (car use, speed limits, public transport, etc.), industrial installations, energy production, type of heating systems in buildings, energy efficiency of buildings and land use planning and needs to be developed in cooperation with the relevant sectoral authorities and stakeholders. Moreover, where applicable, the effectiveness of the plan can be enhanced by developing it in coordination with higher level public authorities and neighbouring municipalities. The plan to improve air quality can also include dissemination of information to residents about the effects and importance of air quality, by, for instance, promoting the use of sustainable transport options.

Target group

Public administrations responsible for the management of air quality.

Applicability

This best practice is applicable to all public administrations responsible for the management of air quality in their territory, targeting specific local issues.

Environmental performance indicators

- Annual average PM10 concentration (?g/m^3)
- Annual number of days when the daily average PM10 concentration exceeds the value of 50 ?g/m^3 (days/year)
- Annual average PM2.5 concentrations (?g/m^3)
- Annual number of days when the daily average PM2.5 concentration exceeds the value of 25 ?g/m^3 (days/year)
- Annual number of days when ozone (O_3) concentration exceeds the value of 120 ?g/m^3 of maximum daily 8-hour mean (days/year)
- Annual average nitrogen dioxide (NO_2) concentration (?g/m^3)
- Annual number of days when the hourly NO_2 concentration exceeds the value of 200 ?g/m^3 (days/year)

Benchmarks of excellence

For all the indicators defined in this best practice, the results achieve the levels set in the air quality guidelines produced by the World Health Organisation

Description

Air quality declined markedly in the developed world in the 19^{th} century, as the industrial revolution saw the spread of emission heavy manufacturing factories and power generation plants. As the correlation between air pollution and adverse health consequences has been better understood, national governments and more recently the EU have enacted legislation and policies to ensure minimum levels of air cleanliness are maintained. Policies setting legal limits on the level of emissions permitted by road transport and industrial combustion have resulted in an improvement in air quality and a

reduction in pollution-induced health effects. Air quality in Europe still requires improvement however. The major contributors to air pollution are sulphur dioxide (SO_2), nitrogen dioxide (NO_2), particulate matter (PM), carbon monoxide (CO), and ozone (O_3). The burning of fossil fuels (particularly coal and oil) for heating, power and motor vehicles contributes directly to the release of SO_2, NO_2 and CO_2 into the atmosphere.

Pollution levels are determined by the rate of emissions versus the rate of dispersion and removal processes. These processes are governed by meteorological conditions and the geographical location of the city. Pollution levels are governed by local emissions as well as pollution brought in from nearby areas.

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Environmental benefits

Lowering levels of air pollution reduces the levels of sulphur dioxide (SO_2), nitrogen dioxide (NO_2), particulate matter (PM), carbon monoxide (CO), and ozone (O_3) in atmosphere. This has also a great benefit on biodiversity since this is also affected by air pollution. In fact, air pollution leads to higher nitrogen deposits within soil, which has the capacity to disrupt the biological processes of plants. Nitrogen is absorbed by the roots and transported to the leaves, which results in reduced growth, yellowing of the leaves and in the case of some plant species, death. If substances build up in the tissue of vegetation they can also affect the health of wildlife that consume the vegetation.[1] There is evidence to suggest that nitrogen deposits resulting from air pollution have reduced the diversity of plant species in Europe.[2]

[1] http://environment.alberta.ca/02235.html

[2] http://jncc.defra.gov.uk/page-1426

Side effects

No side effects identified for this best practice.

Applicability

This best practice is applicable to all public administrations responsible for the management of air quality in their territory, targeting specific local issues.

Economics

“Air pollution is one of the most serious environmental problems in urban areas around the world. The rapid process of urbanization and extensive energy utilization (mostly due to rapid economic expansion and population growth over the past few decades) has made urban air pollution a growing problem. The air contains varying levels of pollutants originating from motor vehicles, industry, housing, and commercial sources. The effects of air pollution have multifaceted consequences for human welfare. […] Notably, numerous studies have shown that air pollution adversely affects human health. Epidemiological evidence supports an association between exposure to ambient air pollutants and various health effects,

such as respiratory symptoms or illness (e.g. asthma), impaired cardiopulmonary function, reduction of lung function, and premature mortality. In particular, the most serious health impacts include a significant reduction in life expectancy, and premature death, both of which are strongly linked to exposure to PM. Although exposure to air pollution damages the health of everyone, numerous studies have shown that certain groups of vulnerable people (e.g. elderly people, children, and those with underlying disease) are at greater risk of being affected by air pollutants" (Retrieved from: Pervin, 2008). This represents a heavy cost for national health systems providing care. It is therefore in the best interest of public administration to reduce diseases created by air pollution. As cities are the centre of economic output, the societal costs of developed countries is estimated to be 2% of the Gross Domestic Product. The ailments caused by poor air quality may also lead to a correlative loss in productivity (Hester, 2009).

Driving forces for implementation

Cities are by definition interested in enhancing the quality of life of their citizens, and offering them a pleasant environment to live in. Cities also have the highest concentration of air pollution; therefore it is important that local and governmental authorities play an active role in improving air quality standards, as individual citizens are incapable of changing the air quality situation unaided. Better air quality also has benefits in terms of reduced strain on health care infrastructure. The urban area is also made a more attractive place in which to live and work.

Reference organisations

There are numerous publications on air quality in Helsinki published online, providing an in-depth look at the city's commitment to clean air. Documents include:

- Air quality in the Helsinki metropolitan area: http://www.hsy.fi/seututieto/Documents/Ilmanlaatu_esitteet/air_we_breathe.pdf
- Environmental Sustainability Issues and Challenges in Helsinki 2010: http://www.hel.fi/wps/wcm/connect/7d593d004298169a9779bf4b956b8a55/Environmental+Sustainability+-esite_nettiin.pdf?MOD=AJPERES&lmod=-918449852&CACHEID=7d593d004298169a9779bf4b956b8a55
- City of Helsinki Air Quality Action plan for the Period 2008-2016 Abridgement: http://www.hel2.fi/ymk/Ilmansuojeluohjelma/summary.pdf

Literature

City of Helsinki (2010). Environmental Sustainability Issues and Challenges in Helsinki 2010. Available at: http://www.hel.fi/static/ymk/esitteet/environmental-sustainability.pdf

Hester, R.E. and Harrison, R.M. (2009). *Issues in Environmental Science and Technology Vol. 28: Air quality in urban environments*. Cambridge, United Kingdom: The Royal Society of Chemistry

Pervin T., Gerdtham, U., Lyttkens C.H., (2008). *Societal costs of air pollution-related health hazards: A review of methods and results.* Available at: http://www.resource-allocation.com/content/6/1/19

YTV Helsinki Metropolitan Area Council (2007) Air quality in the Helsinki Metropolitan Area. Available at: https://www.hsy.fi/en/residents/theairyoubreathe/monitoring-stations-helsinki-metropolitan-area/Pages/default.aspx