

Public awareness and efforts to improve air quality in Europe

March 2021

Air pollution a cause in girl's death, coroner rules in landmark case

Air pollution linked to 19% of COVID-19 deaths in Europe

Greece, Bulgaria being taken to court by EU over air pollution

Coroner says failure to reduce pollution level factor in death of Ella Kissi-Debrah, who had severe asthma

Air pollution: Italy 'persistently' broke EU clean air laws, rules the European Court of Justice

EU air quality



Air pollution from nitrogen oxides

but problems remain governments failing to protect citizens from air pollution, data

Air pollution cost billions in health

Pollutants from farming, heating and vehicles beyond levels needed to ensure breath of air

Illustration: Facsimile/Microsoft

Authors:

Sonja Grossberndt (NILU), Alena Bartonova (NILU), Alberto González Ortiz (EEA)

ETC/ATNI consortium partners:

NILU – Norwegian Institute for Air Research, Aether Limited, Czech Hydrometeorological Institute (CHMI), EMISIA SA, Institut National de l'Environnement Industriel et des risques (INERIS), Universitat Autònoma de Barcelona (UAB), Umweltbundesamt GmbH (UBA-V), 4sfera Innova, Transport & Mobility Leuven NV (TML)

European Environment Agency
European Topic Centre on Air pollution,
transport, noise and industrial pollution



Cover design: EEA
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Data reported by the United Kingdom are included in all analyses and assessments contained herein, unless otherwise indicated.

Author(s)

Sonja Grossberndt, NILU – Norwegian Institute for Air Research
Alena Bartonova, NILU – Norwegian Institute for Air Research
Alberto González Ortiz, EEA – European Environment Agency

ETC/ATNI c/o NILU
ISBN 978-82-93752-19-6

European Topic Centre on Air pollution,
transport, noise and industrial pollution
c/o NILU – Norwegian Institute for Air Research
P.O. Box 100, NO-2027 Kjeller, Norway
Tel.: +47 63 89 80 00
Email: etc.atni@nilu.no
Web : <https://www.eionet.europa.eu/etcs/etc-atni>

Preface

Air pollution and its impacts on human health have gained more and more public attention in the recent years. People seem increasingly aware of the effects of air pollutants on health and are conscious of the power they have as consumers and are therefore more involved in activities of citizen science. For their part, environmental NGOs tend to be proactive, with some having initiated court cases against competent authorities for poor air quality. At the same time, voices questioning scientific facts are also gaining attention, an example being the 2019 controversy in the German media whereby the effect of NO₂ concentrations on health were attempted called into question by 112 German lung doctors who claimed that there was "no scientific justification" for current limits. Their open letter kicked off a comprehensive debate, resulting in the German Transport Minister sending an inquiry to the European Commission, asking for a review of current limits. However, it turned out that there were mistakes in the study that was the basis for the open letter signed by the lung specialists, which even one of their leading doctors had to acknowledge^(1,2,3). The open letter was published in the wake of the so called «diesel-gate» scandal that originated in 2015. In September that year, the US Environmental Protection Agency discovered that many diesel engines in US Volkswagen (VW) cars had an intentionally programmed software that could change the performance to improve NOx emission results while being tested to comply with national limit values. Under real driving conditions, this functionality would turn off and the engines would emit up to 40 times more NOx than the limit values. This faulty software has been discovered in more VW diesel cars in other countries later⁽⁴⁾.

The issue of air pollution is high also on the political agenda, separately or as an element of a holistic approach to sustainable development. In 2019 the European Commission finalized the fitness check of the Ambient Air Quality Directives and held its second Clean Air Forum at the end of 2019; furthermore, it has opened several infringement procedures; the European Court of Auditors has assessed the implementation of the Directives; and the World Health Organization held its First Global Conference on Air Pollution in November 2018. Clean air is also prominently featuring in EU strategies for development until 2030, including, as parts of the EU Green Deal⁽⁵⁾ strategy, the action plan "Towards a Zero Pollution Ambition for air, water and soil – building a Healthier Planet for Healthier People"⁽⁶⁾ to be adapted by the European Commission in 2021; and the European Climate Pact⁽⁷⁾ which foresees that Europe will be the first climate neutral continent by 2050.

This report reflects on what air quality information authorities provide, how the public perceives air quality and the given information and what actions civil society takes towards improvements of air quality in Europe. Public awareness and understanding have a central role.

The report is structured as follows:

- (1) An introduction of the legal framework and governance of air quality in Europe (Chapter 1) with examples of public information at EU level and city level, and an overview of measures designed to raise public awareness, from the EEA's Air Implementation Pilots in 2013 and 2018 and citizen science activities and other programmes known to the project team (Chapter 2).

(1) <https://www.timeslive.co.za/motoring/news/2019-01-31-call-for-relaxed-car-pollution-laws-in-germany/>; Accessed on 22.12.2020.

(2) <https://www.dw.com/en/german-doctors-admit-to-mistakes-in-study-critical-of-air-pollutant-limits/a-47527138>; Accessed on 22.12.2020.

(3) <https://www.handelsblatt.com/english/politics/not-a-single-death-diesel-fumes-no-serious-health-hazard-german-doctors-claim-23904500.html?ticket=ST-17547784-6hezVv1NAR9gyAkZbmcC-ap6>; Accessed on 22.12.2020.

(4) Source: e.g., <https://www.bbc.com/news/business-34324772>; Accessed on 26.03.2021.

(5) <https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal>; Accessed on 26.03.2021.

(6) https://ec.europa.eu/environment/strategy/zero-pollution-action-plan_en; Accessed on 26.03.2021.

(7) https://europa.eu/climate-pact/index_en; Accessed on 24.03.2021.

- (2) A short introduction to research on perception of air quality and awareness of air pollution. In this context, valuable insight has been provided by Eurobarometer surveys that have been compiled in past years (Chapter 3).
- (3) Examples of cities overcoming the public perception barrier (Chapter 4).
- (4) Examples from civil society actors that have taken action to improve air quality by influencing policies and measures, either by lobbying or through court action (Chapters 5 and 6).
- (5) Reflections on the actions that could be pursued by public authorities and civil society in order to utilise public awareness to obtain clean air over the whole of Europe (Chapter 7).

This report was developed as part of ETC/ATNI's work plan for 2020, and thus may refer to research carried out prior to the United Kingdom's (UK) withdrawal from the EU. Research and data relating to the UK will generally be explained by using terminology such as: 'EU-27 and the UK' or 'EEA-32 and the UK'. Exceptions to this approach will be clarified in the context of their use.

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Summary

Air pollution is the single largest environmental risk to the health of the Europeans and is receiving significant attention in the public space. It is comprehensively regulated in the EU, addressing air pollutants concentrations, as well as emissions from numerous sources. The legislation requires also for the authorities to inform the public.

In some cases, the authorities are struggling to implement measures to improve air quality and are met with barriers in the form of public opinion, for example, in cities. In other cases, citizens are taking action with the aim of pushing the authorities to improve air quality.

This report aims to reflect on what air quality information authorities provide and how the public perceives air quality and the information provided. It also looks on actions civil society takes towards improvements of air quality and the role of public awareness and understanding.

EU Clean Air policy framework and provision of air quality information

The European Union's (EU) Clean Air policy framework consists, among others, of a number of ambient air quality directives (AAQDs) that have been continuously updated to enforce stricter targets on air pollution in the EU Member States. National authorities have to ensure that ambient air quality does not exceed defined concentrations, normally set as limit or target values of certain pollutants. The European Commission (EC) has the mandate to check the legal compliance with the Directives. Several Member States failed and still continue to fail to comply with air quality standards (especially, for the air pollutants NO₂ and PM₁₀) and the European Commission has launched infringement procedures against several Member States that exceed the limit values repeatedly.

Information on air quality in Europe

Citizens of the EU Member States have legal right to clean air and to free access to information, public participation, and access to justice in environmental matters. This provides citizens with the right to request insight into national air quality plans and air quality data. According to the EU AAQDs, Member States are obliged to provide information on air quality to both the European Commission and the public. The duty of national authorities is to ensure that information about air quality reaches the public timely and adequately, especially in case of exceedances of thresholds.

A pivotal role in air quality management is played by urban areas. As the closest level of governance to citizens, cities are key not only to implement pollution abatement measures, but also to provide air quality information to their citizens and to involve them in the development of air quality measures. As examples from the EEA's so called Air Implementation Pilot in 2013 and 2018 showed, many participating cities provided air quality information to the public using internet and other information channels. Cities also implemented measures to comply with the air quality limit values. All participating cities had implemented activities and measures focusing on public information to increase public awareness and engagement with the citizens. They also communicated individual actions that the residents could take in order to contribute to the reduction of air pollution.

The cities in the Pilot reported about diverse reactions from the public to the different measures. These ranged from indifference (e.g., technological measures in public transport) to acceptance (e.g., bike sharing programmes) and to rejection (e.g., LEZ, circulation restrictions). Public opposition was considered a very significant challenge. This was also the case when trying to modify peoples' perception of a given environmental problem or solution, especially when they are convinced that they are already acting environmentally friendly (e.g., burning of biomass is considered "eco-friendly" and thus, good, while scientific evidence shows significant negative health effects).

