URBAN AGENDA FOR THE EU

WORKING TOGETHER FOR BETTER CITIES

AIR QUALITY

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POSITION PAPER

ON THE FITNESS CHECK OF THE EU AMBIENT AIR QUALITY DIRECTIVES

Recommendations to improve the implementation of air quality legislation and identify regulation gaps in the urban environment

Preamble

This document was prepared by the following members of the Partnership for Air Quality as a joint input into the Fitness Check of the Ambient Air Quality Directives.

EU Member States:

- The Netherlands (coordinator)
- Croatia
- Czech Republic
- Poland

Cities:

- Helsinki/HSY1 (FI)
- London (UK)
- Utrecht (NL)
- Milan (IT)
- Constanta (RO)
- Duisburg (DE) - representing the Consortium Clean Air Ruhr Area

Stakeholders:

- EUROCITIES
- HEAL[2].

[1] Helsinki Region Environmental Services Authority.
[2] Health and Environment Alliance.

Introduction

The aim of the Partnership on Air Quality is to improve air quality in European cities and to bring the concept of the 'Healthy City' to local, national and EU agendas as part of the *Urban Agenda for the EU*.

In support of this, the Partnership has reviewed the interaction between different regulations and the implementation of air quality legislation including funding mechanisms and knowledge sharing.

European cities are growing, with over sixty percent of the EU population living in urban areas increasing to around eighty percent by 2050. Expansion at such a rapid pace will be accompanied by a range of challenges that include achieving and maintaining healthy air for all citizens to breathe.

The Partnership recommends a cooperative and integrated approach to address these emerging challenges and to ensure a safe and healthy environment for all EU citizens. The Partnership believes that different governance levels (local, regional, national, European) should cooperate more closely on air quality issues, and that air quality measures should be better integrated with measures from other relevant policy sectors (mobility, energy, climate, etc).

Clean air is essential for the health of people and the environment and exposure to air pollutants is regarded as an ongoing threat to public health[i]. Poor air quality is linked to an estimated 400,000 premature deaths in the EU each year.[ii] Addressing this issue involves acknowledging the unique impact of different pollutants and emission sources as well as accounting for atmospheric chemistry and transboundary effects. Air quality is therefore a complex issue that depends on accurate monitoring, relevant legislation and effective controls and enforcement.

Concerns have been raised over air quality in the EU for some time and the first major legislative instrument aimed at improving air quality was introduced in 1996[iii]. Since then, significant reductions in pollutant emissions and concentrations have been observed[iv], but there is still some distance to go until all EU citizens live in areas compliant with either the current legislation or the WHO guideline values.

Of those pollutants routinely monitored, particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), nitrogen dioxide (NO_2) and ozone (O_3) have been identified as particularly harmful to human health across the EU. The importance of polyaromatic hydrocarbons (PAH) is increasing as is the role of specific components of particulate matter such as ultrafine particles and

black carbon, either directly or as indirect indicators of other harmful pollutants. Both ambient and short-term peak exposure to these pollutants adversely impact health, with susceptible populations such as children, pregnant women, unborn babies, the elderly and those with pre-existing respiratory or heart conditions at increased risk of experiencing harmful effects. There is strong evidence that long term exposure to air pollution can also lead to chronic health effects including diabetes, cognitive impairment, dementia and cancer.[v, vi]

Given the complexity and evolving nature of the issues affecting air quality, the European Union has introduced a series of legislative controls intended to reduce emissions and improve air quality. These currently include the Ambient Air Quality Directive (AAQD)[vii], the National Emission Ceilings Directive (NECD)[viii] and a series of source-specific regulatory instruments such as the Industrial Emissions Directive (IED)[ix], the Medium Combustion Plant Directive (MCPD)[x] and EURO standards for road transport[xi].

The AAQD defines[3] the primary mechanism for determining whether air quality is harmful to health or the environment by introducing a series of concentration limit values specific to each criteria pollutant. The premise being that if the concentration of an air pollutant is less than the limit value then the air quality is good. However, for certain pollutants, principally PM_{10} and $PM_{2.5}$, but also ozone and sulphur dioxide (SO_2) the current EU limit values are greater than the guideline values suggested by the World Health Organisation (WHO) as having no or minimal risk to human health.[xii]

The European Commission, in the Clean Air Policy Package for Europe has expressed a desire to achieve concentrations below the WHO guideline values across the EU.[xiii] This is supported by a number of studies including the *Aphekom* project which have performed quantitative analyses of the gains in life expectancy in European cities if they were to comply with the WHO guideline concentrations.[xiv]

[3] Also defined in the 4th Daughter Directive 2004/107/EC relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air.

