



URBAN AGENDA FOR THE EU

Partnership for Air Quality

Final Draft Action Plan

1 November 2017¹

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INTRODUCTION

The Urban Agenda for the EU – consolidated with the Pact of Amsterdam, agreed on 30 May 2016 by the EU Ministers responsible for Urban Matters² - 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. This will be done through contribution to policy assessment in the consultation phase, and to improvement the development and/or of implementation of regulation, funding mechanisms and knowledge at all levels, as well as the coordination between them.

The **Members of the Partnership** are:

- Member States: The Netherlands (coordinator), Croatia, Czech Republic, Poland;
- Cities: Helsinki/HSY (Helsinki Region Environmental Services Authority) (FI), London (UK), Utrecht (NL), Milan (IT), Constanta (RO), and Duisburg (DE - Representing the Consortium Clean Air Ruhr Area);
- Stakeholders: EUROCITIES, HEAL (Health and Environment Alliance);
- European Commission: DG Regional and Urban policy (coordinator), DG Environment, DG Research & Innovation, DG Agriculture, DG Growth, the Joint Research Centre (JRC).

The Partnership is also actively supported by the URBACT programme, which has an observer status.

Following the scoping exercise of existing regulation, committed resources and knowledge, advice can be given as input for improving the EU policy and funding landscape. The Partnership works on proposals for better regulation (and implementation), funding and knowledge in this area. The first step consisted of the identification of the relevant issues regarding urban air quality focusing on regulation and implementation of regulations; funding and knowledge (see Annex 1). The findings of the Partnership have then been thoroughly discussed among the partners and shared with public stakeholders through an international workshop and a public consultation to gather feedback that has been used to complement the Partnership’s work³. Drawing on the evidence gathered to find concrete solutions to the issues identified, the Partnership has developed a series of actions, presented in this plan.

The Partnership’s actions also aim to contribute to the goals of the New Urban Agenda and to the targets set in the Sustainable Development Goals⁴.

² See: <https://ec.europa.eu/futurium/en/content/pact-amsterdam>.

³ URBAN AGENDA FOR THE EU, Main findings and issues, Partnership for Air Quality, 17.07.2017

⁴ New Urban Agenda, adopted at the United Nations Conference on Housing and Sustainable Urban Development (Habitat III) in Quito, Ecuador, on 20 October 2016. <https://habitat3.org/the-new-urban-agenda>, and <http://www.un.org/sustainabledevelopment/sustainable-development-goals>.

1 BETTER REGULATION AND IMPLEMENTATION

1.1 ACTION N°1 – IDENTIFICATION OF GAPS IN REGULATION AND IMPLEMENTATION ON AIR POLLUTANT EMISSION SOURCES

What is the specific problem?

Air quality is a complex issue. It requires setting of common air quality standards, controlling pollutant sources, legislative as well as non-legislative measures, and effective implementation at national and local level. It also requires coordinated efforts at national, regional and local level.

The overall air policy strategy of the EU is directed towards meeting the Air Quality Guideline Values of the World Health Organisation (WHO) in the coming decades (EAP7). At the EU level, six main instruments can be distinguished:

- i. The Ambient Air Quality Directives (AAQD)⁵: These Directives (i.e. 2008/50/EC and 2004/107/EC) set air quality standards and requirements to ensure that Member States adequately monitor and/or assess air quality on their territory, in a harmonised and comparable manner. This includes maximum concentrations for twelve key air pollutants deemed to be most relevant (i.e. sulphur dioxide, nitrogen dioxide and nitrogen oxides, particulate matter (PM₁₀ and PM_{2.5}), ozone, benzene, lead, carbon monoxide, arsenic, cadmium, nickel, and benzo(a)pyrene) to be attained across the EU, including an obligation to further reduce the average exposure of the urban population to PM_{2.5};
- ii. The National Emission Ceilings Directive (NECD): This Directive (i.e. 2016/2284/EC) requires national emission inventories and sets national emission reduction targets to limit transboundary pollution for the most important transboundary air pollutants (SO_x, NO_x, PM_{2.5}, NMVOC, and NH₃);
- iii. Source-specific regulatory approaches: These include emission limits for vehicles (EURO standards) and non-road mobile machinery, fuel standards, energy efficiency standards, the Industrial Emissions Directive, the Eco-design directive, the Sulphur Directive, which regulates the sulphur content of certain liquid fuels mostly addressing SO_x from maritime transport, and the Fuel Quality Directive addressing air pollution from the road transport setting additional fuel quality parameters. These approaches also include the Directive on deployment of alternative fuels infrastructure that requires MS to make publicly available electric charging points, hydrogen, LNG and CNG refuelling stations, in order to speed-up deployment of less polluting vehicles.

⁵ See: http://ec.europa.eu/environment/air/quality/existing_leg.htm.

- iv. Monitoring and reporting requirements and requirements to inform the public on emissions and (actual and expected) air quality, (these partly result directly from the above-mentioned Directives).

In addition, two other (non-regulatory) instruments can be mentioned:

- v. Funding mechanisms e.g. for innovative “green” or “smart” projects.
- vi. Knowledge transfer, e.g. data, models and other tools for air quality planning, which can be used at the national, regional and local levels.).

The Partnership’s analysis focused on pollutants, as well as on sources that have a proven negative impact on the health of exposed populations, especially in urban environments, as follows:

- Particulate Matter (PM):
 - No regulation exists on black carbon⁶ and limited regulation exists on nanoparticles⁷, which are far smaller than the regulated PM₁₀ and PM_{2.5} particle classes, and are believed to have serious health implications, too.
- NO_x:
 - NO_x emissions from vehicles are regulated, but there have been concerns about the effectiveness of Euro emissions limit values, i.e. considering NO_x and NO₂ real-world driving emissions from Light Duty Vehicles (LDVs), and about the negative effects of tampering practices (i.e. removal of catalyst systems).
- Non-exhaust traffic-related particles:
 - Notably road, brake, clutch and tyre wear are currently not regulated, but can contribute to a relevant portion of total non-exhaust traffic-related PM emissions and of total traffic-related PM emissions in urban environments.
- Air pollution from shipping in coastal areas and port cities⁸:
 - Air pollution from SO_x and NO_x produced by from international shipping may have accounted, without adopting timely relevant sulphur regulations, for approximately 50,000 premature deaths per year in

⁶ For a definition of black carbon, see *Status of black carbon monitoring in ambient air in Europe*, EEA Technical report No 18/2013, ISBN 978-92-9213-415-0.

⁷ In 2011 a particle number (PN) limit was introduced in the European Union's vehicle exhaust legislation for diesel passenger cars. The PN method requires measurement of solid particles (i.e. those that do not evaporate at 350 °C) with diameters above 23 nm. In 2013 the same approach was introduced for heavy duty engines and in 2014 for gasoline direct injection vehicles.

⁸ Sulphur content in marine fuel is strictly regulated in the Baltic Sea and the North Sea and the English Channel which are SO_x-Emission Control Area (Sox-ECAs), but not in the Mediterranean Sea. However, as of 2020 a significantly stricter Sulphur Cap decided by the International Maritime Organisation will apply globally in sea areas outside the SO_x-ECAs, including the Mediterranean Sea. Legislation for NO_x emissions reductions on the North Sea and the Baltic Sea will come into force in 2021 for new ships.

Europe, according to recent scientific studies⁹. Many actions have been undertaken in recent years to significantly reduce air emissions from ships. Most of these actions have been taken through Annex VI of MARPOL, an international instrument developed through the International Maritime Organization (IMO) that establishes legally binding international standards to regulate specific emissions and discharges generated by ships. At the EU Level, the Sulphur Directive has been, in a consistent manner with that international instrument, the reference for control of sulphur oxide emissions from ships. Since air pollution from ships continues to increase as the sector grows and its impact to air quality on land can be significant in coastal areas and port cities, it is essential that current and future legislation is adequate and correctly implemented. Land-based emissions – SO_x and NO_x – on the other hand, particularly from fixed installations, have been reduced dramatically. However, NO_x from shipping, which is not yet regulated at EU level, is set to exceed NO_x from all EU land-based sources in the coming decade.

- Ammonia (NH₃) volatilization from manure application:
 - Ammonia contributes to the formation of secondary particulate aerosols, an important air pollutant due to its adverse impacts on human health¹⁰. The most polluting farms are big animal rearing installations with 80% of agricultural emissions coming from 5% of the farms. Measures to reduce ammonia emissions are suggested in the existing regulations for only the largest 3% - the large industrial animal holdings. It is up to the Member States to decide how to distribute the burden. The National Emissions Ceilings (NEC) Directive allows them to take into account impacts on small farms.
- Space heating and power:
 - Specifically referring to particulate matter emissions to air from biomass heating, which comes primarily from urban areas and is a problem mainly related to the low efficiency of boilers and stoves in households (below 1MW), but also to coal, and oil heating¹¹.
- Emissions from construction sites:
 - Constructing buildings, roads and other infrastructure can have a substantial, temporary impact on local air quality. The most common impacts are increased particulate matter (PM) concentrations, and nitrogen oxide (NO_x) emissions. The vast majority of these emissions come from the diesel diggers, generators and other machines operating

⁹ J. Brandt et al., 2011: Assessment of Health-Cost Externalities of Air Pollution at the National Level using the EVA Model System, CEEH Scientific Report No 3, Centre for Energy, Environment and Health Report series, March 2011, pp. 98. http://www.ceeh.dk/CEEH_Reports/Report_3/CEEH_Scientific_Report3.pdf. Studies carried out by the International Maritime Organisation and the Impact Assessment accompanying the proposal for the Sulphur Directive.

¹⁰ See also <https://www.eea.europa.eu/data-and-maps/indicators/indicators/eea-32-ammonia-nh3-emissions/eea-32-ammonia-nh3-emissions>.

¹¹ The use of highly efficient boilers, such as the ones required under the Eco-design after 2020, will address the problems (existing EU legislation on air pollution already includes requirements on medium and large combustion plants).

on sites. Yet this machinery is subject to specific emission regulation, different from the Euro emission standards for road vehicles.

What action is needed?

The Partnership identified the following twofold action to address the issues described above. The first part of the action focuses on better implementation; the second on aspects related to better regulation.

Better Implementation

- Encourage MS and local/regional administrations to adopt a continuous improvement approach to sources of PM and NO_x (as these are the two pollutants that many MS struggle to legally comply with), taking action wherever possible.
- Focus on measures to accelerate the switch to low- and zero-emission vehicles (such as electric buses and cars) and zero-emission modes of transport (e.g. active modes), and to deploy digital and ITS solutions that would facilitate this transition.
- Further investigate the possibility to improve coherence of cities' implementation approaches of Low Emission Zones (LEZs), e.g. via road pricing, speed limits or reducing on-road parking facilities. Collaboration with the Partnership on Urban Mobility will be considered.