The cities of Stockholm and London have been quite successful in implementing measures (e.g., congestion charging) to improve air quality even though such measures have not been popular with the public in the beginning. Communication and consultation processes were helpful in the implementation, as well as demonstrating the effects the measures actually had on air pollution. Flexible and open negotiations have been identified as successful strategies. Political consensus and leadership are as important as a legal framework that supports the implementation. These positive examples show that public opposition can be turned into acceptance or even support. However, approaches that achieved positive change cannot always be applied to other places without alterations, as cultural and societal backgrounds vary and have to be considered.

The cities combine new ideas, skills and resources, and develop innovative approaches to improve air quality communication, to increase awareness, to encourage changes in behaviour, and to engage the public – as well as other stakeholders – in improving urban air quality. Experience from the Air Implementation Pilot cities showed that public acceptance was generally higher in those cities where public knowledge and perceptions of severity are high and where alternative solutions and economic incentives are available. Highlighting the positive effects on health associated with the new measures also helped to achieve greater public acceptance, but even the public health measures that seem rather common sense, such as not jogging along a busy road or keeping windows closed during rush hour if living near a busy road, should be communicated clearly.

Public awareness and air quality perception

Air pollution is perceived as one of the main reasons for concern by Europeans since the late 1990s. The more recent “Eurobarometer” survey results from 2012 and 2019 reveal attitude of Europeans towards air quality. The majority does not feel well enough informed and expresses the opinion that public authorities have not done enough to improve air quality.

Any perception is influenced by a number of factors, not only by evidence, and some experts even claim that human behaviour is mainly driven by perception, rather than by facts. This has implications for how the public responds to actions and measures to improve air quality.

Citizens are addressing air pollution in several Member States⁸

Recently, citizens have been actively involved in addressing air pollution issues on local, regional, and national level and have gone to court both on national and at EU level for their right to clean air in different States, as for instance in the Czech Republic, France, Germany, Italy, and the UK. In these cases, the courts have ruled in favour of the citizens and required the Member States to take further action to tackle air pollution. But citizens can choose different ways to create awareness about air pollution in their cities/countries and to get public administrations to implement the EU AAQDs, as examples from Italy and Germany show. This development indicates an increasing importance of the citizens’ actions.

Public awareness about (to begin with, often local) air quality issues led to more public engagement on air quality through citizen science projects. Such projects also provide knowledge and increase public awareness.

Conclusions and lessons learned

This report focuses on measures designed by authorities to raise public awareness, and by the civil society to improve air quality. Citizens’ awareness can lead to actions that impact air pollution both directly, through citizen activities and actions, and indirectly, through influencing public authorities.

⁸ This report uses examples from before the UK officially withdraw from the EU on 1.2.2020.

The provisions of the Aarhus Convention ensure easy public access to environmental information and enable the general public to get involved in decision-making processes and to take legal action against environmental law infringements. This is increasingly used by the civil society to take legal steps aiming towards clean air in Europe.

We provide examples on how public authorities find themselves increasingly confronted by concerned citizens. The authorities are challenged on how they provide information about air quality to the public. They are also facing legal action against them by citizens/citizen initiatives that claim the legal rights to clean air. There are however also examples of low acceptance or opposition from citizens to measures designed by the authorities to improve air quality.

This development indicates that citizens and citizen groups increasingly exercise their right to clean air by different means. It also shows that not all public efforts are accepted by the inhabitants. Communication and consultation processes seem to be key to effective collaboration of citizens and public authorities. By reiterating the framework in which air quality is managed and providing examples of various actions and processes we hope to contribute to the success of this collaboration.

Acknowledgements

The EEA task manager was Alberto González Ortiz.

The contribution of the EEA's Communication programme with statistics on access to air quality related web pages is acknowledged and appreciated.

We gratefully thank the following persons for contributing to this report through interviews and discussions:

- Anna Gerometa, Cittadini per l'aria, Italy
- Dorothee Saar, Deutsche Umwelthilfe e.V., Germany
- Ugo Taddei, ClientEarth Brussels, Belgium
- Ivaylo Hlebarov, Za Zemiata, Bulgaria
- Agnieszka Warso-Buchanan, ClientEarth, Poland
- Margherita Tolotto, EEB European Environment Bureau, Belgium

1 Introduction

Air pollution is the single largest environmental risk to human health (EEA, 2020a), and is receiving increasing attention in the public space. At the same time, it is comprehensively regulated in the European Union (EU), addressing air pollutants concentrations as well as emissions from numerous sources, including industries, combustion processes, power generation and energy distribution, or consumer products. EU legislation requires also for the authorities to inform the public. Yet, in some cases authorities are struggling to implement measures to improve air quality, for instance due to public opposition (e.g., EEA, 2019b). An increasing number of citizens are also mobilizing themselves with the aim of pushing the authorities to take action (see Chapter 5 & 6 of this report).

This report is meant as a reflection of this status. It has the ambition to provide input to all stakeholders, public as well as within the local administrations, enabling them to implement successful processes towards better information about air quality and collaborative efforts for its improvement.

1.1 EU Clean Air policy framework

Clean air is an essential prerequisite for a healthy environment and healthy people living in it. The scientific evidence of harmful effects of air pollution is well-established. It can lead to chronic and serious diseases and is responsible for premature deaths as a consequence of, mainly, stroke, respiratory and cardiovascular problems, or lung cancer. This results in ca 7 million premature deaths each year globally, of which 4.2 million deaths occur due to polluted outdoor air (WHO, 2019). According to latest estimates, around 400.000 premature deaths each year can be attributed to exposure to air pollution in Europe (EEA, 2020a).

The World Health Organization (WHO) is the United Nations' institution that is directing and coordinating international health issues⁽⁹⁾. It sets recommended limits for concentrations of key air pollutants both outdoors and indoors, based on global synthesis of scientific evidence of what levels are harmful to human health. In their guidelines from 2005, WHO covers long-term (annual) and short-term (daily or hourly) concentrations of fine particulates (PM_{2.5} and PM₁₀), nitrogen dioxide (NO₂), sulphur dioxide (SO₂), carbon monoxide (CO) and ozone (O₃) for outdoor air quality (WHO, 2005). Since then, the evidence base for adverse health effects related to short- and long-term exposure to these pollutants has become much larger and broader. Based on these developments, WHO started its work on updating the Air Quality Guidelines in 2016. A revised version of these guidelines is expected to be published in 2021 (WHO, 2017).

At European level, the EU adopted air quality policies already back in the 1970s (e.g., Crippa et al., 2016) to preserve both environment and peoples' health. These policies cover currently, under the EU Clean Air policy framework, the following aspects:

1. Air quality standards to regulate concentration levels of pollutants in the ambient air (Directives 2004/107/EC and 2008/50/EC, as amended by Commission Directive (EU) 2015/1480)
2. National emission reduction commitments for key pollutants under the National Emissions reduction Commitments Directive (Directive 2016/2284/EU)
3. Source-specific legislation establishing specific emission and energy efficiency standards for key sources of air pollution. This includes, among others, Directives 2010/75/EU (on industrial emissions), 2015/2193/EU (on medium combustion plants), 97/70/EC (on fuel quality), 2016/802/EU (on sulphur content in liquid fuels), 2009/125/EC (on ecodesign), as well as EC Regulations 443/2009 and 510/2011 (on emission standards for vehicles),

⁽⁹⁾ <https://www.who.int/about>; Accessed on 30.04.2020.

Regulations (EU) 2016/427, (EU) 2016/646, and (EU) 2017/1154 (on real driving emissions), and Regulation (EU) 2016/1628 (on non-road mobile machinery).

Member States transpose provisions of the AAQDs into national legal instruments and national authorities have to ensure that ambient air quality does not exceed defined concentrations, normally set as limit or target values of certain pollutants. The European Commission has the mandate to check the legal compliance with the Directives and can start infringement cases against countries that do not comply with the EU legal requirements. A number of Member States failed and still continue to fail to comply with air quality standards (especially, for the air pollutants NO₂ and PM₁₀). Thus, the European Commission has launched infringement procedures against several Member States that exceed the limit values repeatedly (European Parliament, 2018)

1.2 Do the AAQDs provide for good air quality and information?

Even though the EU's Ambient Air Quality Directives have been updated and amended to enforce stricter targets on air pollution concentrations in the EU Member States ⁽¹⁰⁾, they have been considered as lagging behind "those of other developed nations" (EC, 2013, p2). A number of assessments have been carried out during the last years to evaluate whether EU's AAQDs are still fit for purpose.

In 2018, the European Court of Auditors ⁽¹¹⁾ (ECA) carried out an assessment of those EU actions that were to protect human health from air pollution (ECA, 2018). The report concluded that the work EU has initialized to protect human health from damages caused by air pollution was not sufficient and that significant human and economic costs have not yet been reflected in adequate action across the EU. Another point of criticism was the right of citizens in this context. In the last two decades, citizens have been going legal ways to bring national and local authorities to court for breach of air quality plans. The auditors concluded that since the AAQD protects citizens' rights to access to justice less explicitly than some other environmental Directives, there is still room for legal actions.