In summary, **the Partnership would like to highlight the following issues**:

- Poor air quality has a serious impact on the health of EU citizens with susceptible groups at special risk. Currently, the air quality regulations direct member states and cities towards a focus on meeting air quality limit values. The Partnership would like to see this approach complemented by a focus on health improvement.

- As poor air quality in our cities and member states is caused by local, national and transboundary emissions, improvement requires action at all levels. There is a need for co-operation at all levels of authority, including an exchange of knowledge and experience.

- The current EU legislation is lacking in certain areas, including regulation of increasingly relevant emission sources, such as automotive brake and tyre wear and consideration of pollutants such as PAHs, ultrafine particles and black carbon. A consideration of emissions under realistic future use scenarios is essential in designing effective measures from both cost and health perspectives.

- The impact on air quality and health should be evaluated at the early stages of any activity that may have a negative impact on either one. Measures to reduce the negative impact on air quality are often more effective and less burdensome when introduced early in the process and the Partnership recommends a precautionary approach where necessary.

1 Current Implementation Issues and Solutions

Member states are responsible for the implementation of air quality directives. However, the Partnership notes that there is often ineffective communication between levels of governance which can impact on the uptake and success of air quality controls and plans.

In many member states the responsibility for drafting and implementing Air Quality Plans (AQPs) is delegated to local authorities (regions or cities depending on national legislation). However, the measures defined in the air quality plan often include measures whose enforcement and implementation would be governed by urban, regional or national authorities.

A good example of this coordination is the National Air Cooperation Programme (NSL) in the Netherlands in which the national government, provinces and city regions cooperate, share investment and contribute with measures and projects.[4]

The Partnership strongly promotes coordination between each level of governance, from city through to national level. This can be achieved, for example, by introducing specific legislative instruments.

There is a lack of specifically targeted EU funding for the drafting and implementation of air quality plans or for air quality improvement in general.

The Partnership has observed that success in implementing air quality improvements is significantly influenced by the business plans of individual projects by competent authorities, primarily their organizational capacities and the availability of necessary financial resources.

There are various EU and national funds available to prepare and implement national, regional and local air pollution policies. However, the Partnership found that there is an overall lack of specific programmes dedicated to funding projects aimed at air pollution reduction, and the drafting and implementation of Air Quality Plans in particular. This is made more difficult as the funding for air quality improvement projects often competes with other societal challenges.

[4] https://www.rivm.nl/Onderwerpen/M/Monitoring_NSL

To obtain EU funding a knowledge of the correct procedures and eligibility criteria are necessary, and stakeholders consider the process of acquiring funding for clean air projects from EU funds difficult. In the operational programmes for the large funding mechanisms (e.g. ERDF and Cohesion Funds), air quality tends to be considered as an integrated measure with other priority areas (e.g. energy, waste, nature) rather than being targeted solely through priorities for air quality improvement and the attainment of air quality compliance.

Investment in local leadership, knowledge, capacity and resources should be increased to improve the realisation of clean air quality goals.

Ensuring that there is sufficient expertise and resources available at the local level can be beneficial in the drafting of air quality plans and in improving the choice, implementation and evaluation of measures to improve air quality. One of the most straightforward ways of achieving this is ensuring that staff are made aware of available funding and technical resources.

At the European level, urban governance could be assisted by following the example of currently successful collaborations, for instance the Covenant of Mayors for Climate and Energy[5] who have created an online knowledge sharing resource which details codes of best practice and new initiatives.

The Partnership suggests the creation of 'guidelines for air quality planning' with a registry of 'best practices in urban air quality planning'. These are intended to promote access to the details of air quality measures including suitability and relative effectiveness. The *Catalogue of Air Quality Measures*[6] provided by the European Commission's Joint Research Centre (JRC) and the 'Code of Good Practice for Cities Air Quality Plans' that the Partnership is developing are good examples.

It is hoped that stakeholders and industry will also invest in utilising these resources and contribute with their own feedback. The Partnership also advises peer learning for environmental policy such as the TAIEX-EIR PEER 2 PEER programme.[7] This provides tailored support to authorities implementing environmental policy and legislation by expert missions, workshops and study visits.

[5] https://www.covenantofmayors.eu/
[6] http://fairmode.jrc.ec.europa.eu/measure-catalogue/
[7] http://ec.europa.eu/environment/eir/p2p/index_en.htm

Ineffective implementation of air quality related EU directives by member states coupled with a lack of public support hinders the perceived acceptability and adoption of air quality plans.