Better Regulation

- Based on the Partnership's findings, provide input to EU level policy discussions, for example, to promote additional actions for national governments to remove/retrofit old installations, for local government to improve transport infrastructure, as well as initiatives on car sharing and on negative fiscal incentives for cars.
- City, stakeholder and national members of the partnership will set up a multilevel governance working group to provide input to the European Commission and/or established policy processes (including regulatory Committees, as relevant) on relevant policy and regulatory developments, e.g. during the Fitness Check of the EU Ambient Air Quality Directives. The European Commission will act as an observer in this group. The group will not replace other consultation processes put in place by the European Commission.
- Collaboration with the Partnership on Urban Mobility and with the Covenant of Mayors for Climate and Energy will be considered.

How to implement the action?

The Partnership's findings pointed out that EU and national regulatory instruments, and/or the way they are implemented, might not always ensure an adequate and timely reduction of the above list of pollutants, sources and effects of air pollution. Nevertheless, ***the Partnership also underlines that the search for solutions to the issues falling under the scope of this action will not automatically lead to proposing new EU regulation, which is an option that could occur only in the absence of alternative approaches. The***

Partnership is aware that this action should not create any expectation on a change in Comitology rules nor any privileged access to legislative processes.

For the activities regarding better implementation, the Partners will carry out studies, consultations in order to formulate recommendations and policy inputs, also trying to liaise with *inter alia* the Partnership for Urban Mobility and the Covenant of Mayors for Climate and Energy.

As regards the activities under better regulation, the Partnership will set up the multilevel governance working group described above. The multilevel working group will try to feed into the preparations of initiatives like the biennial Clean Air Forum and other relevant events, as well as any Commission stakeholders’ meetings related to air quality. Public workshops may be organised to stimulate dialogue between city leaders, member states, EU policy makers and the relevant industries (e.g. transport, energy, waste management, agriculture), notably the car industry. The seminars, based on the findings of the Partnership, will search for cross-sector and multi-governance solutions and seek commitments from the involved partners to rapidly improve air quality in cities.

The multilevel governance working group’s method will be based on the **principle of subsidiarity**. First, when looking for solutions to mitigate the negatives impacts of pollution, it will begin from the local level. If that is not possible, the search for solutions will be escalated at regional level, then at national level, and so on up to the European level, until a suitable solution is found.

Given the need for a strong multilevel governance dimension for this action, a **representative of the local level and a representative of the national level will provide a joint coordination**, with the other Partners providing expert input and the European Commission acting as an observer.

Which partners are necessary to carry out the action?

Partner	Role
Greater London Authority	Action Coordinator (Representative local level)
The Netherlands	Action Coordinator (Representative national level)
Europe (Eurocities, HEAL):	Expert input on better implementation and on better regulation
Europe (European Commission):	Observer ¹²
National/Regional (Partners and other MS/Regions):	Expert input on better implementation and on better regulation
Local (Utrecht and other cities):	Expert input on better implementation and on better regulation

¹² EC could not be member of this working group as it could be in conflict with its institutional role in the EU legislative process. Nevertheless, its participation as an observer is justified by the fact that the purpose of the multilevel working group is coherent with its activity on Better Regulation policy and the interinstitutional agreement on better law-making (OJ L 123, 12.5.2016).

1.2 ACTION N°2 – BETTER AIR QUALITY PLANNING (GOVERNANCE)

What is the specific problem?

Almost three quarters of Europeans live in cities, which remain the immediate level of intervention in dealing with the threats to human health coming from pollutants such as nitrogen dioxide, particulate matter, and ozone.

However, “Air quality planning” in the EU is not always under the responsibility of cities, as the majority of Members States set the responsibility for drafting and adopting Air Quality Action Plans (AQAP) from Art. 23 of Directive 2008/50/EC¹³ at regional or even at national level.¹⁴ In the meantime, the measures defined by the AQAP should address different sectors, whose enforcement and implementation are of competence of urban, regional or national authorities, as appropriate.

These elements raise two needs:

- i. to improve the coordination between different levels of governance (national regional, local) involved, respecting specific situations and the subsidiarity principle; and
- ii. to improve the coordination within cities between air, health, energy, transport and urban planning, taking into account the contributions that could come from the involvement of citizens in urban policy development.

Furthermore, the work of the Partnership has allowed identifying issues of concern for many cities relating to the development and implementation of Cities Air Quality Action Plans. Notably, it has been found:

- That access to knowledge and experiences (e.g. on process optimization, pitfalls, stakeholder interactions, governance, monitoring, etc.) from front-runners cities having already designed and implemented AQAPs is often crucial to avoid inefficiencies, and that such knowledge should be improved.
- Likewise, that knowledge of best practices in the selection, design, funding, and implementation of air quality measures is essential to facilitate the choice of the relatively most effective measures for the AQAPs, and that such knowledge should be improved.

¹³ Article 23 - Air quality plans: 1. Where, in given zones or agglomerations, the levels of pollutants in ambient air exceed any limit value or target value, plus any relevant margin of tolerance in each case, Member States shall ensure that air quality plans are established for those zones and agglomerations in order to achieve the related limit value or target value specified in Annexes XI and XIV. In the event of exceedances of those limit values for which the attainment deadline is already expired, the air quality plans shall set out appropriate measures, so that the exceedance period can be kept as short as possible. The air quality plans may additionally include specific measures aiming at the protection of sensitive population groups, including children. Those air quality plans shall incorporate at least the information listed in Section A of Annex XV and may include measures pursuant to Article 24. Those plans shall be communicated to the Commission without delay, but no later than two years after the end of the year the first exceedance was observed. Where air quality plans must be prepared or implemented in respect of several pollutants, Member States shall, where appropriate, prepare and implement integrated air quality plans covering all pollutants concerned. 2. Member States shall, to the extent feasible, ensure consistency with other plans required under Directive 2001/80/EC, Directive 2001/81/EC or Directive 2002/49/EC in order to achieve the relevant environmental objectives.

¹⁴ See also: <http://eeadmz1-cws-wp-air.azurewebsites.net/>

Which action is needed?

The Partnership identified the following action to tackle the problem described above:

- Development of a Code of Good Practices for Cities Air Quality Action Plans aiming to present examples of consistent interpretation of the content listed under Annex XV, Section A of Directive 2008/50/EU.
- Assemble and keep updated a register of examples of best practice in urban air quality planning, in order to encourage the dissemination of knowledge on relevant air quality measures and facilitate comparative analysis on their relative effectiveness.

How to implement the action?

1. Development and dissemination of a Code of Good Practices for Cities Air Quality Action Plans¹⁵ in cooperation with experienced cities. All partners can provide expert input and reviewing.
2. Promote the dissemination of best practices in urban air quality planning between different governance levels (European/National/Regional/Urban), and between cities fostering the use of state-of-the-art methodologies, tools and data for air quality planning. This work could be carried out in cooperation with the Forum for Air Quality Modelling (FAIRMODE¹⁶). The Partners involved in the implementation of this action and communicated to the stakeholders will define best practices selection mechanisms and criteria in a transparent manner.

Which partners are necessary to carry out the action?

<i>Partner</i>	<i>Role</i>
Milan	Action Leader
Europe (JRC):	Coordination of sharing register of air quality regional-local measures
Europe (EUROCITIES, HEAL):	Expert input/review of Code of Good Practices
Europe (URBACT):	Expert input/review, based on the experience of URBACT Action Planning and Implementation Networks
Europe/National (e.g. National Fund for Environmental Protection and Water Management in Poland):	Promotion of the use of Code of Good Practices of Cities Air Quality Plans and dissemination of best practices and facilitation of comparative analysis on

¹⁵ Note that in an exceedance situation air quality plans are mandatory (and not voluntary) – see Directive 2008/50/EC

¹⁶ <http://fairmode.jrc.ec.europa.eu/>

<i>Partner</i>	<i>Role</i>
	their relative effectiveness between cities and different governance levels
National (Croatia):	Expert input/review of Code of Good Practices. Croatia participates in FAIRMODE work, notably WP5 – Management practices (which includes planning), led by JRC. Croatia can share knowledge and experiences on this with the rest of the Partnership.
Local (Utrecht):	Expert input/review of Code of Good Practices
Local (HSY/Helsinki):	Expert input/review of Code of Good Practices, incl. write a chapter about stakeholder and public consultation. HSY/Helsinki participates in FAIRMODE work, notably WP5 – Management practices, and can share the related AQ Planning knowledge and experiences with the Partnership.
Local (Milan):	Coordination of the development of Code of Good Practices in cooperation with experienced cities Expert input/review of Code of Good Practices Milan participates in FAIRMODE work, notably WP5 – Management practices, and can share the related AQ Planning knowledge and experiences with the Partnership.
All partners	Provide input on best practices to the Register of air quality regional-local measures shared by JRC

2 BETTER FUNDING

2.1 ACTION N°3 – BETTER TARGETED FUNDING FOR AIR QUALITY

What is the specific problem?

The Partnership observed that the dynamics of measure implementation are to a high degree influenced by the business plans of each individual competent authority, primarily their organisational capacities and the availability of necessary financial resources.

Various EU and national funds are available to prepare and implement national, regional and local air pollution policies¹⁷. However, the Partnership found that there is an overall lack of specific programmes dedicated to funding of projects aimed at air pollution reduction, as funding of air quality improvement projects usually has to compete with other societal challenges. In addition, knowledge of the right procedures and conditions is required and stakeholders consider procedures to acquire funding for clean air projects from EU funds difficult. In the operational programmes (OP's) for the large funding mechanisms (i.e.: such as ERDF and Cohesion Funds), air quality tends to be considered as an integrated measure with other priority areas (i.e.: energy, waste, nature) rather than being targeted solely through priorities for air quality improvement. This can be linked with the lack of funding available for regions to achieve abatement measures since air quality improvement may have not have been given priority in the OP's earmarked budgets. It also appears that in some Member States the legal support for local experiments could be improved.

Finally yet importantly, the Partnership found that air quality policy is often treated as a stand-alone effort, where developments in economic activities, transport, agriculture and energy use are seen as given. Air quality policies becomes more effective when integrated to other policies, for examples decisions about implementation of common agricultural policy, the European transport network, or the EU-climate and energy policy. This increases the possibilities for synergies between policy areas or to include potential negative side effects for air pollution in an early stage of the policy development process. In this respect, the Partnership observed that cities are in demand for more possibilities to integrate existing EU/MS/regional funds for implementing air quality measures.

The elements above combined notably determine a need for an increase in the relevant funding options for urban projects/plans to carry out air quality management solutions. This issue is particularly sensitive for those urban areas where the costs of local

¹⁷ E.g. within the European Structural and Investment Funds €1.57 billion is allocated in the period 2014-2020 to air quality measures. Air quality measures can also be funded from the sustainable transport programme of the Cohesion Fund and measures to abate ammonia (a precursor of particulate matter) can be funded from the European Agricultural Fund for Rural Development. Management authorities in each member state decide about specific operational allocation of the available funds. Moreover co-funding for innovative projects can be obtained from the Connecting Europe Facility (CEF) programme, LIFE-programme, the European Fund for Strategic Investments (the so-called Juncker Investment Plan), Horizon 2020 (e.g. the European Green Vehicles Initiative), the Urban Innovative Actions in sustainable development programme (€371 million for 2015-2020) and the JPI Urban Europe."

abatement measures for limit values compliance are remarkable (stronger measures and wider range of action to be taken).