The report concluded furthermore that the EC should take more effective actions, including the update of the AAQD and prioritization and mainstreaming of air quality policy into other EU policies, as well as improvement of public awareness and information. The report also gave specific recommendations on how to improve air quality information to citizens: 1) spread information on health impacts and precautionary measures; 2) rank zones with best and worst performance; 3) create channels for citizens to report on bad practices to the Commission; 4) harmonize air quality indexes (ECA, 2018).

Another assessment has been carried out, focusing on the effectiveness and efficiency of measures taken by national and local governments to improve air quality. This report has been compiled by a number of Supreme Audit Institutions ⁽¹²⁾ (SAIs) and the European Court of Auditors in 2019. This report was a comprehensive summary of 16 audits on air quality performed by the European Court of Auditors and by 15 SAIs in 15 EU Member States and neighbouring countries ⁽¹³⁾. The report identified several inadequate measures in the countries assessed. With regard to providing air quality information to the public, the report's recommendation was to increase efforts to raise public awareness, such as design and carry out awareness raising campaigns of air pollution effects, provide

⁽¹⁰⁾ https://ec.europa.eu/environment/air/quality/existing_leg.htm; Accessed on 03.07.2020.

⁽¹¹⁾ The ECA has been established in 1977 to audit EU's policies and budget: <https://www.eca.europa.eu/en/Pages/ECAWork.aspx> ; Accessed on 03.04.2020.

⁽¹²⁾ An independent and professional Supreme Audit Institution (SAI) is an important actor in a country's accountability chain. It is a government entity whose external audit role is established by the constitution or supreme law-making body (<https://www.oecd.org/gov/external-audit-supreme-audit-institutions.htm>; Accessed on 30.04.2020.)

⁽¹³⁾ Albania, Bulgaria, Estonia, Georgia, Hungary, Israel, Kosovo, Moldova, North Macedonia, Poland, Romania, Slovakia, Spain, Switzerland, and the Netherlands.

citizens access to real-time air quality data, not only in times of high pollution episodes, and provide concrete actions that the citizens can take (EUROSAI, 2019).

In addition to the ECA and EUROSAI AAQD assessments, also the European Commission undertook a so called “fitness check” in 2018. Its aim was to assess relevance, effectiveness, efficiency, coherence, and EU added value of the Directives. The fitness check drew on the experience of all Member States and covered the period from 2008, when the AAQD 2008/50/EC came into force, to 2018. It has been carried out by the EC in 2019, based on a literature review and legal analysis, analysis of reported data, case studies and modelling and computing (EC, 2019a), and a wide public consultation. A range of different stakeholders contributed, including Member State competent authorities at all relevant levels (i.e., national, regional, and local), civil society and non-governmental organizations, organizations representing industry and trade, researchers and the scientific community, international organizations (such as the WHO), as well as individual citizens.

The fitness check concluded that the AAQDs have been “partially effective in improving air quality and achieving air quality standards. It also acknowledges that they have not been fully effective and not all their objectives have been met to date, and that the remaining gap to achieve agreed air quality standards is too wide in certain cases” (EC, 2019b, p.1). The report elaborates on the fact that the AAQDs have facilitated the availability and accessibility of objective and comparable air quality data and information across the EU. Harmonisation of the way Member States present air quality information was recommended (EC, 2019b).

In addition to the fitness check of the AAQDs, the European Commission adopted in October 2020 a Communication on Access to Justice and a related legislative proposal amending the Aarhus Regulation ⁽¹⁴⁾ to allow for better public scrutiny of EU acts affecting the environment. This amendment strengthens the obligation of both, EU and Member States, to implement EU law in national law and guarantee the rights of individuals and NGOs (EC, 2020a,b).

⁽¹⁴⁾ <https://ec.europa.eu/environment/aarhus/>; Accessed on 26.03.2021.

2 Clean air and information on air quality in Europe

Much has happened since the first policies on EU level were formulated in 1970. Overall, the air quality in Europe has significantly improved (EEA, 2020a). During the last decades, the improvement happened under the EU's Clean Air policy framework, which includes a range of measures approved and implemented by the EU and national, regional and local authorities (EC, 2019a). However, there are still geographical areas in Europe with poor air quality, despite reductions in emissions and ambient concentrations, and a significant number of EU citizens, and especially those living in urban areas, are exposed to air pollution concentrations exceeding the EU air quality standards and, especially, the WHO air quality guidelines (EEA, 2020a; EEA indicator CSI004 ⁽¹⁵⁾).

According to the AAQDs, Member States are obliged to provide information on air quality to both the European Commission and the public. Article 26 of the Ambient Air Quality Directive 2008/50/EC stipulates how to provide information to the public and the content of such an information (ambient air quality; postponements/exemptions; air quality plans; and competent authorities). It requires that citizens are informed adequately and in good time about levels of ambient air quality, about any air quality plans and whether any time extensions have been granted. Information must be free of charge and provided by means of any easily accessible media. Member States must also publish an annual air quality report, summarizing breaches of limit values and other objectives and their effects on, for example, human health (EU, 2008). There is no systematic overview about the manner Member States implement their information obligation. Directive 2008/50/EC also requires Member States to provide information to the public regarding exceedances of 'information thresholds' and 'alert thresholds' (Art. 19); the content and implementation of short-term action plans (Art. 24.3); and exceedances of thresholds in relation to transboundary air pollution (Art. 25) (EU, 2008). In most Member States, these obligations fall on the local administrations, but in some countries, they are the responsibility of regional authorities or of organisations mandated with this obligation. Many national Environmental Protection Agencies or other agencies/ministries/administrations already provide air quality information at country level on their web pages.

A pivotal role in this context is, however, played by the larger cities. As the closest level of governance to citizens, cities are key not only to implement pollution abatement measures, but also to provide air quality information to their citizens and involving them in the development of air quality measures (HEAL, 2018). With the increased awareness of citizens in the last decades, and with the advent of new technologies to monitor air quality, there has also been a number of citizen-initiated activities that are providing relevant information.

2.1 Citizens' legal right to clean air and access to information

The implication of the EU clean air related legislation is that the citizens of the EU Member States have legal "right to clean air", even though this expression cannot be explicitly found in any law text (Misonne, 2020). By ratifying the "Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters" – also referred to as Aarhus Convention – both EU and Member States guarantee their citizens the rights to access to information, public participation and access to justice in environmental matters (UNECE, 1998). Thus, citizens have the right to request insight into national air quality plans and air quality data.

2.2 EU level information

Information sent to the EC under the AAQDs by the countries includes near real-time (or up to date) data on air quality, as well as validated data that are to be submitted once a year. The data has to be delivered electronically through a central data repository of the European Environment Information and Observation Network (EIONET) which is hosted by the European Environmental Agency (EEA).

⁽¹⁵⁾ <https://www.eea.europa.eu/data-and-maps/indicators/exceedance-of-air-quality-limit-2/assessment>; Accessed on 03.11.2020.

EEA is the EU's official agency, collecting data and producing assessments on different environmental topics, such as air quality to provide independent information to policy makers and the public ⁽¹⁶⁾.

The EEA compiles all obtained air quality data from EU Member States and the rest of its member and cooperating countries (together with that from other voluntary reporting countries) and provides online access to the data (both up-to-date and validated), statistics, maps and annual air quality reports, summarizing key findings at its webpage ⁽¹⁷⁾. The EEA web pages also host the European Air Quality Index (EAQI ⁽¹⁸⁾), launched in 2017. The EAQI is a tool for near real-time information about air quality in Europe. It displays information in form of coloured dots on a map, at station level, for five air pollutants that harm both people's health and the environment: particulate matter (PM_{2.5} and PM₁₀), ground-level ozone (O₃), nitrogen dioxide (NO₂) and sulphur dioxide (SO₂). The EAQI provides information about the short-term air quality situation and does not reflect long-term (annual) situations which may differ significantly. The EAQI is being accessed approximately ten times more often than the general air quality pages ⁽¹⁹⁾. This seems to be in line with findings of a study performed in Oslo where citizens indicated that up-to-date information about air quality was most relevant to them (Castell and Grossberndt, 2017).

2.3 Cities as information providers

With the aim of gaining a better understanding of what cities need in order to better implement EU air quality legislation, the European Commission and the EEA undertook between 2011-2013 a so-called Air Implementation Pilot to identify good practices, promote exchange of knowledge and expertise, and identify areas for further guidance. The following cities took part: Antwerp (Belgium), Berlin (Germany), Dublin (Ireland), Madrid (Spain), Malmö (Sweden), Milan (Italy), Paris (France), Ploiesti (Romania), Plovdiv (Bulgaria), Prague (Czech Republic), Vienna (Austria) and Vilnius (Latvia) (Figure 1). The focus of the Air Implementation Pilot was on the following topics: 1) local emission inventories; 2) modelling activities; 3) air quality monitoring networks; 4) management practices; and 5) public information. The purpose of the latter was to investigate how information on air quality was communicated to the public and how this information raised awareness. It turned out that all the pilot cities used reports in these efforts, eight of them mass media (tv, radio, press), and seven electronic displays. Also, seven cities provided air quality information on demand, including email-addresses and telephone numbers that served as "information desk" to obtain air quality information. Five cities made use of smartphone applications, and only one (Paris) used also social media for communication purposes. Five cities applied "Other" means, such as SMS service, newsletters, or a museum about air and related topics to engage with the public (ETC/ACM, 2013b).