When an air quality plan is drafted, Article 23.1 of the AAQD stipulates that air quality plans *shall set out appropriate measures, so that the exceedance period can be kept as short as possible*. There is also the threat of infringement proceedings against member states that do not achieve compliance with the EU air quality limit values. However, the effective choice and implementation of improvement measures also relies on an acceptance by the public that the measures are necessary, and in the case of "social" measures the public need to be motivated to participate.

Raising public awareness of the health impacts of poor air quality is important to gain acceptance of measures to improve air quality, but also of the costs of air quality measures necessary to be taken by local communities. This is especially true for those measures which may be perceived as 'inconvenient' or 'unnecessary' or 'costly' for the citizens. For example, urban vehicle access restrictions, building restrictions or biomass burning restrictions. The scope of air quality plans also needs to be publicly acceptable (in relation to inconvenience and (in)direct additional costs, and for both practical and political reasons a focus on pollution hotspots is often seen as the most effective approach. However, it is expected that more general measures would reduce the health impact of a larger population.

Methods to raise public awareness include:

- Citizen science, for example engaging the public to monitor air quality using low-cost sensors. A practical example of this is the CurieuzeNeuzen citizen science project in which 2,000 citizens of Antwerp measured NO_2 using passive diffusion tubes outside their homes.[8]

- Projects like ClairCity, in which people are involved in deciding the options for reducing air pollution and CO_2 emissions in their local environment.[9] This project receives support and funding from Horizon 2020 and the LIFE programme.

- A general raising of public awareness of the impact of air pollution on health and the environment in the media and from official information sources.

The Partnership recommends that emphasis should be placed on involving the general public in the process of drafting air quality plans as well as

[8] http://www.curieuzeneuzen.eu/en/
[9] http://www.claircity.eu/

providing easily accessible and readily understandable information to support air quality plans and promote active engagement.

An integrated approach combining different policy areas can be more cost-effective than separate measures.

A synergistic approach to urban air quality is often more efficient and effective than adopting separate policies to address specific goals, for example aligning climate change policies with air quality policies.[xv] The Thematic Strategy on Air Pollution[xvi] in 2005 issued recommendations that synergies and conflicts between air quality and climate change management policies should be considered and this is especially important where policies to address greenhouse gas emissions may contribute to poor air quality or vice versa.

Given the multi-sector, multi-governance aspect of air quality improvement policies and climate change mitigation policies, it is important that there is effective national and regional cooperation and that the relative merits of each policy are considered. At the EU level, air quality projects are often considered as an integrated measure with energy or climate policies under the large operational funds such as the European Regional Development Fund (ERDF) and the Cohesion fund. An example of this is the Madrid “Plan A”, which incorporates a multi-level framework aligning climate, mobility, energy, public transport and air quality polices for coordinated action.

The Partnership recommends that, where practical, an integrated approach to different environmental policies is adopted to share economic and health benefits, while minimising or eliminating conflicts.

2 Gaps in Regulation and Solutions

Effective regulation is required to combat poor air quality in European urban environments. To evaluate the effectiveness of existing EU air quality regulations the Partnership has studied its implementation in three Partnership cities: Milan, Warsaw and London. The studies identified gaps in the existing EU legislation and bottlenecks in national implementation that directly or indirectly regulate air quality and sources of pollution.

2.1 Principle findings of the Partnership study:

Some pollutants are not currently controlled at EU level

- There is little or no regulation of the components of particulate matter, in particular black carbon which is also an important short-lived climate pollutant.[xvii] Likewise, there is little regulation of ultrafine particles or recognition of the increased health hazard these may constitute. Proper evaluation of the added value of further legislation is necessary as one might expect current legislative measures are already addressing the main sources of these emissions.
- NO_X emissions from vehicles are regulated but there are concerns about the effectiveness of Euro 6 light-duty diesel vehicle technologies, including the proportion of NO_2 directly emitted from the tailpipe.
- New pollutants emerging from the introduction of biofuels or SCR technologies are not yet considered, these include aldehydes, cyanides, ammonia.

Legislative gaps in addressing pollution sources

- Emissions from small space heating and power plants that fall beneath the scope of the Medium Combustion Plant Directive. These sources produce a relatively high proportion of secondary particulate matter that is not controlled by current legislation.
- Emissions from brake & tyre wear in road transport.
- Emissions from construction sites that fall outside the scope of the Non-Road Mobile Machinery regulations.
- Emissions of ammonia from less intensive farming operations that fall outside the scope of the National Emissions Ceilings Directive.
- Non-Sulphur shipping emissions and a lack of international standards governing shore-side electrical power.
- Emissions from mobile refrigeration units.