Which action is needed?

The Partnership identified the following action to tackle the problem described above:

- Assessing funding needs for the sustainable design/implementation of Cities Air Quality Action Plans and develop an appropriate business model to fund air quality measures, considering also the possibilities offered by the integration of different funding instruments (e.g. blending facilities).
- Making recommendations for :
 - Improving the targeting of existing funding instruments on air quality, as well as for providing technical assistance for cities to access such funding instruments. As a positive example, the Croatian Environmental Protection and Energy Efficiency Fund (EPEEF) provides co-financing to cities for developing air quality plans and air quality projects, as well as for measures implementation. Likewise, in Poland, the National Fund for Environmental Protection and Water Management funds air quality projects, using resources coming, among other things, from penalties raised on pollutants.
 - Having funding bodies play a more active role in making funding opportunities easier to access for cities, as well as in facilitating the dissemination and the uptake of air quality–related project results in EU and national policy making. Promoting better accessibility and dissemination by managing authorities of funding opportunities that are targeted at air quality could help regions and authorities raise awareness on opportunities available and realise the tangible effects of applying for such funds.

How to implement the action?

1. Defining funding needs for the sustainable design/implementation of Cities Air Quality Action Plans, and assessing sources of funding, and options for their integration.
2. Developing a pilot business model based on the City Air Quality Action Plans designed based on the Code of Good Practices developed under Action N°2 above. Present results on pilot business model at events and by online dissemination.
3. Drafting recommendations for improving the targeting of existing funding instruments on air quality, as well as their integration, based on the results of the pilot, as well as for having funding bodies make funding opportunities easier to

- access for cities, and be more active in facilitating the dissemination and the uptake of air quality–related project results in EU and national policy making.
4. Sharing draft recommendations with stakeholders through internet-based public consultation and/or Partnership event and finalization of recommendations.

Which partners are necessary to carry out the action?

<i>Partner</i>	<i>Role</i>
Milan	Action Leader
Europe (European Commission):	Expert input/review
Europe (URBACT):	Invite URBACT cities to comment on the proposed business model
National/Regional:	Expert input/review
National (Croatia, Poland, Netherlands):	Expert input/review, especially with consideration on existing/future financing solutions
Local (Milan)	Development and pilot project for Business Model definition
Local (All partners):	Expert input/review

3 BETTER KNOWLEDGE

3.1 ACTION N°4 – BETTER FOCUS ON THE PROTECTION AND ON THE IMPROVEMENT OF CITIZENS' HEALTH

What is the specific problem?

The findings of the Partnership clearly highlight that air quality planning in cities would benefit from complementing the 'focus on exceedances of limit values', with an additional emphasis on citizens' health.

In particular, an important finding of the Partnership is that, although limit values (based on existing indicators) are not questioned, there is a need to go beyond them, as there are health impacts even at concentrations below current EU air quality standards. For instance, it was pointed out that in some hot spot areas, such as urban traffic stations, there are often exceedances of limit values (NO₂, PM₁₀, even in some locations PM_{2.5}). In these areas, a number of people are exposed to the concentrations exceeding limit values, although the majority of urban population is not. Urban background concentrations are in most cities well below limit values. These concentrations better reflect the general large-scale health impacts in these cities¹⁸.

The Partnership also observed the need to better consider how air quality outcomes can be better integrated into existing funding mechanisms. To this end, it would be useful to include considerations regarding the impact on air quality as early as possible in the planning formulation process as a possible criterion for funding infrastructural or industrial development projects. This would be an ideal way to communicate with stakeholders, financiers and government layers and to contribute to make it harder to fund projects that would contribute negatively to air quality.

The development of an additional indicator/-s for measuring air quality health impacts could be a way to move in that direction¹⁹. Such a health assessment instrument would be no replacement of existing indicators, nor would it question the related limit values, but it would be a concrete way to go beyond them, as relevant for safeguarding citizens' health.

There is already a lot of technical knowledge about air quality, both regarding the effects and the causes of air pollution, as well as useful indicators²⁰. However, the Partnership

¹⁸ This was presented in the JRC modelling reported in the Partnership's findings on Work Package (WP)1. Notably urban populations, more than people residing in other areas, suffer the effects on health of traffic-related pollutants, mainly 'primary pollutants' such as NO/NO₂ and finest particles (Ultrafine Particles or Nanoparticles) characterized by the presence of toxic and carcinogenic compounds such as PAHs (Polycyclic Aromatic Hydrocarbons), Black Carbon, benzene and heavy metals.

¹⁹ Indicator does not necessarily mean a single number. It may also refer to a set of numbers or an instrument/approach. Moreover, the term "indicator" can refer to many types of data.

²⁰ Several tools, or indicators, are available, such as GES in the Netherlands, the use of DALYs, and health impact assessments. See for example the WHO report on Air Pollution Health Risk Assessments (AP-HRA)

found that health impact assessments obtained by means of larger scale models are not able to capture the additional effect on health of traffic proximity exposure²¹, which can only be assessed with detailed models, which are more expensive - both financially and in term of computational time, although generally useful for determining the effects of local measures.

The Partnership believes that the development of this additional indicator/-s for measuring air quality health impacts can be a valuable opportunity to foster synergies in urban planning between different policies (i.e. air quality, energy, mobility, housing, etc.) and health.

As a further step, instruments able to assess external costs of different health impacts could be developed with the help of experts (i.e. WHO). This health assessment instrument could be used to obtain the relative value in term of external cost and become a basis for cost-benefit analysis of measures to improve air quality.

Last but not least, the introduction of an additional indicator/-s for measuring air quality health impacts would also contribute to boost the effectiveness of communication to the general public. Instead of talking about the co-funding of technical operations, budgets lines spent, rules modified, the institutional messages would focus more on measurable benefits generated in terms of well-being, quality of life improved, and cleaner air, which are issues that probably resonate more for most of European citizens.

Which action is needed?

The Partnership identified the following action to tackle the problem described above:

In the current situation (spatial) planning is based upon approaches that do not fully reflect adverse health effects of pollution. Therefore additional instruments are needed to take these effects into account, and protect and improve citizen's health. This could be useful for:

- Stimulating more focus on improvement of citizens' health and encouraging cities to give more emphasis to air quality-related impacts on health in the strategic planning of their interventions.
- Requesting to indicate the impact of air quality on health and apply a new instrument for measuring benefits generated in terms of citizen's health and living environments.

http://www.euro.who.int/_data/assets/pdf_file/0006/298482/Health-risk-assessment-air-pollution-General-principles-en.pdf?ua=1.

²¹ See also APHEKOM Project results http://aphekom.org/c/document_library/get_file?uuid=4846eb19-df8a-486e-9393-1b7c7ac78ce3&groupId=10347 and also <http://decumanus-fp7.eu/home/>.

How to implement the action?

1. Mapping and assessing existing (health) impact tools, or monetisation tools (e.g. Cost benefit analyses), specifically regarding their applicability for air pollution and/or for environmental stressors,²² taking also into account context (explanatory) factors (e.g. institutional and cultural factors)
2. Conducting empirical case studies
3. Developing an instrument, including indicators and use the instrument in a pilot project or in a test run call (e.g. with funding from relevant EU programme/initiative)
4. Evaluating and disseminating results through event, web and social media.

Which partners are necessary to carry out the action?

<i>Partner</i>	<i>Role</i>
Utrecht	Action Leader
Europe (European Commission):	Expert input/review
Europe (URBACT):	Support the dissemination of the additional indicator/-s for measuring air quality health impacts
National/Regional (Croatia and other partners)	Expert input on existing tools, case studies, indicators and review
Local (Milan and all partners)	Empirical case studies covered by this piloting activity, expert input and review
Local (Utrecht):	Development, pilot and monitoring/evaluation
International (WHO):	Expert input and review

²² See for instance https://ec.europa.eu/transport/themes/sustainable/studies/sustainable_en.

3.2 ACTION N°5 – AWARENESS RAISING AND KNOWLEDGE SHARING

What is the specific problem?

In spite of the work carried out by the EU institutions, the Member States, many cities and grass-root movements in Europe, the general public is little engaged in air quality policy initiatives and knowledge of the effects of poor air quality on health is not widely available. Likewise, the general public has in some instances a low appreciation and acceptance of the measures adopted to improve air quality (e.g. traffic bans). The general public is often not aware of the impact of personal choices on air pollution and on their own health.

The Partnership has found that differences in the level of awareness of the general public across cities about the negative impacts of pollution on health represent a barrier to the effectiveness of air quality policy measures. Such differences, however, could be alleviated by sharing examples of successful measures to trigger participation and to coproduce solutions. Increased public awareness about health impacts is therefore essential for improving social acceptance of and support for air quality management measures, and the Partnership agrees that providing cities with improved communication strategies and tools and with relevant examples of best practice could contribute to deliver that result.

Which action is needed?

The Partnership identified the following action to tackle the problem described above:

- Improving cities' communication strategies by focusing on the benefits brought by clean air for health and well-being, environment and economy, as well as potential of positive side-effects (e.g. less noise, less congestion, greener cities).
- Developing a Communication Toolbox for awareness-raising strategies on air quality issues and solutions, organisation of events etc., focusing on an integrated multi-stakeholder approach (European, national, regional, local).
- Bringing together educational and information models of awareness-raising campaigns for different stakeholder groups to emphasise shared responsibility for air quality, propose concrete actions, and provide support for bottom-up awareness-raising/knowledge sharing initiatives (e.g. by schools, local businesses, civil society organisations). Examples of possible activities:
 - Educational campaigns --> e.g. inform children; involve all stakeholders; concentrate on health authorities; sectoral campaigns, bottom-up initiatives. For instance, Croatia: CZ collaboration; Chimney sweepers campaign in Finland [Chimney sweepers are distributing a leaflet "burn right" for households about wood burning in woodstoves and pharmacies are distributing a leaflet about street dust (e.g. how to reduce your exposure)].

- Promote citizen science and better solutions to complement regulatory and mandatory approaches to measure and manage air quality (e.g. like in the <https://hackacity.eu/> project) or consultations around various measures.
 - Promote examples of participatory design and implementation of air quality policies, e.g. like recent citizen panels in Gdansk or ideas developed as part of <http://www.claircity.eu/> project or *Smogathons* (<https://www.smogathon.com/about>) to emphasise that air quality management is not only an expert issue; citizens may be part of a problem, but can also hold valuable solutions.
 - Scale up activities such as <https://www.cleanairday.org.uk/> to the European level.
- Inviting the European Commission, MS and cities to dedicate resources for the development and implementation of communication campaigns²³.

How to implement the action?