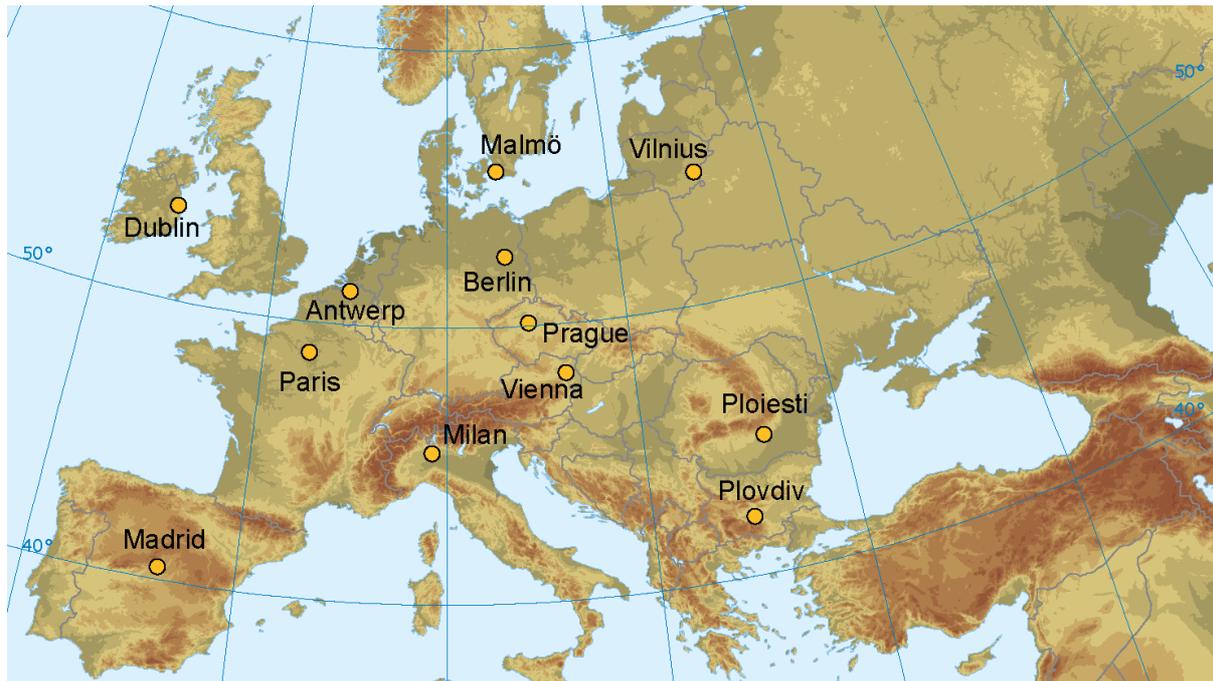
⁽¹⁶⁾ <https://www.eea.europa.eu/>; Accessed on 03.04.2020.

⁽¹⁷⁾ <https://www.eea.europa.eu/themes/air> ; Accessed on 03.04.2020.

⁽¹⁸⁾ <https://airindex.eea.europa.eu/>; Accessed on 30.04.2020.

⁽¹⁹⁾ Data were extracted by the EEA's Communication Programme.

Figure 1: Geographical distribution of the Air Implementation Pilot cities



All Air Implementation Pilot cities provided air quality information to the public on the internet. A number of municipalities provided more elaborated air quality information to their citizens with, e.g., air quality maps, forecast services and mobile applications. The content was available in local language(s), sometimes also in English. Some air quality web pages provided also information for additional stressors such as noise. The pages usually contained explanations about how to use and interpret air quality data. In this way, citizens could access near real time data about the air quality at different places in the city.

The Air Implementation Pilot provided also information on the different measures each city implemented in order to comply with their air quality plans. They were classified in six groups: I) Industry; II) Buildings: Commercial and residential sources; III) Traffic: Technological and Infrastructure; IV) Traffic: Limiting traffic emissions; V) Campaigns; and VI) Agriculture. The category “Campaigns” included “soft measures”, implemented to create awareness, to encourage residents to adopt emission reducing practices and to promote low emission activities (Table 1). These activities included, e.g., car sharing, cycling, use of electric vehicles, information campaigns about air quality, or training campaigns in defensive driving. They had been promoted by all participating cities. These were important measures to ensure that the air quality problems were well understood by the residents, resulting in an adoption of the initiatives (ETC/ACM, 2013c).

Table 1: Percentage of measures classified as “campaigns” implemented or to be implemented back in 2013 in order to comply with the limit values established for NO₂ and PM₁₀ (adapted from ETC/ACM 2013c).

City	Campaign examples	% of measures for reducing NO ₂	% of measures for reducing PM ₁₀
Berlin	Measures promoting environmentally friendly means of transports and/or activities, such as cycling, Euro 6 vehicles, natural gas vehicles, pedestrian traffic and car sharing	27 %	-
Vienna	n.a.	15 %	9 %
Milano	n.a.	5 %	-
Prague	Measures to increase the attractiveness of public transport and promote it	5 %	14 %
Madrid	Tax measures to promote the use of less pollutant fuels or promoting pedestrian mobility	24 %	
Ploiesti	Promote public transport or public awareness on the importance of measures to reduce air pollution	-	27 %
Dublin	Car clubs; promoting health benefit of active travel; public meetings with air quality and health experts; monitoring campaigns where the public act as monitors (e.g., PEOPLE project on benzene with JRC); commissioning and participating in national TV series on the environment	15 %	
Antwerp	Create awareness of open fires (illicit burn) and educate in the correct use of stoves; eco-sailing in the harbour	-	10 %
Plovdiv	Development of programmes to increase the attractiveness of public transport (for NO ₂); campaigns to promote the use of better-quality fuels and more efficient heating (for PM ₁₀); development of programmes to promote commuting and the introduction of movement plans in schools (for both pollutants)	46 %	43 %
Paris	Comprehensive measures including not only technical or economical aspects but also educational aspects	38 %	50 %
Vilnius	n.a.	-	14 %

Except for Prague, all cities participating in the 2013 pilot foresaw public participation when drafting their air quality plans. Furthermore, the public was also informed about the implementation and the results (again with the exception of Prague) obtained with the plans (ETC/ACM 2013b).

Five years after the first pilot, ten of the twelve original Air Implementation Pilot cities participated in a second round to evaluate progress, to continue to support the exchange of good practice information and to identify new challenges with respect to the implementation of air quality legislation at urban scale (EEA, 2019b). The cities were Antwerp, Berlin, Dublin, Madrid, Malmö, Milan, Paris, Plovdiv, Prague, and Vienna. The same five work streams as in the first round were assessed: I. local emission inventories; II. modelling activities; III. monitoring networks; IV. management practices; and V. giving information to the public (EEA, 2019b).

All pilot cities had implemented activities and measures focusing on public information to increase public awareness and engagement with the citizens. They used their own web pages or those of the monitoring network to inform the public about air quality. The municipal administrations of Berlin

(²⁰), Dublin (²¹), Madrid (²²), Malmö (²³) and Vienna (²⁴) provided air quality information on their own web pages. For Paris, air quality information was accessible via the web pages of Airparif (²⁵), a non-profit organization accredited by the Ministry of Environment to monitor air quality in Paris and the capital city region. Regional air quality information was e.g., available for Flanders at the web pages of the Flanders Environment Agency (²⁶), for the Lombardy Region (²⁷) through the web pages of the Lombardy Environmental Protection Agency and for Plovdiv (²⁸) through the web pages of the Regional Inspectorate for Environment and Waters – Plovdiv (RIEW). Air quality information for the Czech Republic was accessible at the web pages of the Czech Hydrometeorological Institute (²⁹), together with information about weather and water quality.

They also communicated individual actions that the residents could take in order to contribute to the reduction of air pollution. The cities participating in the 2018 pilot used additional communication channels, including smartphone applications and social media. A different challenge arose for the cities – how to best obtain feedback from the public on the different information and communication channels. City air quality experts from the participating cities generally commented that they lacked the necessary expertise in communication and public engagement, especially since the topic is very complex to communicate. Their counterparts in municipal communication offices may also not have the required expertise to communicate technically complex information. Thus, communication of air quality information would strongly benefit from input from specialized communication experts. A number of cities asked for support by communication professionals to develop targeted media communication strategies for increasing public awareness of air pollution issues, to avoid misinformation and to improve the information systems alerting the public of pollution episodes in real time (EEA, 2019b).