National level legislation and policies that negatively impact air quality

- Increased dieselisation of the vehicle fleet combined with a failure in regulation has increased NO_X emissions. Much of the increase in diesel fleet numbers is a result of national fiscal incentives for uptake of diesel cars to reduce CO_2 emissions.
- Increased biomass combustion in cities which have been encouraged by carbon and renewable energy targets at EU and national level.
- Congestion on urban roads increases emissions and concentrations of air pollutants, this is often a result of outdated road infrastructure and increased vehicle numbers.
- Local infrastructure developments can increase emissions and exposure to poor air quality when planning decisions fail to adequately consider air pollution. This is often due to prioritising economic development.
- Secondary inorganic particulate matter driving pollution episodes in cities can be traced to a failure of national and international measures to control secondary precursors, in particular, ammonia.

2.2 Road transport emissions in the urban environment

Reliable data on transport emissions is necessary for the effective implementation of transport related air quality measures. The widely publicised scandal surrounding cheating on diesel passenger car emission tests highlighted the difference between legislated emissions of NO_X and actual emissions from these vehicles.[xviii] An emerging threat is the increased emissions from tampering with emission control systems, specifically particle filters and NO_X abatement systems.

There are several measures that can be implemented to reduce road transport emissions, the most obvious of which are low emission zones and urban vehicle access restrictions However, active methods of transport (walking/cycling) and the deployment of Intelligent Transport Systems are also viable options in many circumstances. Additionally, retrofit technologies are available for some vehicles and captive fleets such as urban taxis and buses lend themselves to this type of measure.

As new evidence emerges, the Partnership advises the use of current research on real driving emissions to inform the application of road transport measures and to aid in the switch to low and zero emission vehicles.

2.3 Particulate Matter in the Urban Environment

Particulate matter is comprised of primary and secondary particulates. Primary particulates are produced directly at source and the principle sources of primary particulate matter in the urban environment are road transport, road abrasion, tyre and brake wear, and biomass/coal burning stoves.

Secondary particulate matter is created from precursor emissions such as sulphur dioxide (SO_2), nitrogen oxides (NO_X), volatile organic compounds (VOCs) and ammonia (NH_3) undergoing chemical and mechanical processes in the atmosphere. These emissions are often from non-urban sources such as agriculture, shipping (inland and coastal), industry, non-urban transport, waste management, power production and natural sources. The impact of secondary PM can be experienced some distance from the source of emissions making abatement policies more challenging, particularly when the source is in another country.

Urban authorities are limited in the level of control they can exercise over both primary and secondary particulate emissions as in many cases they have little to no power over the source emitters. In these instances, and particularly in the cases of industrial emissions and domestic heating, national or even EU measures are fundamental to achieving reductions.

2.4 Residential Combustion and Domestic Heating in the Urban Environment

Residential wood and coal burning in stoves and boilers produces significant quantities of health and climate damaging pollutants including benzo(a)pyrene and black carbon. This is a problem of importance, particularly in those countries where dependency on these fuels is high e.g. some Eastern European countries.

The EU Ecodesign directive and energy labelling legislation are intended to make many of these smaller stoves cleaner, however they are yet to come into force and it is important that real use conditions are reflected in EU legislation. For instance, it has been found that the Ecodesign standards do not necessarily reflect realistic usage scenarios, and one study has noted that emissions of specific products can be up to three times higher than the standards.[xix]

For larger installations, between 1 and 50 MW, the Medium Combustion Plant Directive sets emission limit values but in the urban environment the legislated limits may still be too high to effectively reduce pollutant concentrations, particularly given the exemptions for district heating

installations. For existing installations, the emissions limits will only apply from 2030 for plants between 1 and 5 MW, and from 2025 for plants between 5 and 50 MW.

The options available to city authorities that wish to control these emission sources are currently somewhat limited, however social measures may prove effective. For example, engaging with the operators of larger installations to voluntarily reduce emissions. Promotion of energy savings and alternative means of heating are further options, including the promotion of heat pumps and waste heat harvesting from industry.

2.5 Non-Exhaust Road Transport Emissions

As overall particulate emissions from road transport declines, the fraction emitted by vehicles from tyre, brake, clutch and road wear becomes increasingly significant. There is currently no regulation on targeting these emissions and methods of regulation at national or EU level are necessary if non-exhaust emissions are to be reduced.

The Partnership suggests research involving health and air quality experts specialized in tyre and brake wear technology and emissions, along with tyre manufacturers to formulate better regulation and knowledge on the matter.