1. Selection of examples of best practice in the area of educational and information models of awareness-raising campaigns for different stakeholder groups to emphasise shared responsibility for air quality, propose concrete actions, and provide support for bottom-up awareness-raising/knowledge sharing initiatives.
2. Development of Communication Toolbox for awareness-raising strategies on air quality issues.
3. Fine-tuning of Communication Toolbox through feedback from stakeholders at EU, national, regional and local level.
4. Publication of Communication Toolbox with illustrative examples of best practices (web, social media) and presentation at showcasing event/-s.

HEAL as a partner can assist in developing Air Quality communication strategies, including a toolbox for designing, delivering and evaluating awareness raising campaigns. The Air Quality Communication strategies and the Toolbox will be based on examples of best practices. Best practices selection mechanisms and criteria will be defined in a transparent manner by the Partners involved in the implementation of this action and communicated to the stakeholders. Educational/information campaigns on "clean" driving styles, traffic control for lower emissions and information on tampering of particle filters on vehicles can be included here.

The work under this action will take into account results from EURO CITIES' relevant working group/-s, EEA, noise abatement societies and their equivalents on air pollution. The Covenant of Mayors has an extensive collection of best practices (<http://www.eumayors.eu/Brochures-Publications.html>) and case studies (http://www.eumayors.eu/media/case-studies_en.html) covering many mitigation and adaptation measures, such as promoting sustainable mobility, development of green/blue infrastructure, renaturing urban spaces and others. These practices will also

²³ In compliance with public procurement applicable regulations.

be considered for sharing with the Air Quality community. Likewise, synergies will be sought with ongoing relevant EU projects in order to capitalise on their results.

Which partners are necessary to carry out the action?

<i>Partner</i>	<i>Role</i>
HEAL	Action Leader
Europe (HEAL):	Development of a communication strategy and toolbox
Europe (URBACT):	Support the development of Communication Toolbox, based on existing good practice and URBACT experience with stakeholder engagement
Europe (EUROCITIES):	Disseminate the strategy and tool box to their membership
National/Regional:	Expert input/review communication strategy and toolbox
National (Poland):	Organize events/webinars in coordination with the Polish Ministry of Economic Development
National / Local (Croatia, Helsinki, Milan):	Expert input/review communication strategy and toolbox. Notably Croatia, Helsinki, Milan will share with the Partnership the experience achieved as a pilot country / city in FAIRMODE WP 5 – Management practices
Local (All partners):	Expert input/review, implementation

3.3 ACTION N°6 – OUTREACH

What is the specific problem?

The Partnership has an EU-wide representation from cities, Member States, NGOs and the European Commission. Through an international workshop and other communication channels, such as the FUTURIUM web platform, the Partnership has already gathered valuable inputs from stakeholders and started to spread its results.

However, more work is needed to further disseminate the outcomes of the Partnership's work and to complement them with the views of an even larger number of stakeholders across Europe.

Indeed, one of the objectives of the Partnership was also to try and involve other Member States and cities in the development and implementation of pilots where models and best practices could be tested. For instance, some stakeholders indicated that they are interested in test-running the Code of Good Practices for Air Quality Plans, as developed by the Partnership in Action N°2 above.

Which action is needed?

The Partnership identified the following action to tackle the problem described above:

- Organising local/national/European Air Quality events to exchange experiences and be updated about scientific developments under EU-projects (e.g. FAIRMODE), UNEP, WHO, the UNECE Air Convention, etc.

How to implement the action?

In order to foster exchange with and engagement of other stakeholders, the Partnership will organise a series of events (i.e. workshops, round-tables, or webinars) in different Member States. These events will be either national-/regional-oriented or have an international character.

Through these events the Partnership will seek to collect:

- Inputs on the new Action Plan (Findings, Actions)
- Suggestions for additional Actions and/or Recommendations
- Involvement of other stakeholders in the Actions (such as Partners already involved in the Partnership on Urban Mobility, and networks like the Covenant of Mayors and CIVITAS).

Partners will additionally seek opportunities to participate in relevant international workshops organised by third parties to further improve the outreach of the Partnership's communication activities on its results. As an example: The Partnership organised mid 2017 an international workshop in London to obtain input for the current Action Plan. The Netherlands will organise an international conference in spring 2018 on Ports and Shipping and Clean Air.

Which partners are necessary to carry out the action?

<i>Partner</i>	<i>Role</i>
The Netherlands	Action Leader
Europe (HEAL):	Organisation of webinars
Europe (European Commission):	Participate in and promote selected events
Europe (URBACT, EUROCITIES):	Support the dissemination of stakeholder events and consider opening some of the URBACT and EUROCITIES events, especially on the national scale, to Partnership representatives
National (Poland):	Organize events/webinars with involvement of Polish advisors network and the signatories of Covenant of Mayors initiative, in coordination with the Polish Ministry of Development
National (Croatia):	Organize national workshop or Partnership meeting in cooperation with Croatian UDG representative (tbc)
All Partners:	Organise events Participate in events/webinars organised under this action, as relevant Promote the Partnership's results in third-party events

4 LINKS WITH OTHER COMMITMENTS

4.1 LINK WITH THE CROSS-CUTTING ISSUES

The Pact of Amsterdam states that the complexity of urban challenges requires integrating different policy aspects to avoid contradictory consequences and to make interventions in Urban Areas more effective. In line with the competences and responsibilities of the different participants and taking into account that the EU does not have competences on some of these issues, the Partnerships shall consider the relevance of cross-cutting issues for selected priority themes.

Below it is described how these themes have been taken into account in the development of the Partnership's Action Plan.

4.1.1 *Good urban governance, sound and strategic urban planning and an integrated approach*

These first three themes are very important for the Partnership on Air Quality. Indeed the Partners agreed that on Air Quality Planning there is a need to:

- improve the coordination between different levels of governance (national regional, local) involved, respecting specific situations and the subsidiarity principle; and
- improve the coordination within cities between air, health, energy, transport and urban planning; taking into account the contributions that could come from the involvement of citizens in urban policy development.

Furthermore, it was stated that the measures defined by the Air Quality Action Plans should address different sectors, whose enforcement and implementation are of competence of urban, regional or national authorities, as appropriate.

The following actions are proposed to address good urban governance, sound and strategic urban planning and an integrated approach:

- **ACTION N°2 – Better Air Quality Planning**, through:
 - o Development of a Code of Good Practices for Cities Air Quality Action Plans to ensure a consistent interpretation of the AQAP content listed under Art. 23 of Directive 2008/50/EU (Annex XV, Section A), and
 - o Assemble and keep updated a register of examples of best practice in urban air quality planning, in order to encourage the dissemination of knowledge on relevant air quality measures and facilitate comparative analysis on their relative effectiveness.
- **ACTION N°4 – Better Focus on the Protection and on the Improvement of Citizens' Health**, through:
 - o Stimulating more focus on improvement of citizens' health and encouraging cities to give more emphasis to air quality-related impacts on health in the strategic planning of their interventions.

4.1.2 *Innovative approaches*

The Partnership did not specifically focus on innovative approaches.

4.1.3 *Impact on societal change, including behavioural change*

Behaviour is a crucial factor influencing urban air quality. Urban planning, e.g. availability of good public transportation can influence the modal shift. Attractive layout may encourage walking or cycling modal choice. Likewise, sustainable use of energy, waste treatment, etc. have a direct impact on air quality. The support of authorities for measures that have a positive impact on urban air quality is therefore essential. These themes were therefore assessed as being of major importance for achieving better urban air quality.

The findings of the Partnership clearly highlight that air quality planning in cities would benefit from complementing the ‘focus on exceedances of limit values’ with an additional emphasis on citizens’ health. The Partners consider that the development of an additional indicator/-s for measuring health impacts is a way to move in that direction, and addressed this in **ACTION N°4 – Better Focus on the Protection and the improvement of Citizens’ Health**.

The Partnership also found that differences across cities in the level of public awareness about the negative impacts of pollution on health represent a barrier to air quality policy measures’ effectiveness. The Partnership agreed that providing cities with improved communication strategies and tools and with relevant examples of best practice could contribute to deliver that result. Relevant actions in this Action plan are also **ACTION N°5 – Awareness Raising and Knowledge Sharing**, and **ACTION N°6 – Outreach**.

4.1.4 *Challenges and opportunities of small- and medium-sized cities; and polycentric development.*

Air quality is not an issue limited to larger cities. Therefore, the Partnership did not define special city size-related issues, which should justify different Air Quality policies and/or measures.

4.1.5 *Urban regeneration*

Urban renewal and regeneration is the transformation of existing urban areas to accommodate much denser and generally mixed used environments. It enables the use and development of an area to better align with the current and future needs of a growing city. The Partnership focussed indirectly on the relation of Air Quality issues and urban regeneration, for example on actions where there is or should be a connection between Air Quality with urban planning, such as **ACTION N°1 – Identification of Gaps in Regulation and Implementation on Air Pollutant Emission Sources**, and **ACTION N°2 – Better Air Quality Planning**.

4.1.6 *Adaptation to demographic change*

The Partnership did not consider demographic change to have a strong direct link with air quality and this issue was therefore not specifically addressed in the Action plan.

4.1.7 Availability and quality of public services of general interest

The Partnership considered that the quality of public services of general interest did not have a relevant link with the air quality and did therefore not specifically address it.

4.1.8 International dimension (Habitat III and the Sustainable Development Goals).

The Partnership puts a strong attention to creating synergies with the Sustainable development Goals and the New Urban Agenda. See § 4.2 below.

4.2 NEW URBAN AGENDA & SUSTAINABLE DEVELOPMENT GOALS

The EU and its Member States agreed on the New Urban Agenda and committed to implement it through the Urban Agenda for the EU. This paragraph indicates which actions from the present plan explicitly contribute to their achievement (cross-referencing).

4.2.1 GOAL 3. Ensure healthy lives and promote well-being for all at all ages

This is a major target of the Action plan. All the proposed actions aim to positively contribute to this goal.

4.2.2 GOAL 6. Ensure availability and sustainable management of water and sanitation for all

The Partnership's Action plan is directly related to this goal and aims to have a positive impact on it.

4.2.3 GOAL 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

The Partnership's Action plan seeks to positively contribute to this goal, notably by improving urban planning through **ACTION N°2 – Better Air Quality Planning (Governance)**, **ACTION N°3 Better Targeted Funding for Air Quality**, and **ACTION N°4 – Better Focus on the Protection and on the Improvement of Citizens' Health**.

4.2.4 GOAL 11. Make cities and human settlements inclusive, safe, resilient and sustainable

All actions in this plan aim to positively contribute to this goal.

4.2.5 GOAL 13. Take urgent action to combat climate change and its impacts

All the actions of the Partnership's Action plan are directly linked to the fight against climate change and aim at positively contributing to this goal, while avoiding possible contradictions between climate change and air quality measures.

4.2.6 GOAL 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

All the actions of the Partnership's Action plan aim at positively contributing to this goal.