Several cities in both Air Implementation pilots emphasised the positive effects of providing the public with information on the costs and benefits of certain measures. The cities reported about very diverse reactions from the public on the different measures implemented. These ranged from indifference (e.g., technological measures in public transport) to acceptance (e.g., bike sharing programmes) to rejection (e.g., LEZ, circulation restrictions). Public opposition was considered a very significant challenge. This was also the case when trying to modify peoples' perception of a given environmental problem or solution, especially when they were convinced that they were already acting environmentally friendly (e.g., burning of biomass is considered “eco-friendly” and thus, good). Experience from the pilot cities showed that public acceptance was generally higher in those cities where public knowledge and perceptions were high and where alternatives and economic incentives were available (ETC/ACM, 2013a). Also highlighting the positive effects on health associated with the new proposed measures helped to achieve greater public acceptance. In addition, measures that built on common knowledge, such as not jogging along a busy road or keeping windows closed if living near a busy road during rush hour also should be communicated clearly (EEA, 2019b).

Further challenges regarding provision of air quality information to the public listed by the cities included how to best present air quality issues in the general media, using social media and

(²⁰) <https://www.berlin.de/senuvk/umwelt/luftqualitaet/index.shtml>; Accessed on 03.07.2020.

(²¹) <https://dublincityairandnoise.ie/>; Accessed on 03.07.2020.

(²²) www.mambiente.munimadrid.es/opencms/opencms/calaire/index.html; Accessed on 03.07.2020.

(²³) <https://malmo.se/Service/Var-stad-och-var-omgivning/Stadsmiljon/Laget-i-staden/Luften-i-Malmo.html>; Accessed on 03.07.2020.

(²⁴) <https://www.wien.gv.at/ma22-lgb/luftgi.htm> ; Accessed on 23.03.2021.

(²⁵) <http://www.airparif.asso.fr/>; Accessed on 03.07.2020.

(²⁶) <https://www.vmm.be/data/actuele-luchtkwaliteit>; Accessed on 03.07.2020.

(²⁷) <https://www.arpalombardia.it/Pages/Aria/qualita-aria.aspx>; Accessed on 03.07.2020.

(²⁸) <https://plovdiv.riosv.com/main.php>; Accessed on 03.07.2020.

(²⁹) <http://portal.chmi.cz/#!>; Accessed on 03.07.2020.

smartphone applications, adopting a common system of indicators, providing information to the public in an understandable way, increase public awareness of air quality and knowledge about sources of air pollution, bring about changes in behaviour. However, as public awareness has increased, citizens have started to expect authorities to act to improve urban air quality. Another important challenge for city administrations still remains: How to best communicate the introduction of measures that are not always popular to the public, such as banning car traffic from the city centre, introduction of road tolls, etc. (EEA, 2019b).

2.4 Citizen Science

Against this background, the cities were trying to develop innovative ways to tie new ideas, skills, and resources to improve air quality communication, increase awareness and changes in behaviour in their citizens and engage the public – as well as other stakeholders – in improving urban air quality. One example is AIRLAB⁽³⁰⁾, an initiative initiated by Airparif (Paris) and partners. AIRLAB is building a user community to improve air quality by bringing together companies, research institutes, public bodies, and individuals. They create space for citizens to test new (sensing) technologies and coordinate air quality innovations through public initiatives (EEA, 2019c).

Public awareness about air quality issues was considered much higher in the cities participating in the Air Implementation pilot in 2018 than it was back in 2013, also media attention on this topic has increased. This led to more public engagement on these issues through citizen science projects, which are also suitable tools to communicate and increase public awareness (EEA, 2019c).

Citizen science describes a concept where non-professional volunteers contribute to scientific knowledge. These activities have become increasingly popular in different environmental monitoring disciplines. The rise and availability of simple, relatively cheap samplers and sensor monitoring devices facilitate monitoring activities for interested individuals and groups. With regard to air quality, citizen science activities can address a variety of objectives, such as producing information on local air quality and the exposure of the population to air pollution; raising awareness of a local air quality problem to attract the attention of local or national authorities; complementing measurements taken by official air quality monitoring networks and helping improve air quality models; and/or generating experience on the use of low-cost measuring devices and networks of such devices (EEA, 2019c). Different citizen science initiatives on air quality monitoring have been initialized and carried out during the last years, as can briefly be seen in Table 2. More information about this topic can be found in EEA, 2019c and ETC/ACM, 2019.

⁽³⁰⁾ <http://www.airlab.solutions/en>; Accessed on 03.07.2020.

Table 2: Selected examples of Citizen Science Activities measuring air quality.

Title	Initialized by	Why?	Pollutants monitored and monitoring device
CurieuzeNeuzen Vlaanderen (Curious Noses Flanders) https://curieuzeneuzen.be/	University of Antwerp	To map NO ₂ concentrations in ambient air in Flanders. Results have also been used in a court case against authorities in the Brussels region to adopt an adequate AQ plan to ensure compliance with NO ₂ limit value in the region	NO ₂ ; passive samplers
Luftdaten, now Sensor.Community (https://luftdaten.info/) https://sensor.community/en/	OK Lab Stuttgart	Visualizing PM air pollution in Stuttgart, Germany	Originally PM _{2.5} and PM ₁₀ ; NovaSDS011 DIY sensor; now also other environmental pollutants
CleanAir@School https://www.eea.europa.eu/themes/air/urban-air-quality/cleanair-at-school	EEA	To better understand children's exposure to NO ₂ in the school environment across Europe	NO ₂ ; passive samplers
Making Sense http://making-sense.eu	EU H2020 funded project; WAAG Society as coordinator	To explore how open-source software, open-source hardware, digital maker practices and open design can be effectively used by local communities to fabricate their own sensing tools, make sense of their environments and address pressing environmental problems in air, water, soil and noise pollution.	CO ₂ , PM, VOC, noise, temperature, relative humidity, possibility for other pollutants. SmartCitizen Kit
We Count https://www.we-count.net/	EU H2020 funded project; Transport & Mobility Leuven NV as coordinator	To quantify local road transport, produce scientific knowledge in the field of mobility and environmental pollution, and co-design informed solutions to tackle a variety of road transport challenges.	Low-cost road traffic counting sensor (Telraam)

The increasing availability and popularity of low-cost sensors for air quality monitoring pose a number of communication challenges for city air quality practitioners. The new technologies provide tools for raising awareness of the public and of policy making communities. The new devices can also facilitate monitoring air quality with high spatial and temporal resolution in a large area possibly not represented by a reference monitoring station. At the same time, the obtained data are often not of desirable quality and generally require further scientific data treatment in order to achieve characteristics that would make them comparable with measurements provided by reference stations. The difficulties, in terms of the time and staff resources required, of reconciling and communicating the reasons for differences between official monitoring results and those obtained by low-cost sensors used by the public are expected to be an increasing challenge in the future (EEA, 2019c).

In most cases, participants of citizen science activities around air pollution are very much aware of the topic and its related issues. The question is thus, how to communicate air quality issues to and engage with citizens who are unaware of the relevance of these issues for their everyday life.

3 Public awareness and perception of Air Quality

3.1 Perception of air quality in Europe

Air quality is perceived as one of the main reasons for concern by European citizens since the late 1990s ⁽³¹⁾ (EC, 1999, 2011, 2014 and 2017). This information was obtained through so called “Eurobarometer” surveys, conducted regularly on behalf of the European Commission and other EU Institutions, to collect the opinion from citizens in the European Member States on different topics. Eurobarometer surveys from 2012 and 2019 reveal insight into the attitude of Europeans towards air quality (EC, 2013 and 2019c). We present a summary of the results from both surveys. The first number indicates the result from the Eurobarometer in 2012, the second number from the one in 2019. This shall make it easier to see whether the public attitude has changed during the last years.

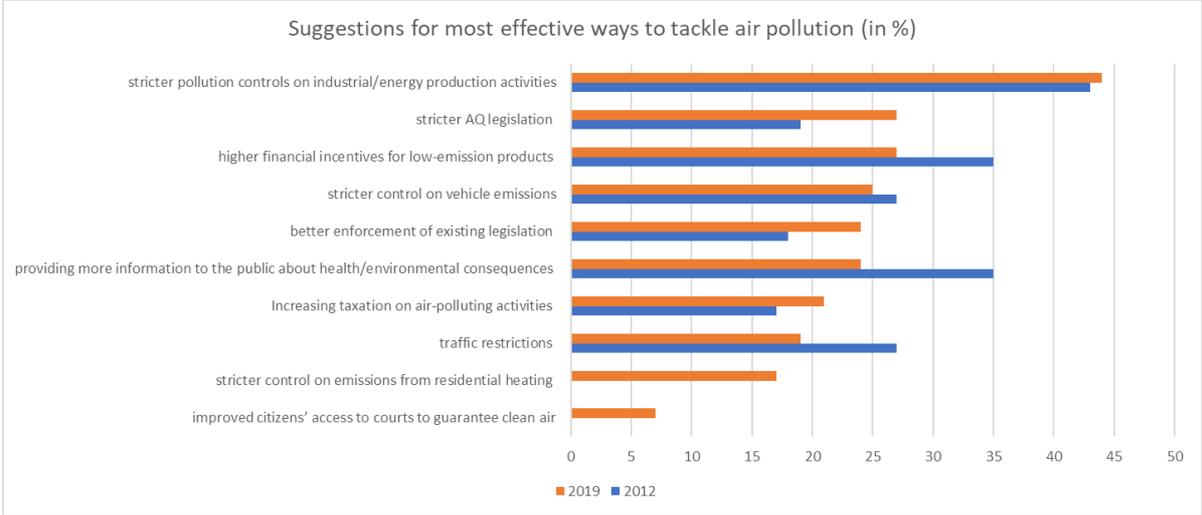
The majority of European citizens (59% vs 54%) does not feel informed about air quality problems in their country. More than half of the respondents (56% vs 58%) think that air quality has deteriorated during the previous decade. In the survey from 2019, people were also asked about which group they think has not done enough to promote good air quality. Here, the interviewees mention public authorities (66%), energy producers (65%), car manufacturers (64%), households (52%) and farmers (49%).