2.6 Emissions from Shipping

Emissions from inland waterway transport (IWT), shipping and ports can have a detrimental effect on the air quality of coastal and inland waterway areas. The EU regulatory framework setting emission limits for IWT has been less stringent than arrangements for road transport and in common with other sectors IWT emission standards are applicable only to new engines entering the market. IWT operators currently have little or no economic incentive to invest in after-treatment or end-of-pipe devices to reduce NO_X or PM emissions, unlike CO2 reduction strategies which can usually generate co-benefits obtained by lower fuel consumption.

The monitoring and restriction of emissions could be beneficial to air quality and the Directive on Non-Road Mobile Machinery[xx] emissions will regulate new vessels. In 2013 the European Commission adopted the NAIADES II package[10] with the ambition of improving the quality of inland waterway transport.

[10] https://ec.europa.eu/transport/modes/inland/promotion/naiades2_en

The Partnership encourages the Commission to evaluate if the limits are adequate to protect citizens' health and propose revised solutions accordingly, including retrofit technologies if appropriate.

2.7 Agricultural Emissions

Ammonia emissions from agricultural processes can be a significant contributor to urban PM concentrations. For example, the French National Centre for Scientific Research determined that 62% of the fine particles in a severe air pollution episode in Paris during the spring of 2014 were ammonia induced.[xxi]

The National Emissions Ceiling Directive includes targets for the reduction of agricultural emissions and recognises that some 80% of agricultural emissions originate from roughly 5% of the largest animal rearing installations. The legislation suggests that the largest 3% of animal holdings are targeted with emissions reduction targets, however member states are free to decide how they split this burden, including the voluntary adoption of measures to reduce emissions from manure application. Therefore, measures to reduce ammonia emissions from smaller farms are reliant on national legislation and subsequently, more bilateral cooperation and exchange among EU member states could increase efficiency of reductions.

The Partnership believes that there should be more effort dedicated to implementation and raising awareness in the field of agricultural emissions.

2.8 Urban Power Generation

Combined heating and power plants (CHP) and supplementary diesel generators are often used during periods of high energy demand and can emit high levels of NO_X to the atmosphere. Those generators rated between 1MW and 50MW fall within the scope of the Medium Combustion Plant Directive (MCPD), however many of these installations are exempt from the regulations due to the limited period over which they are intended to operate, less than 500 or in some cases 1000 hours per year. Therefore, the MCPDs provisions are unlikely to curb the anticipated increase in high NO_X generators and the consequent increase in emissions.

The Partnership does not believe that either the MCPD or the NECD are sufficient to reduce the use of these installations and would like to see specific monitoring or regulation covering these types of engine.

2.9 Other sources of emissions

Other sources of emissions in the urban environment include:

- Internal combustion powered refrigeration units
- Construction and demolition activities, both buildings and infrastructure

To help reduce the impact of these emissions sources there are both technical and behavioural approaches. For example, emissions from transport refrigeration units (TRU) can be reduced by switching to electric power in urban areas or adopting alternative refrigeration methods, such as liquid nitrogen.[11] Codes of good practice can also be used to help reduce construction emissions and local authorities can provide valuable input to this process, for example that provided by the Mayor of London's "Control of Dust and Emissions" guidance.[12]

[11] https://www.airqualitynews.com/2018/05/04/ms-leases-low-emission-refrigeration-trailer/
[12] https://www.london.gov.uk/what-we-do/planning/implementing-london-plan/supplementary-planning-guidance/control-dust-and

3 About the Partnership

The Urban Agenda for the EU – consolidated with the Pact of Amsterdam, agreed on 30 May 2016 by the EU Ministers responsible for Urban Matters - has introduced a new working method of thematic Partnerships being elaborated by partners representing various governance authorities aiming to tackle social challenges by focussing on cities. It aims to promote cooperation between Member States, Cities, the European Commission and other stakeholders, in order to stimulate growth, liveability and innovation in the cities of Europe. The Partnership on Air Quality is one of the 12 priority themes of the "Urban Agenda for the EU".

The main objective of the Partnership on Air Quality is to improve air quality in cities and bring the 'healthy city' higher on the local, national and EU agendas as part of the Urban Agenda. The Partnership focuses on Better regulation (and implementation), better financing and better knowledge (sharing).

The Partnership has an Action Plan in place. This position paper is one of the results of Action 1.

The Partnership for Air Quality

- EU Member States:
  - → The Netherlands (coordinator)
  - → Croatia
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  - → Poland

- Cities:
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- Stakeholders:
  - → EUROCITIES
  - → HEAL

- The European Commission
  - → DG Regional and Urban policy (coordinator)
  - → DG Environment
  - → DG Research and Innovation
  - → DG Agriculture
  - → DG Growth
  - → The Joint Research Centre (JRC)

- The URBACT programme (observer).

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