4.3 OTHER COMMITMENTS

The action plan of the Partnership on Air Quality has a strong relation with Climate Change as there is often a strong alignment between reduction of air pollution and the reduction of Greenhouse Gases (GhG). Possible contradictions between measures taken on climate change and air quality should be avoided.

5 MONITORING

The monitoring of the actions described above is presently as follows:

Action	Responsible	Deadline	State of Play
Action n° 1	Great London Authority and The Netherlands	End 2018	Approved by DGUM
Action n° 2	Milan	End 2018	Approved by DGUM
Action n° 3	Milan	End 2018	Approved by DGUM
Action n° 4	Utrecht	End 2018	Approved by DGUM
Action n° 5	HEAL	End 2018	Approved by DGUM
Action n° 6	The Netherlands	Mid 2018	Approved by DGUM

ANNEX 1: MAIN FINDINGS AND ISSUES

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INTRODUCTION

European cities are growing and developing rapidly. Currently, around two-thirds of the EU's population live in cities, and it is expected that this share will grow to around 80% in 2050. It is needed to anticipate future developments and take action to improve public health where possible in order to improve the urban environments.

There were more than 500.000 premature deaths attributable to PM_{2.5}, NO₂ and O₃ exposure in the EU-28 in 2013²⁴. Air quality is therefore one of the major determining factors for the quality of living environment in cities, the Partnership on Air Quality established under the Urban Agenda for the EU focuses on addressing this topic.

The Urban Agenda for the EU – consolidated with the Pact of Amsterdam, agreed on 30 May 2016 by the EU Ministers responsible for Urban Matters²⁵ - 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 Partnership on Air Quality consists of:

- 4 Member States: The Netherlands (coordinator), Croatia, Czech Republic, Poland
- 6 Cities: Helsinki/HSY (FI), London (UK), Utrecht (NL), Milan (IT), Constanta (RO), and Duisburg (DE - Representing the Consortium Clean Air Ruhr Area)
- 2 Stakeholder networks: EUROCITIES and HEAL (Health and Environment Alliance)
- The European Commission (DG Regional and Urban policy, DG Environment, DG Research & Innovation, DG Agriculture, DG Growth, and the Joint Research Centre (JRC))

The Partnership is also actively supported by the URBACT programme, which has an observer status.

The main objective of the Partnership on Air Quality is to improve air quality in cities and to bring the ‘healthy city’ higher on the local, national and EU agendas as part of the Urban Agenda. This will be done through improving the development and/or implementation of regulation, funding mechanisms and knowledge at all levels, as well as the coordination between them.

The Partnership's actions and recommendations also aim to contribute to the goals of the New Urban Agenda and to the targets set in the Sustainable Development Goals²⁶.

²⁴ ETC/ACM, 2016c, Quantifying the health impacts of ambient air pollution — Methodology and input data, de Leeuw, F. and Horálek, J., Technical Paper 2016/5, European Topic Centre on Air Pollution and Climate Change Mitigation.

²⁵ See: <https://ec.europa.eu/futurium/en/content/pact-amsterdam>.

²⁶ New Urban Agenda, adopted at the United Nations Conference on Housing and Sustainable Urban Development (Habitat III) in Quito, Ecuador, on 20 October 2016. <https://habitat3.org/the-new-urban-agenda>, and <http://www.un.org/sustainabledevelopment/sustainable-development-goals>.

Currently there are many cities that have difficulty complying with the air quality standards as set by the EU, rendering their environment unhealthy for EU citizens²⁷. The Air Quality Partnership, therefore, tries to explore the gaps, overlaps and contradictions in existing regulations and map out the resources and available funding put in place to assist cities improve air quality. In addition, through the Air Quality Partnership cities have the chance to exchange knowledge and share the best practices currently being implemented in cities around Europe, their surrounding regions and across Member States. Following the scoping exercise of existing regulation, committed resources and knowledge, advice can be given on improving the EU policy and funding landscape. The Partnership works on proposals for better regulation (and implementation), funding and knowledge in this area.

The overall duration of the Partnership will be three years (2016-2018). During this period actions and recommendations will be elaborated/implemented with the aim to establish a set of practical and efficient pathways and guidance to improve air quality in urban areas. This will be based on a comprehensive inventory of current practices, experiences, new research and smart combinations of opportunities and innovations as well as the identification of bottlenecks in legislation and gaps in funding.

The first step consisted of the identification of the relevant issues regarding urban air quality. Based on the input of the different partners during several meetings between December 2015 and June 2016, four concrete topics have been identified to focus on until mid-2017.

The four topics are:

Topic 1: Modelling city-specific situations

Topic 2: Mapping of regulation and funding.

Topic 3: Assessment of air quality good practices and identification of barriers.

Topic 4: Guidelines for cities air quality action plans.

This paper illustrates the main findings of the Partnership's work on those four topics. On the evidence gathered the Partnership would base actions and recommendations. A public feedback based on this paper will seek to complement the Partnership's findings.

²⁷ More than 130 cities across the European Union persistently exceed air quality standards.

1 PARTNERSHIP AIR QUALITY TOPICS

The following four topics, as chosen by the Partnership²⁸, explore how air quality can be improved in EU cities:

Topic 1: Modelling city-specific situations

Local measures are often developed for specific local circumstances, so it is useful to share best practices between different cities. The exchange of details and experience with these local measures is required to complement the overview of efficient and effective measures and to help other cities to develop their own specific strategies to improve air quality taking into account local circumstances.

Healthy living and urban air quality can be improved by mitigation of the relevant emission sources of air pollutants or their precursors. Urban air quality is not only influenced by urban sources (i.e. traffic, public transport, space heating, industry) but also by sources situated outside the city. This so called “background concentration” is composed of/influenced by the emissions from non-urban (regional, national and international) emission sources such as agriculture, shipping (inland and coastal), industrial activity, non-urban transport, waste management, power production, natural sources and emissions in distant urban areas. Decisions made at international, EU and Member State level are best to tackle the effects and control the emissions of industrial activity, shipping, agriculture, power production, non-urban transport including aviation. Cities can only mitigate the effects of these emissions.

Decisions on which urban sources could best be mitigated require reliable data on the background sources (which determine the background concentration and the city’s own contribution to the air quality) and projections of future background concentration levels. Only if this information is available one can assess in advance to what extent mitigation measures in the city can actually contribute to the improvement of urban air quality (and environmental performance in general). Air quality modelling is a common approach in the (ex ante) assessment of effectiveness of (proposed) mitigation measures. This approach is based on models requiring input data on urban emissions to simulate background concentrations. Background concentration – and its future evolution – is for a large part governed by the effectiveness of related emission reduction measures and as such guided by EU, national, regional and local policies. Thus, the improvement of urban air quality is the result of a complex interaction of EU, national, regional and local legislation and policies.

Aims of topic 1:

- To get an overview of air quality in Partnership cities and on the share of different emission sources affecting it.
- To find out how modelling has been carried out by different cities to identify measures that can improve air quality.
- To establish a firm information base of emission sources affecting air quality and of measures taken to improve air quality in Partnership cities.

²⁸ URBAN AGENDA FOR THE EU ACTION PLAN, Partnership Air Quality, 9 February 2016

Because of the limited amount of cities, the mapping is to be regarded as case studies. The content of and the results of this topic will feed into and interact with the Partnership's activities on Mapping of regulation and funding and on Assessment of air quality good practices and identification of barriers, and eventually form the basis for formulating Guidelines for cities air quality action plans.

The following activities were conducted for Topic 1, thereby focusing first on the cities represented in the Partnership.

- Inventory of sources of air pollution and better understanding of the effects of air pollution caused by local, regional, national and European sources.
- Source allocation of air pollution, to understand “key sectors/pollutants/geographical areas” influencing air quality.
- Inventory of practical measures in relation to the reduction of (specific sources of) air pollution and the effect on health conditions. Information of measures, indicators (e.g. modal share, traffic volumes) and costs (if available).
- Analysis of measures based on modelling carried out by cities in their Air Quality plans.
- Synthesis and elaboration of data from the above activities. Making comparisons of the type of modelling used and the impacts of different measures on Air Quality in various cities.

Topic 2: Mapping of EU regulation instruments and funding

The negative effects of ambient air pollution on human health have been well documented. In particular, there is no evidence of a safe level of particulate matter (PM) below that no adverse effects occur. The current level of air pollution in European cities is contributing to a significant burden of mortality, hospital admissions and exacerbation of existing health problems, such as respiratory and cardiovascular diseases. As exposure to air, pollution is largely beyond the control of individuals; action is required at various levels of public authority. The Ambient Air Quality Directive (2008/50/EC)²⁹ was introduced in May 2008. It sets out limit values for a number of pollutants with dates by which they were to have been attained. However, more than six years after the Directive was transposed into national legislation across the Member States, there are widespread exceedances of the limit values across Europe, specifically with regard to particulate matter (PM₁₀), nitrogen dioxide and ozone. In 2014, PM₁₀ and nitrogen dioxide limit values were exceeded in 23 Member States and the European Commission had opened infringement procedures against 19 Member States as of October 2016. Exceedances of PM₁₀ are typically driven by primary sources including solid fuel burning in residential buildings, road traffic and industry. Diesel vehicles are the main cause for exceedances of the nitrogen dioxide limit value.

As Member States and cities try to improve air quality and meet the legal limits there may be a need for new innovative regulatory concepts. This Partnership looked at the possibility that some of the gaps and bottlenecks can be remedied by more appropriate or better targeted funding. The Partnership, through mapping of existing EU regulation and legislation directly or indirectly affecting air quality, identified gaps in EU regulations regarding pollutants and sources of pollution, as well as ways to improve fiscal and other incentives given at Member State level to improve air quality.

There are numerous EU directives, regulations and other legal and non-legal instruments in place, which aim specifically at the improvement of air quality, and healthy living in cities, or

²⁹ See: http://ec.europa.eu/environment/air/quality/existing_leg.htm

regulations, which have an indirect effect on these objectives (e.g. climate policies). For instance, EU actions are aimed at specific emission sources, harmonizing the process of issuing environmental permits, or the type approval of vehicles across the EU. Member States (and Regions in some cases) have developed additional legal instruments to improve air quality. Cities strive to improve the health of their citizens through city planning and through schemes targeting urban transport. The Partnership's analysis of the existing legislation and a selection of city led air pollution schemes (e.g. bus retrofitting, Low Emission Zones (LEZs), etc.) showed that these different regulations do not always work together optimally and in some (worst) cases they might even counteract each other.

Since in many places in Europe there is still non-compliance with the air quality standards, it was also assessed that the implementation of existing legislation is not sufficient. Furthermore, it was concluded that the air quality legislation is mainly focussed on emission standards and not enough on the average exposure of the population to air quality pollutants.

Topic 3: Air quality good practices and identification of barriers

In cities all over Europe, actions are being implemented to improve urban air quality and health. The Partnership analysed existing applications of air quality measures with a view to help cities choose the ones that would work best in their specific local context.