Both surveys asked about what the Europeans have done personally to reduce harmful emissions. 54% vs 41% claim they have replaced old energy-intensive equipment with newer equipment with a better energy rating, and 63% vs 35% have frequently used public transport, bicycle or walked instead of choosing the car. In 2019, almost one third (9% vs 28%), however, claim to have not done anything. When asked what they suggest as most effective ways to tackle air pollution (

⁽³¹⁾ 1999 – 70.6%, rank 1; 2007 – 40%, rank 3; 2011 – 36%, rank 3; 2014 – 56%, rank1; 2017 – 46%, rank 2.

Figure 2), 43% vs 44% suggest stricter pollution controls on industrial and energy production activities. Stricter air quality legislation (19% vs 27%) and higher financial incentives for low-emission products are also mentioned (35% vs 27%), together with stricter control on vehicle emission (27% vs 25%), better enforcement of existing legislation (18% vs 24%) and providing more information to the public about health and environmental consequences (35% vs 24%). Increasing taxation on air-polluting activities was mentioned by 17% vs 21%, traffic restrictions by 27% vs 19% and stricter control on emissions from residential heating by 17%. Only 7% would like to see improved citizens' access to courts to guarantee clean air. The last two options were not given in the survey in 2012 (EC, 2013, 2019).

Figure 2: Suggestions for most effective ways to tackle air pollution (in %). Results from Eurobarometers in 2019 and 2012.



Asked about the preferred level of action for addressing air pollution in the 2019 survey, 72% mentioned international level, 50% EU and 50% national level, and 38% see regional or local level as responsible for addressing AQ problems. (EC, 2019).

In the 2019 survey, the majority of Europeans is not aware of the EU AQ standards (68%). Of those that have heard about EU AQ standards, 63% believe they should be strengthened, while 26% think they are adequate. 71% of the Europeans think the EU should propose additional measures to address AQ problems. 38% of those Europeans would like to express their views on the additional measures, 33% do not wish to do so (EC, 2019).

These results seem to indicate that communication efforts by governing bodies begin to pay off. European citizens are increasingly aware of air pollution problems in their country. However, despite the fact that air quality has significantly improved over the last decade, more than 50% of the interviewees claim the air quality has even deteriorated during this period. At the same time, the majority claims that they do not feel themselves well enough informed about this issue, and that they are not aware of air quality standards. Interestingly, even though more than 50% claim a lack of information about air quality problems, only 24% (in 2012: 35%) request more information about health and environmental consequences of air pollution. Also, the respondents want to see more actions at a more global level to improve air quality. Here they see public authorities and industry being more in charge of implementing actions to improve air quality than for example households. In the survey from 2019, seven in ten respondents say they have carried out at least one action to reduce harmful emissions into the air.

At local level, as an example, a study was carried out in Paris in 2003 and 2007 in order to assess the public perception about air pollution and Airparif's mission. About 500 people were interviewed as representatives from the 11 million inhabitants of the region. 70% of them felt concerned about air pollution. They were positive about Airparif's services on air quality information but did not know that it was an NGO and most of their requests were related to a need for more information. Another example is a study led by Plaine Commune (group of cities in the north of Paris) in 2011, in the frame of the low-emission zone studies (in coordination with Paris), targeting people with low social level. It showed that they were aware of air pollution but could not qualify it and they could not make any relation with their personal behaviour (ETC/ACM 2013b).

These surveys show that air pollution is perceived as a problem, but how does this perception lead towards actions?

3.2 Factors related to perception of reduced air quality as a problem

Human perception is the result of a multidimensional and dynamic process with individual characteristics. Some experts even claim that human behaviour is mainly driven by perception, rather than by facts (Renn, 2008). Understanding of people's perception is important for facilitating changes in awareness, response to risks, changes in behaviour and carrying out successful participation activities (Huang et al, 2017).

There are not many studies available about the risk perception of air quality. Recent research results indicate an association between annual average pollutant concentrations and perceptions of air pollution (Grossberndt et al, 2020). Other studies report ambiguous results regarding the "standard" determinants such as age, gender and education (Bickerstaff & Walker 2001; Brody et al, 2004; Elliott et al, 1999; Forsberg et al, 1997; Howel et al, 2002; Pantavou et al, 2017; Piro et al, 2008). Some studies indicate that air quality perception can also be shaped by the area of residence, source of pollution, health symptoms and thermal sensation (Huang et al, 2017; Pantavou et al, 2017). In general, people more likely experience air pollution when they can see dust, hear traffic and see exhaust fumes, rather than when it cannot be sensed through visual and sensory feedback (Gatersleben & Uzzell, 2000). People seem to perceive higher risks when they feel they cannot trust risk managers/authorities (Gatersleben & Uzzell, 2000). Scientists and NGOs however seem to be most trusted stakeholders (EC, 2014; Pattinson et al, 2015).

Also media have the potential to influence people's perception of risks which leads to serious implications for risk communication (Renn, 2008; Cologna et al, 2017). Media's intention and the way stories are told can be quite influential on people's risk perception (Sharp et al, 2009). However, other studies indicate that this influence is only one factor among many, which does not have a major impact on one of the more influential factors: personal risk perception (Wählberg & Sjøberg, 2000). Better engagement with media would be beneficial to improve the quality of information (ibid). Examples from Poland and the UK show that also social media campaigns can function as strong pressure against local authorities to act upon air pollution⁽³²⁾.

3.3 From awareness to (re-)action

For several decades, the question of which factors determine human actions, especially with regard to pro-environmental behaviour, has produced a number of theories and models. To cite some of them, one can find the Protection Motivation Theory by Rogers (1983), the Norm Activation Model by Schwartz & Howard (1981), or the Value-Belief-Norm Theory of Environmentalism by Stern (2000). Saksena (2011) refers to the OECD Pressure-State-Impact-Responses Framework, whereas McKenzie & Schultz (2014) developed the Community-Based Social Marketing framework (CBSM) to foster sustainable environmental behaviour. To conclude with Kollmuss & Agyeman (2002, p239), *"The question of what shapes pro-environmental behaviour is such a complex one that it cannot be visualized through one single framework or diagram."*

Hyland and Donnelly (2015) investigated barriers and incentives to protect health and wellbeing and at the same time reduce the risk of traffic-related air pollution by interviewing public and private sector organisations in Scotland. They identified two main factors: (1) Air pollution was an invisible threat, especially for vulnerable groups of society. The fact that there were not enough options available for alternative modes of travelling carried more weight than a lack of awareness about the negative health impacts of air pollution. (2) Silofication of both local and national policies resulted in car travels still being the most efficient and cost-effective option for personal transport. The interviewed stakeholders claimed that a de-silofication approach combined with punitive measures and measures offering adequate choices for changes in (travelling) behaviour would lead to an

⁽³²⁾ <https://www.theguardian.com/cities/2014/jan/31/air-activists-social-media-pollution-city>; Accessed on 03.07.2020.

improvement of AQ and reduction of related health effects. These activities should be amended by additional information to the public on air pollution and its effects on human health.

Also Bubeck et al (2012) demonstrated that information about and perception of environmental risks alone will not lead to changes in behaviour. They performed a literature review on perception of flood risks and adoption of private mitigation measures. They could demonstrate that there was almost no positive relation between perception only and action. The following additional factors have been identified: previous experience with flooding, fear/worry about flooding, knowledge about flooding hazards, socioeconomic and geographical factors, hindrances for private flood mitigation, perceived effectiveness and coping appraisal. Bubeck et al suggest therefore to focus on coping appraisal strategies and provide additional information on the effectiveness of flood mitigation measures as well as practical guidance on how to implement them (2012).