The partners collected also examples of innovative approaches currently developed to address air quality issues. Apart from technological innovations, for instance innovative modality options like e-bikes, cargo bikes or car sharing, healthy designs of public areas stimulating cycling and walking, nature-based solutions in cities to reduce background concentration of air pollution, citizen science (measuring air quality with small measuring devices in order to create a large dataset on air quality), urban strategy (modelling quality of the living environment in different city designs and settings), behavioural change and public participation projects. The possible large scale effectiveness of these innovations is not always clear, as they often involve start-ups and small scale pilot projects, or they are simply not known to a larger public or the technology is not yet reliable enough (e.g. some small sensors). In order to enable cities to make an informed choice on innovations and to keep up with current developments, an overview of best practices should include examples of effective and efficient innovative approaches.

Under Topic 3 - Recommendations on air quality best practices, the Partnership envisaged to compile an overview of examples of best practices to improve air quality and to identify the barriers cities are facing. The Partnership's analysis focuses on practices already identified under the Modelling of city-specific situations and the Mapping of EU regulation instruments and funding, complemented by a desk study on other EU examples.

The following activities were conducted for topic 3:

- Collection of (recommended and transferable) examples of best practices building on the results from topic 1 and 2. Including both effective and non-effective measures (in health, environmental and financial terms), policies and funding practices.
- Compilation of best practice documents on specific topics.
- Sharing knowledge on best practices outside the Partnership.

Topic 4: Guidelines for cities' air quality action plans

Currently many cities are developing their own air quality action plans³⁰ not knowing what other cities have already developed. There is not yet a structured exchange on current practices for the elaboration of air quality action plans (and their relation to public health). This practice leads to inefficiencies as the knowledge and experiences (process optimization, pitfalls, stakeholder interactions, governance, monitoring etc.) from front-runners is often ignored.

Hence, there is a clear need for streamlining and providing guidance on processes and practices in air quality action planning.

The following context has to be taken into account when addressing this issue. The Air Quality and Clean Air Directive for Europe (Ambient Air Quality Directive) contains not only air quality limit values but also already provisions to the content and the process of development (public participation) of Air Quality plans. The questions of transposition of the directive was provided in the directive by the establishment of an "Ambient Air Quality Expert Group". This recommendation regarding guidelines for air quality plans takes this context into account.

In Topic 4 – Guidelines for cities air quality action plans, this guidance will be elaborated including the results of the previous Partnership's activities. This topic will result in a basic set of guidelines for cities for the preparation of air quality action plans. This set of guideline is expected to facilitate local decision making, uniformity in air quality plans and safeguard compliance with EU legislation and, by doing all that, it will help cities bring down atmospheric concentrations of air pollutants and thus improve public health. These guidelines are both beneficial for cities with exceedances of Air Quality limit values and cities with no exceedances and the urge to draft a voluntary Air Quality Action Plan. This topic will also give recommendations on possible pilots or demonstration projects to be implemented in cities within the Partnership and beyond. These pilots are to demonstrate the actual improvement of air quality through usage of the identified examples of best practices.

The following activities were conducted for topic 4:

- Extracting relevant information from previous Partnership's work for the elaboration of a basic air quality plan.
- Describing relevant issues to be addressed required process steps, stakeholder involvement and funding issues.

Draft guidelines will be prepared, including recommendations.

³⁰ Note that in an exceedance situation air quality plans are mandatory (and not voluntary) – see Directive 2008/50/EC

2 MAIN FINDINGS AND ISSUES

The Partnership's identification of main issues and of topics to be addressed has been done. Actions are derived from this. This chapter presents the main findings so far. These findings are based on the work done by the Partnership, notably between local, national and EU partners, as well as on the inputs gathered through stakeholder surveys.

2.1 INTRODUCTION ON MAIN AIR QUALITY POLLUTANTS

Particulate Matter (PM), nitrogen dioxide (NO₂) and ground-level ozone (O₃), are now generally recognised as the three pollutants that most significantly affect human health³¹. They can have adverse effects on both the environment and human health. In 2013, the International Agency for Research on Cancer (IARC) classified the particulate matter (PM) in outdoor air pollution as carcinogenic to humans. Especially children up to 19 are vulnerable to air pollution. It is of utmost importance to protect children from these pollutants, which are dangerous for healthy urban living.

Effects on human health of air pollutants in ambient air are³²:

- **PM_{2.5}, PM₁₀ and ultrafine particles:** Exposure to fine Particulate Matter (i.e. PM_{2.5}) is widely recognised as the principal cause of health concern across the EU, but there is little or no regulation on the species components of PM. Directive 2008/50/EC (Annex IV) requires Member States to undertake speciated monitoring for anions/cations and Elemental/Organic Carbon (EC/OC) at rural background locations, so as to judge the enhanced levels in more polluted areas (including urban background and roadside locations). There are currently no controls on emissions of speciated PM, and specifically EC/OC (SLCPs). Particulate matter that is small enough can enter the lungs and cause health problems. This air pollutant is most strongly associated with health effects, in terms of chronic mortality. However, unlike the gaseous pollutants, PM is not a single discrete component and is instead made up of contributions from numerous sources, both local and transboundary, and comprises both primary and secondary material across a range of sizes. These include metals, Polycyclic Aromatic Hydrocarbons (PAHs), sulphate particles, and black carbon; in 2012, the International Agency for Research on Cancer (IARC) classifies diesel engine exhaust as a carcinogen. However, WHO Guidelines and EU Limit Values focus control on the total mass of particles, as PM₁₀ and PM_{2.5}.
- **Nitrogen Dioxide:** High levels of nitrogen dioxide exposure can lead to coughing and shortness of breath. People who have extensive exposure to NO₂ for a long time have a higher risk of respiratory disease. Recently also negative effects on cardiovascular system and cognitive functions were found.
- **Ozone:** Ozone near the ground can cause a number of health problems. It can irritate the respiratory system, aggravate asthma and chronic lung diseases and may cause permanent lung damage.
- **Short-lived climate pollutants (SLCP)** are gases or particles that have climate warming effects with atmospheric lifetimes shorter than carbon dioxide, but often persisting for only weeks or

³¹ <https://www.eea.europa.eu/themes/air/intro>

³² EEA Air Quality in Europe Report 2016.

even days. Important examples include black carbon, methane, ozone and hydrofluorocarbons. Importantly, some SLCPs are also toxic air pollutants. Health impacts related to PM_{2.5} dominate³³ the health impacts. More in detail, the following table shows premature deaths³⁴ attributable to fine particulate matter (PM_{2.5}), ground-level ozone (O₃) and nitrogen dioxide (NO₂) exposure in 2013 in 41 European countries and the EU 28³⁵.

Table 1 Premature deaths attributable to PM_{2.5}, NO₂ and O₃ exposure in 41 European countries and the EU-28 in 2013³⁶.

	PM _{2.5}	NO ₂	O ₃
EUROPE	467 000	71 000	17 000
EU-28	436 000	68 000	16 000

2.2 FINDINGS ON AIR QUALITY AND HEALTH

The main findings on this topic can be summarized as follows:

- Air quality planning in cities could complement the ‘focus on exceedances of limit values’, with an additional ‘focus on health protection of citizens’.
- Depending on the pollutant, urban sources can be of more or less importance. For NO₂, for instance, traffic and space heating are in most of cities the main contributors and actions at urban level can be very useful to reduce concentrations, exceedances and improve exposure of citizens. Anyway urban air quality is not only influenced by urban sources (among others individual car traffic, heavy goods transport, space heating, industry) but also by sources from outside the city. This so-called background concentration is composed of/influenced by the emissions from non-urban emission sources such as agriculture, shipping, natural sources and emissions in distant urban areas, including also trans-boundary pollution.
- Transboundary pollution (i.e. international emissions) can largely influence local concentrations (i.e. coal burning).

Nitrogen dioxide (NO₂)

For **Nitrogen dioxide (NO₂)**, the analysis of the evidence gathered, supported by previous knowledge on the topic and by the *Screening for High Emission Reduction Potential on Air (SHERPA)*³⁷ modelling for “urban background concentration”, shows that:

- It is difficult to meet NO₂ Limit Values in most of the cities.
- The main problems are at the street level.
- The main sources are often local (i.e. traffic) although the composition of air pollution sources are different per city.
- To address this problem, a mix of local and national/European actions would be needed.
- Cities can play an important role in reducing NO₂ exposure.

³³ EEA, 2016; IIASA, 2014.

³⁴ Premature deaths are deaths that occur before a person reaches an expected age. This expected age is typically the age of standard life expectancy for a country and gender. Premature deaths are considered to be preventable if their cause can be eliminated.

³⁵ EEA, 2016.

³⁶ ETC/ACM, 2016c, Quantifying the health impacts of ambient air pollution — Methodology and input data, de Leeuw, F. and Horálek, J., Technical Paper 2016/5, European Topic Centre on Air Pollution and Climate Change Mitigation.

³⁷ <http://aqm.jrc.ec.europa.eu/sherpa.aspx>.

Particulate Matter (PM_{2.5} and PM₁₀)

- For **fine particles** with a diameter of 2.5 µm or less (PM_{2.5}) the analysis supported by previous knowledge on the topic and by the SHERPA modelling³⁸ for 'urban background concentration' shows that it can be difficult for many cities to meet PM₁₀ and PM_{2.5} limit values.
- From the health point of view:
 - Health impacts due to PM_{2.5} concentrations is a key issue.
 - There is no evidence of a safe level of particulate matter (PM) below which no adverse effects occur and WHO guidelines for PM_{2.5} is lower (i.e. more stringent) than the EU limit values. This could be taken into account, when reflecting on the health impacts due to air pollution.
 - Significant reductions in Years of Life Lost³⁹ due to PM_{2.5} exposure typically require action at different levels. The health impact reduction due to local actions is different depending on the city and the cities themselves cannot completely solve their air quality problems, but national/international cooperation is needed as the following graph shows
- From the phenomenological point of view:
 - Primary PM is directly emitted in the atmosphere, secondary PM is created through chemical reactions from different precursors (NO_x, NH₃, SO₂, VOCs).
 - Both primary and secondary sources in different geographical areas contribute to urban background concentrations.
 - Regional/national/European emissions contribute to PM_{2.5} background concentrations; both primary and secondary PM can be transported long distances.
 - At urban level, it is possible to act to reduce primary pollutants emissions and relative concentrations; more difficult it is to control the concentrations of secondary pollutants.
 - The definition of sectorial and geographical sources is more complex than in the NO₂ case. It is clear, for example in Utrecht, how actions at the city level (mainly related to traffic) can only contribute to the reduction of part (e.g. 10%) of the urban background concentration in the city. To address the rest of the urban background concentrations, action at other levels (regional, national, European) and on other sectors is needed.
 - However, actions at city level can reduce some toxic components of PM (PAH, BC, metals) and relative citizens exposure. Awareness on this would improve citizens' support for urban measures aiming at air quality improvement.

³⁸ The SHERPA model can help to understand the sources and type of interventions needed to improve air quality in cities.