This was also one of the main outcomes from the Air Implementation Pilots. The main challenges found in the cities was clear communication about air quality issues, but also about alternatives in e.g., use of transportation means or use of fuels for transport or heating. Some of the participating cities reported about positive feedback from the residents when health effects of air pollution were communicated, along with practical information on what to do to avoid or reduce air pollution (EEA, 2019b). Also the partnership behind the URBAN AGENDA FOR THE EU suggested to focus communication to the public on measurable benefits generated in terms of well-being, improved quality of life and clean air. Sharing examples of successful measures to trigger participation and co-produce solutions has been advised to overcome this problem (URBAN AGENDA FOR THE EU, 2017).

These examples demonstrate that the way from awareness to response is not straightforward. Providing information on air pollution and encourage people towards a more environmentally friendly behaviour is not sufficient. Much is dependent on personal attitudes and concern, own experiences, trust in authorities, societal networks, cultural rules or personal inconveniences (Bubeck et al, 2012; Owens, 2000), just to mention some factors.

4 Cities overcoming barriers related to public opinion

The cities of Stockholm and London have been quite successful in implementing measures to improve air quality even though they have not been very popular with the public in the first place. In Stockholm, the concept of congestion charging has been introduced as a pilot in 2006. A preceding communication and consultation process towards the public had been implemented in mid-2005. Based on a referendum where the majority voted in favour of the changes, the charges were finally implemented in 2007 (Eliasson, 2014). The change in public opinion about the congestion charging in Stockholm went from intense public and political resistance to both broad public and political support. The most important factor was that the charges were indeed effective in reducing air pollution and improving urban environment. An ambitious (scientific) evaluation and communication plan helped in making these effects widely known, meeting the high level of environmental concern in the population. It turned out that these two factors were much more potent in the whole process than people's concern about regulating the efficient use of scarce road capacity through the congestion charges. Rienstra et al (1999) had already discovered that support for policy measures in passenger transport in general is not only influenced by problem perception, but also the perceived effectiveness of the measure, the type of measure and, to a minor extent, also personal features. Another positive factor was positive framing. Instead of calling the charges "congestion charges", they were to a certain extent marketed as "environmental charges". This example shows that the plan to "introduce first, get acceptability later" seemed to be a successful strategy in Stockholm. Other studies show that so called "push measures" (i.e., measures that enforce a certain change in behaviour, such as prohibiting car traffic in specific areas) are considered to be less acceptable by the public than so called "pull measures" (i.e., measures that encourage a desired behaviour, such as behaving environmentally friendly). However, where the push measure targeted low-cost behaviour (i.e., reducing littering) or it was obvious that the majority of people supported this policy, push measures were more likely to be accepted (de Groot & Schuitema, 2012; Eliasson & Jonsson, 2011).

The success story for the introduction of congestion charging in London was similar. Traffic had been a concern for many decades. But a Transport Strategy for London containing road pricing as key feature of transport policy for London was passed after the mayor election in 2000. Even though mayor Johnson created a strong mandate for congestion charging already in his manifesto before the election, he still had barriers to overcome, amongst them acceptance by the citizens. This initiated a round of intense public consultations and dialogue with all stakeholders involved. As a result, the scheme that came into effect in 2003 was a consensus of all participating actors and led to low opposition once the congestion charging came into place. The example from London shows that it is possible to create legitimacy in advance by presenting a policy as part of a political manifesto ahead of a general election (Åkerman et al, 2011). Also the recent (2020) mayor Khan has put his focus on clean air. Together with Transport for London (TfL), the local government body responsible for the transport system in Greater London, he launched awareness raising campaigns and offered consultations. Information material is publicly available. The latest consultation was dedicated to the implementation of a so-called Ultra Low Emission Zone (see also chapter 6), which replaced the previous T-Charge from April 2019 ⁽³³⁾ (European Parliament, 2018).

Åkerman et al (2011) identified key success factors and barriers for urban congestion charging. Political consensus and leadership are equally important as a legal framework that supports the initiative. Existing institutional frameworks with clear roles and responsibilities is another important factor. For this reason, TfL in London and the Congestion Charging Secretariat in Stockholm served as administrative units within the respective city administration (Sørensen et al, 2014).

Carefully prepared expert knowledge that was easy to access for both, public and other involved stakeholders in combination with information and communication strategies and public

⁽³³⁾ <https://tfl.gov.uk/modes/driving/ultra-low-emission-zone/ulez-where-and-when>; Accessed on 08.09.2020.

consultations were also deemed important prerequisites for a successful implementation of urban congestion charging (Åkerman et al, 2011). As part of communications, the congestion pricing system should also be simple and easily understandable (Gu et al, 2018). Other scholars suggest applying a “sticks and carrots” approach in combination with clear information on how revenues would be spent (Sørensen et al, 2014). The latter addresses also the barrier of uncertainty (Gu et al, 2018). The benefits of road pricing should be made clear to the citizens (“carrots”) and they should be introduced before the “sticks” (introduction of new charges). Also flexible and open negotiations have been identified as successful strategies. In London for example, public consultations were initialized for this reason. Communication strategies have to be developed especially with the purpose to be responsive to the concerns of the public/other stakeholder groups. Demonstration projects and trials have also been proven to be effective through creating legitimacy and acceptance. The examples of Stockholm and London also reflect the importance of timing in the process of policy forming and implementation (Sørensen et al, 2014). Another factor that might not be in the main focus, but that can also be a reason for concern, is privacy, since the road pricing technologies register vehicles drivers when they pass the toll stations. The distribution of tolls among societal groups with different sociodemographic background may also lead to the issue of equity (Gu et al, 2018).

5 Citizens' initiatives addressing air pollution in different Member States

Recently, and independently of the infringements dealt with by the European Commission, citizens have been more actively involved in addressing air pollution issues on local, regional and national level and have gone to court both on national and at EU level for their right to clean air in different States, as for instance in the Czech Republic, Germany, France, Italy and the UK. In these cases, the courts have ruled in favour of the citizens and required the States to take further action to tackle air pollution. This development shows the increasing importance of the citizens' actions (ECA, 2018).

In order to ensure effective environmental governance, which includes air quality issues, participation of all parts of the quadruple helix⁽³⁴⁾ has to be ensured. This includes also the citizens and civil society. Due to its diverse composition, civil society can play different roles and contribute in different ways to address air pollution issues, such as by:

- Supporting policy development and implementation through collection and dissemination of information, assessment and monitoring (as described in chapter 2 for citizen science);
- Supporting networks of different stakeholders to address air quality issues in a collaborative manner;
- Advocacy to ensure that concerns of those affected by environmental challenges and policies are considered in environmental governance;
- Active participation in air quality management and governance (UNDP, 2016).

Gemmill-Herren and Bamidele-Izu (2002) argue that civil society should play an important role in global environmental governance in the following areas: (1) information collection, dissemination and analysis; (2) provision of input to agenda-setting and policy development processes; (3) performance of operational functions; (4) assessment of environmental conditions and monitoring compliance with environmental agreements; and (5) advocacy of environmental justice.

In this chapter, we provide examples of citizens' initiatives addressing air pollution in several European Member States. We consider three kinds of interventions: citizen science initiatives (section 5.1), actions to raise awareness and reduce emissions (section 5.2), and legal actions/court cases (chapter 6). All those activities are cross-cutting examples for the roles civil society should take in environmental governance as provided by UNDP (2016) and Gemmill-Herren and Bamidele-Izu (2002).

5.1 Cittadini per l'aria⁽³⁵⁾

Cittadini per l'Aria⁽³⁶⁾ is a not for profit, non-governmental environmental organization in Italy. The association has been established in 2015 and has, ever since, carried out its activities mainly in the effort to fill the information gap between scientific evidence on air pollution and its impact on human health and citizens and policy makers. In order to raise awareness and achieve change it implements citizen science projects on air quality and uses legal proceedings to achieve implementation of relevant laws and rules protecting citizens from dirty air. Cittadini per l'aria is a member of the European Environmental Bureau (EEB)⁽³⁷⁾, of Transport and Environment (T&E)⁽³⁸⁾ and of the European Citizens Science Association (ECSA)⁽³⁹⁾.

⁽³⁴⁾ Quadruple helix: framework of interactions between science, industry, government and the public.

⁽³⁵⁾ Information in this section is based on the information provided at the Cittadini per l'aria webpage, complemented with an interview with Anna Gerometta, President of Cittadini per l'aria on 15 April 2020.

⁽³⁶⁾ <https://www.cittadiniperlaria.org/>; Accessed on 03.11.2020.

⁽³⁷⁾ <https://eeb.org/>; Accessed on 30.04.2020.

⁽³⁸⁾ <https://www.transportenvironment.org/>; Accessed on 26.03.2021.

⁽³⁹⁾ <https://ecsa.citizen-science.net/>; Accessed on 26.03.2021.

In 2017, the Italian NGO Cittadini per l'aria carried out the project "NO₂, No Grazie!"⁽⁴⁰⁾. This was a citizen science project originally implemented in the metropolitan area of Milan and repeated twice in the years afterwards, including more Italian cities.