³⁹ Years of life lost (YLL) are defined as the years of potential life lost owing to premature death. It is an estimate of the average years that a person would have lived if he or she had not died prematurely. YLL take into account the age at which deaths occur, giving greater weight to deaths at a younger age and lower weight to deaths at an older age. It gives, therefore, more nuanced information than the number of premature deaths alone.

2.3 AIR QUALITY MEASURES

Cities current experience was collected through a survey to which 35 cities in 18 countries responded. The cities are from Northern (10 cities from 5 countries), Eastern (5 cities from 3 countries), Southern (8 cities from 6 countries) and Western (12 cities from 4 countries) European countries. The findings presented below only take into account the cities, which participated in the survey. It is important to make sure that the obstacles are removed that prevent cities from adopting measures that make sense in their local context. This has to be further explored in interviews and workshops with city experts.

Known Air Quality Measures

Over 50 known air quality measures were reported by cities. Information gathered from different cities on the application of measures and experiences, as well as on expected obstacles were shared. For most measures, the cities experienced/expected one or more obstacles.

Additional/Innovative Air Quality Measures

Most cities also shared several additional and or/innovative measures. In total 57 additional/innovative, measures were identified through a questionnaire, 45 of which included obstacles. The majority of the additional/innovative measures including obstacles, received from Northern, Southern and Western European cities focused on road traffic. Most of those measures mostly have connections with the other policy objectives like climate change, followed by public health. For the measures reported by Eastern Europe cities, the focus mainly lies on the reduction of emissions from energy (incl. space heating) and on public health policies. Some notable measures are those that combine air pollution policy with other policy fields (climate and energy policy, urban planning, healthy urban living policy, noise policy, etc.) and approaches that work on fostering awareness raising, public participation and public support for measures.

In the questionnaire, cities were asked to mention which air quality measures they are implementing in five different sectors, and to identify which of the following known barriers they have encountered during their implementation:

- Social: no political and/or public support/acceptance.
- Financial: high (investment) costs, (more) funding needed.
- Legal: no legislation or legislative power for city.
- Other:
 - Urban Planning: lack of infrastructure and/or space.
 - Impact: local air quality measures can mainly tackle transport as a source of pollution and all other sources need to be primarily addressed by the National or EU level or more (administrative and financial) powers should be given to cities.
 - Technical: technical issues (i.e. not familiar with technical or other obstacles).

Most measures identified as being taken by cities are on road traffic. Eastern cities focus more on emission reduction from energy. Below the key obstacles encountered by cities at the different levels of governance are summarised.

Obstacles related to EU policy (as mentioned in the questionnaire by cities)

- Difficult procedures to allocate funding to clean air projects from European funds (e.g. CAP-funds or EIB). However, it was also mentioned that it is questionable whether the EU should

give specific financial support to cities for air quality measures, since cities have their own budgets and responsibilities.

- Uncertainty of about real driving emissions and future diesel emission factors hampered the introduction of effective Urban Vehicle Access Restrictions (UVAR) and/or Low Emission Zones (LEZ).
- Internal market restrictions for taxes/subsidies to promote the use of cleaner energy.
- Shipping measures require coordination mechanisms with other harbours. Shipping can relate to ports and to vessels. The Directive on Non-Road mobile machinery emissions (NRMM) will cover new vessels⁴⁰. For sea, vessels there are the EU Directive 2012/33/EU regarding the sulphur content of marine fuels⁴¹, and International Maritime Organisation (IMO) rules. However, it is perfectly feasible that the EU requires ships to switch to clean power when they are stationed in harbours and therefore close to urban areas.

Obstacles related to national policy (as mentioned in the questionnaire by cities)

- There is a lack of policies to tackle smaller “forgotten” sectors, i.e. shipping⁴²; uncontrolled emissions from farming/agriculture, mobile refrigeration units, heating and power (specifically biomass). Cities do not have (or use) the jurisdiction and competency to develop measures to tackle agriculture, shipping emissions. Furthermore, shipping measures require coordination mechanism with other harbours and even EU standards. It was also assessed that there is a lack of legal measures to tackle emissions at sources (i.e. emissions standard limit values).
- The measure on road traffic with huge levels of barriers was the ‘Low emission zones (LEZs) for cars’ (subcategory ‘Bans on polluting vehicles’). In particular, social obstacles, i.e. no public and/or political support, and legal obstacles, i.e. no clear/official regulations, are experienced/expected with this measure. Another measure where many obstacles are experienced/expected is for another road traffic measure, ‘Pollution weighted congestion charges’ (subcategory ‘Clean vehicles’). For this measure, both social and legal obstacles are experienced/expected.
- Lack of financial and legal support from national governments for LEZ, or to allow local funding of air quality projects with local pollution weighted congestion charges. However, it was also mentioned that it is questionable whether national authorities should give specific financial support to cities for air quality measures, since cities have their own budgets and responsibilities.
- Lack of financial and legal support from national governments for local experiments.
- Lack of quality assurance (impact) of local air quality plans by national governments.

Local/regional obstacles (as mentioned in the questionnaire by cities)

- Slow implementation of EU legislation.
- Lack of (public) awareness and support for local measures.
- Lack of coordination mechanisms with neighbouring regions to reduce sources outside the city or region (e.g. cattle and poultry, which is a regional source of emissions with relatively

⁴⁰ DIRECTIVE 97/68/EC OF THE EP AND OF THE COUNCIL of 16 December 1997 on the approximation of the laws of the Member States relating to measures against the emission of gaseous and particulate pollutants from internal combustion engines to be installed in non-road mobile machinery (NRMM)

⁴¹ DIRECTIVE 2012/33/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 21 November 2012 amending Council Directive 1999/32/EC as regards the sulphur content of marine fuels.

⁴² Sulphur content of fuel is well regulated in the Baltic Sea and the North Sea but not in the Mediterranean. Legislation for NOx emissions on the North Sea and the Baltic Sea will come into force soon.

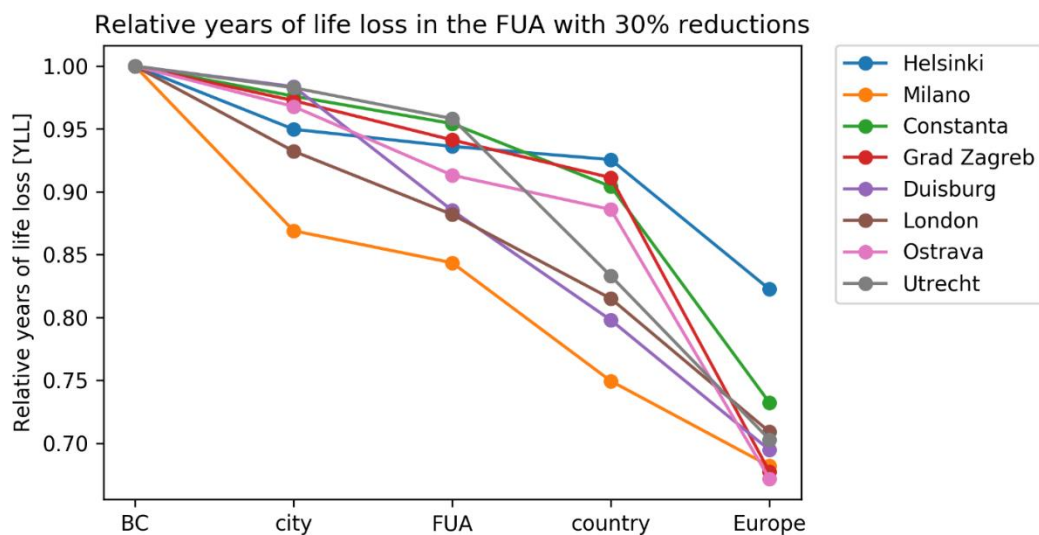
high impact on some cities. The most important pollutant is particular matter, with ammonia (NH₃) being an important source of secondary particulate matter).

- Lack of a structured exchange on current practices for the elaboration of air quality action plans (and their relation to public health). This has been assessed to lead to inefficiencies, since knowledge and experiences (process optimization, pitfalls, stakeholder interactions, governance, monitoring, etc.) from front runners are ignored or at least difficult to access. This is also related to a lack of capacity and/or knowledge.

3 MAIN FINDINGS RELATED TO REGULATION, KNOWLEDGE AND FUNDING

3.1 FINDINGS ON EU AIR QUALITY REGULATIONS

The findings generally point at actions to improve regulation. However, most findings could also point at actions aimed at improving the implementation of regulations at European, national and city level. The following chart shows that any action on local, national or European level should be complemented by measures on other levels. It shows the relative improvement of health due to measures on different levels (FUA=functional urban area). It also shows the differences between cities due to their size and geographical location.



Establishment and implementation of air quality legislation

1. It was assessed that there should be a **much stronger and systematic dialogue between Cities and National/Regional authorities**; frameworks for some useful/effective measures could be established or strengthened, as well as coordination mechanisms with neighbouring regions to reduce sources outside the city or region. These could be regulatory measures or introduced as good practices.
2. The way in which the **monitoring and assessment requirements** of the Ambient Air Quality Directive, 2008/50/EC, are interpreted can make a significant difference to the size of the air quality problem to be addressed. This in turn plays into local decisions on priorities and public funding. However, this issue has not been extensively researched and so it is not clear to which extent different interpretations of the Directive would impose different requirements on urban authorities across the Union.

3. There is a **lack of regulations to enforce and support the adoptions of cities Air Quality Action Plans in the view of 'citizens' health' protection**, considering cities as 'hot spot' areas for exposure and the percentage of the urban population exposed to air pollutant concentrations above EU and WHO reference thresholds.
4. There is a **lack of tools for checking of content and quality of Air Quality Action Plans submitted within e reporting**, which are drafted in national language. There is also a lack of quality assurance (impact) of local air quality plans by national governments.
5. Action on air quality at local level requires **local leadership, knowledge, capacity and resources to invest**. However, such action can also be incentivised, undermined, or blocked, by policy and legislative structures set up at local, national or regional level. For example, the introduction of urban low emission zones in Germany is subject to local level decision-making. However, all German low emission zones follow a common structure and format, a structure set up by the Federal Government. It could be suggested that the lack of such a framework in, for example, the UK has restricted the uptake of low emission zones and those that do exist tend to follow very different patterns.
6. An important finding is that **integrated approaches combining different policy areas** can be more effective in creating healthier cities than focussing on air quality in isolation. While extending these as legal requirements may not be considered appropriate, it may be useful to explore ways to incentivise the development of national/regional integrated policy frameworks (e.g. align climate policy, mobility policy and public transport policy and air quality policy) to enable more coordinated action.

Control of the components of air pollution:

7. Urban areas can exercise measure of control on particulate matter primary sources, such as on industry, domestic heating (only in the cases where cities have powers over these sectors) and mainly transport. Cities also emit the precursors of secondary PM and contribute to the background emissions. Many authorities have been active in promoting clean vehicles and retrofitting Diesel Particulate Filters to older diesel buses, and such measures have been successful in controlling primary emissions from transport. However, **it is not clear to what extent these efforts are influencing the total mass of particulate matter** (and specifically PM_{2.5}). On the other hand by reducing particulate emissions, the effect on particulate matter pollution can also be deduced, even if other factors naturally influence the development of particulate matter pollution.
8. The measures identified as being taken by cities **mostly focus on road traffic**. Eastern European cities focus more on **emissions reduction from energy** (mostly heating).
9. There are **gaps in the regulations/policies tackling emissions from sectors like shipping, farming/agriculture, Heavy Goods Vehicles refrigeration units, heating and power (specifically biomass)**. Cities do not always have (or use) the jurisdiction and competency to develop measures to tackle agriculture/shipping emissions. Nevertheless, this strongly depends on the legal framework and on the ambition of the national, regional and local authorities involved. For example, using power from the shore while being in the harbour

is something cities can facilitate. Furthermore, shipping measures require coordination mechanism with other harbours and even EU standards.

10. It was also assessed that there is a **lack of legal measures to tackle emissions at sources level** (i.e. emissions standard limit values).
11. **Emissions from small diesel engines used to power refrigeration units on lorries** are partly regulated⁴³ and represent a reason of increasing concern. Emissions from these engines are disproportionately polluting, especially within urban areas where such engines are left running even when the main engine is switched off.
12. Below is a listing of the issues identified, arising from the review carried out by the Partnership:
 - a. No regulation exists on black carbon and nanoparticles.
 - b. Failure of Euro Standards to control NOx emissions (specifically from Light Duty Vehicles), control of PM species such as elemental carbon and organic carbon, although measurements of chemical composition of PM_{2.5} is set by Annex IV 2008/50/EC Directive, emissions from brake and tyre wear.
 - c. Non-exhaust traffic-related particles: notably road, brake, clutch and tyre wear.
 - d. Emissions from shipping and ports.
 - e. Fugitive dust emissions from construction sites.
 - f. Emissions from non-intensive farming (cattle, poultry, manure spreading).
 - g. Emissions from mobile refrigeration units.
 - h. Emissions from space heating and power (specifically biomass).

3.2 FINDINGS ON AIR QUALITY AND FUNDING

Funding is one of the fundamental issues in adopting and implementing measures timely and effectively.

There are many projects and actions relevant for the better funding and financing for air quality measures since this goal, i.e. air quality and related policies, is usually a component of the sustainable urban development funding and financing effort, or it is meant as a side positive effect entailed by broader urban policies. Projects in this sector are substantially heterogeneous and aiming at affecting several components of the productive, political and social assets of countries. The following issues regarding 'funding' were identified:

1. It was assessed that there is a **lack of availability of specific funding for Air Quality for City Administrations**⁴⁴, and air quality improvement could be more easily achieved as a target if

⁴³ See: Non-Road Mobile Machinery RL (97/68 / EC), or EU Regulation NRMM Regulation (EU) 2016/1628.

⁴⁴ E.g. within the European Structural and Investment Funds €1.57 billion is allocated in the period 2014-2020 to air quality measures. Air quality measures can also be funded from the sustainable transport programme of the Cohesion Fund and measures to abate ammonia (a precursor of particulate matter) can be funded from the European Agricultural Fund for Rural Development. Management authorities in each member state decide about specific operational allocation of the available funds. Moreover co-funding for innovative projects can be obtained from the Connecting Europe Facility (CEF) programme, LIFE-programme, the European Fund for Strategic Investments (the so-called Juncker Investment Plan), Horizon 2020 (e.g. the European Green Vehicles Initiative), and the Urban Innovative Actions in sustainable development programme (€371 million for 2015-2020).

it is the 'title' of funding items and not only a by-product of mobility, energy and other sectors. Although it was also stated that funding options for cities are already complex and fragmented and adding an extra fund will only contribute to this. Also, integrated funding helps with promoting integrated thinking (so e.g. assessing infrastructure projects with regard to their impact on air quality, promoting nature-based solutions, etc.).

2. There is a **lack of funding dedicated to areas where costs of local abatement measures for Limit Values compliance achievement are remarkable** (stronger measures and wider range of action to be taken). Lack of financial support from national governments for effective (but costly) measures, or to allow local funding of air quality projects with local pollution weighted congestion charges. This can mean that the responsible regions and national authorities have not considered it a priority in Operational Programmes or Rural Development Programmes.
3. There is a **limited accessibility to information on funding resources and procedures**, which is essential to acquire funding for clean air projects from European funds. However, information regarding operational programmes funded by the European Structural Investment Funds are available on the website of responsible authorities of Member States and Regions. Furthermore, the Commission created a tool that gives access to data on financing and achievements under the ESI Funds 2014-2020⁴⁵. The platform visualises, for over 530 programmes, the latest data available (end-2015 for achievements, end-2016 for finances implemented, daily for EU payments).
4. There are **internal market restrictions for taxes/subsidies to promote the use of cleaner energy**.
5. A key component of good policymaking is **ex ante assessment of the impacts of a policy on air quality and ex post evaluation to see if those impacts materialised**. It is not clear to what extent funding mechanisms have been subject to such assessment in terms of air quality benefits and, in particular, in terms of the long-term impacts on air quality. Such information would be extremely helpful to direct local and regional authorities towards the most effective funding schemes and to modify and implement such schemes. It is not within the scope of the Partnership to undertake such an evaluation but it may be possible to gather information on what has been undertaken to date and recommend further action in this area. Evaluation mechanisms though are already in use in relations to EU funds. For example, The Common Agricultural Policy schemes are regularly submitted to a periodic mandatory ex-post evaluation carried out by independent contractors, providing not only the assessment of the different functioning scheme, but also conclusions and recommendations for the European Institutions and the national Administrations. These reports are published on the website of the European Commission. The Articles in the recent National Emission Ceilings Directive 20196/2284 related to the use of EU funding and the reporting will already address many of these findings.

⁴⁵ <https://cohesiondata.ec.europa.eu/>

3.3 FINDINGS ON AIR QUALITY AND KNOWLEDGE

1. Knowledge on the impact/effectiveness of air quality measures (not only regarding contributions to emission reduction, but especially on health effects improvement and related external cost gain), future developments and methods to forecast scenarios are the basis for developing effective air quality policies and select effective measures⁴⁶. The selection of the measures to obtain Limit Values compliance depends on the effectiveness of each individual measure; but this parameter depends the duration of the measure or time necessary for achieving compliance for the selected pollutant, thus the **assessment of the relative effectiveness of measures to be evaluated/implemented** is of crucial importance. Estimation of how much each measure reduces the concentrations at the exceedance location(s) is therefore very challenging as it requires detailed air quality and emission data available, modelling capability, software tools and huge computational time to assess the whole city territory with a good detail.
2. It was mentioned there is a **lack of knowledge on how to promote public awareness and participation**. How to make people more aware of health risks related to air pollution? How to organise participatory processes around air quality, to tap into community knowledge and build ownership (e.g. Citizens' panels in Gdansk, PL)? How to tap into the public mobilisation inspired by environmental organisations and support them in their activities?
3. It was assessed that there currently is a **lack of access to modelling approaches to assess the impact of measures, and difficulties in implementing and use them** is observed by several cities⁴⁷. It was noted that there are difficulties to access to instruments/methods/tools to verify the effectiveness of the planned and adopted measures in terms of concentration/health effects and external costs.
4. It is **difficult to estimate how emission factors will change in the future**. Because conformity factors are larger than 1 there is a uncertainty about the impact of new Euro emission limit values as regards NO_x and NO₂ for diesel cars and their real emissions. It is expected that with the introduction of Real Driving Emissions tests NO_x emissions will decline. However, the current uncertainty has impacts for the accuracy of the calculations regarding expectations about economic growth in the future and growth of mobility and expectations about socio-economic growth of the city (i.e. numbers of workers and citizens). These issues makes it difficult for cities to select and implement measures that would reduce NO₂ concentrations in traffic environment.
5. **Lack of knowledge among citizens about the fundamental role of local policies on traffic regulation measures and potential role in reduction of citizen exposure with health benefits on specific local and toxic pollutants regulated (NO₂, benzene) and not regulated (PAH, BC, PN)**. This knowledge/awareness in citizens would help to achieve wider support of

⁴⁶ Several tools, or indicators, are available, such as GES in the Netherlands, the use of DALYs, and health impact assessments. See for example the WHO report on Air Pollution Health Risk Assessments (AP-HRA) http://www.euro.who.int/_data/assets/pdf_file/0006/298482/Health-risk-assessment-air-pollution-General-principles-en.pdf?ua=1.

⁴⁷ See also APHEKOM Project results http://aphekom.org/c/document_library/get_file?uuid=4846eb19-df8a-486e-9393-1b7c7ac78ce3&groupId=10347 and also <http://decumanus-fp7.eu/home/>.

private traffic limitation measures. It is important to choose the correct pollutant/indicator in assessing the effectiveness of such measures in relation to improving health.

6. **Need for measures tailored to the specific area where a city is located** (orographic and meteorological characteristic, economic situation, type of industry).
7. **Source apportionment** is an important tool for identification of sectors contributing to health impact and concentrations of specific pollutants in air - a baseline for drafting Air Quality Action Plans. It was mentioned that it is important to have/use upgraded and complete local emission inventories.

In most Members States responsibility for drafting and implementing Air Quality Action Plans⁴⁸ from Art. 23 of Directive 2008/50/EC is given to local or regional authorities, while measures defined by the Air Quality Action Plans should address different sectors, also of competence of authorities operating at different governance levels. In the majority of Members States, there is a lack of a national coordination body or competent authority. It has to be taken into account that in some EU countries it is not feasible to introduce a national coordination body due to their internal distribution of tasks and responsibilities regarding urban air quality.

⁴⁸ Article 23 - Air quality plans: 1. Where, in given zones or agglomerations, the levels of pollutants in ambient air exceed any limit value or target value, plus any relevant margin of tolerance in each case, Member States shall ensure that air quality plans are established for those zones and agglomerations in order to achieve the related limit value or target value specified in Annexes XI and XIV. In the event of exceedances of those limit values for which the attainment deadline is already expired, the air quality plans shall set out appropriate measures, so that the exceedance period can be kept as short as possible. The air quality plans may additionally include specific measures aiming at the protection of sensitive population groups, including children. Those air quality plans shall incorporate at least the information listed in Section A of Annex XV and may include measures pursuant to Article 24. Those plans shall be communicated to the Commission without delay, but no later than two years after the end of the year the first exceedance was observed. Where air quality plans must be prepared or implemented in respect of several pollutants, Member States shall, where appropriate, prepare and implement integrated air quality plans covering all pollutants concerned. 2. Member States shall, to the extent feasible, ensure consistency with other plans required under Directive 2001/80/EC, Directive 2001/81/EC or Directive 2002/49/EC in order to achieve the relevant environmental objectives.