The project started in February 2017, initiated by the NGO itself - in which two lawyers play an active role - in collaboration with a scientist and some communicators. The initial idea arose after the «diesel-gate» scandal and due to the high concentrations of NO₂ in Milan. The organizers planned this citizen action to highlight the problem of air pollution and force the administrations and policy makers to address it and find solutions. The novelty was to focus on NO₂, since until then, only PM was perceived as a problem in Milan.

Only one month after initialising the idea, Cittadini per l'aria found a supplier for the tubes to be used in the initiative for the citizens' measurements, launched an appeal to the public to participate in the campaign and gathered more than 150 volunteers that were willing to participate. The NGO ordered then sampling tubes that had already been paid by the citizens during the registration process. The project was also supported by some other NGOs and companies. To start, Cittadini per l'aria arranged for a public information campaign about air pollution and the project idea. Citizens were then invited to buy passive samplers for NO₂ and install them in different locations of Milan and its metropolitan area. The citizens decided themselves where to place the passive sampling tubes, for instance in front of their home, shops, offices or their children's schools. The only requirement was that samplers had to be placed at the same height (2.5 to 3 m). This way of designing the campaign created a sense of ownership in the participants and a great engagement. The project led to a bias in participation since the participants had to buy the sampling tubes themselves, which excludes economically weak families/participants from joining. However, the project did not imply a spatial bias, since most and least deprived populations are spread across the whole city, which was evenly covered by sampling tubes from the participants.

After an exposure period of one month, the participants had to demount the samplers and return them to the collection points. The samplers were sent to the laboratory that supplied them, where they were analysed. The data was processed and validated with data from the reference measurement stations of the Regional Environmental Protection Agency (Agenzia regionale per la protezione ambientale – ARPA), thanks to the support of a researcher, under the patronage of the Division of Environmental Chemistry and Cultural Heritage, of the Italian Chemical Society⁽⁴¹⁾. This provided accountability and credibility to the results.

The final aim of the project was to map the NO₂ concentrations in Milan to increase public awareness about and involvement in air quality and show the need for more ambitious measures. It was also a way of pressing policy makers to take action, facing them with their unfulfillment of legislation, also supported by the fact of having a lawyer on board. The final map⁽⁴²⁾ showed NO₂ concentrations above the annual limit value of 40 µg/m³, which was a breach of the AAQD and thus, required immediate action of both administration and policy.

The NGO's web sites and facebook page reported about this initiative. A press release made it possible to reach the local pages of newspapers, several websites and some radios. Media involvement was very important for recruiting participating citizens. The project was very well perceived by the press, as an innovative idea with a clear outcome – the final map. There was already public awareness about the topic of air pollution, enforced by the «diesel-gate» scandal that facilitated the participation of both public and media. As a matter of fact, a high number of journalists participated themselves in the project.

⁽⁴⁰⁾ <https://www.cittadiniperlaria.org/no2-no-grazie/>; Accessed on 03.11.2020.

⁽⁴¹⁾ <https://www.cittadiniperlaria.org/campagna-no2-no-grazie-un-approfondimento-scientifico/>; Accessed on 08.09.2020.

⁽⁴²⁾ <https://www.cittadiniperlaria.org/nasce-la-prima-mappa-dell'inquinamento-da-no2-dell'aria-di-milano-creata-dai-cittadini-per-i-cittadini-2-2/>; Accessed on 03.11.2020.

ARPA Lombardia⁽⁴³⁾ was informed about the project and was asked to participate by placing some tubes at their monitoring stations or by working on data calibration, what they did not do at this stage. Also local administrations have been approached to participate and they gave permission to mount the sampling tubes on lamp poles and other municipal inventory and took care that the tubes were not removed.

Before the results were published, a video teaser was released⁽⁴⁴⁾. The results were then published on a map on Cittadini per l'aria's webpage with the monthly mean values from the campaign⁽⁴⁵⁾. Based on these values, an annual mean value was estimated for each sampler, creating a new map with annual means⁽⁴⁶⁾. Both maps have been published with information on the effects of air pollution on human health.

The results were also presented to the Municipal Environment Commission in July 2017 and subsequently, on initiative of a group of Municipal councilors, to the Mayor of Milan (Mr. Giuseppe Sala) in January 2018⁽⁴⁷⁾. Furthermore, Cittadini per l'aria sent a letter to the mayor, requesting effective and timely policies and interventions⁽⁴⁸⁾ to reduce the circulation of cars, in particular diesel. A letter that can be sent to the mayor by everybody, requesting immediate actions to reduce the use of the most polluting diesel vehicles and banning all diesel vehicles by 2025 is also available for download on the webpages of Cittadini per l'aria⁽⁴⁹⁾.

Building on the success of the first initiative, a second campaign started in 2018, this time including the cities of Milan, Rome and Brescia (and, autonomously but following the project's methodology and indications, Bologna and Torino). In Milan, this second campaign focused on children's exposure and thus, the samplers were placed either in schools or at playgrounds. This resulted in lower concentrations than in the first campaign. ARPA Lombardia was contacted again and some tubes for calibration purposes were located close by their premises.

⁽⁴³⁾ https://www.arpalombardia.it/Pages/ARPA_Home_Page.aspx; Accessed on 24.03.2021.

⁽⁴⁴⁾ https://www.youtube.com/watch?v=uhx9TIRU0oY&feature=emb_logo; Accessed on 03.11.2020.

⁽⁴⁵⁾ <https://www.cittadiniperlaria.org/no2-mese/>; Accessed on 08.09.2020.

⁽⁴⁶⁾ <https://www.cittadiniperlaria.org/no2-anno/>; Accessed on 08.09.2020.

⁽⁴⁷⁾ <https://elisabettastrada.com/i-miei-progetti-futuri/misure-contro-linquinamento-a-milano/#jp-carousel-715>; Accessed on 26.03.2021.

⁽⁴⁸⁾ This contained:

- From 1 January 2018: implementation of a low emission zone (LEZ) as per current city planning, Urban Plan for Sustainable Mobility (PUMS), establishing an absolute traffic ban for Euro 3 and Euro 4 diesel vehicles without particulate filter and a tariff system, with a tariff according to the need to dissuade entry into the city by such means, for all diesel vehicles (Euro 4, 5 and 6) that do not comply with the on-road emission levels (CF 2.1) referred to in the 2016 Regulation / 646 Real Driving Emissions (falling within today's categories A, B and C of the EQUA system on which the ranking of real road emissions for the Revolution'Air system to which the Municipality of Milan has joined will be based).
- From 1 January 2020, the paid LEZ will be extended to vehicles that do not comply at least with the conformity factor 1.5 on the road, (falling under today's category C of the EQUA system).
- That these measures are coordinated at the metropolitan level by favoring the adoption of similar measures in the municipalities of the Metropolitan City, adequately increasing public service, cycling and intermodality in this perspective.
- From 2025 ban on access to the LEZ of all diesels.

⁽⁴⁹⁾ <https://www.cittadiniperlaria.org/fai-sentire-la-tua-voce-invia-il-tuo-appello-al-sindaco/>; Accessed on 08.09.2020.

The results of the campaigns in Milan ⁽⁵⁰⁾, Brescia ⁽⁵¹⁾ and Rome ⁽⁵²⁾ were again made visible on a map. 95 % of the tubes showed concentrations above the annual limit value. Later that year, epidemiologists ⁽⁵³⁾ created a map, using machine learning for an estimation of the spreading of NO₂ for those points on the city map where no sampling results were available. Furthermore, for Milan, the increased yearly mortality due to the exposure to NO₂ exceeding the legal limit of 40µg/m³ was estimated as amounting to 594 premature deaths, equalling to one out of five deaths in Milan. The epidemiologists also concluded that accounting of premature deaths would be triple (1.791 premature deaths/year) if one would consider the impact of exposure starting from 20µg/m³ of NO₂ ⁽⁵⁴⁾.

These campaigns were again a success. In Milan, after the announcement of a second campaign in schools, a proposal was presented to the city council for the elimination of diesel vehicles in 2025. In June 2018, three weeks after the presentation of the results of the epidemiological analysis of the second citizen science campaign at Palazzo Marino, Mayor Sala announced “Area B”, Milan’s Low Emission Zone (LEZ) covering most of the city territory. A similar advocacy pattern could be followed in Rome. Epidemiologists created a map that showed the concentrations of NO₂, estimated the connected health risks on the basis of the results from the citizen science campaign and presented it to the mayor in Rome. Based on information about the activities, measurements and subsequent measures in Milan, mayor Raggi announced the creation of a LEZ in Rome, banning Euro 3 vehicles in a certain ring of Rome (“Ztl Anello ferroviario”).

On 8 February 2020, a new round of campaigns started in Milan, Rome (together with the organization *Salvaiciclisti Roma* ⁽⁵⁵⁾) and Naples (with the *Comitato Vivibilità Cittadina di Napoli* ⁽⁵⁶⁾) ⁽⁵⁷⁾. The objective of this third campaign was to show that the air quality situation was still unacceptable and that stronger measures on a shorter term were needed. Again, samplers were located outside homes, schools and workplaces. About 2000 volunteers were participating during the whole period of 2020. An app had been developed to facilitate the gathering of the samplers’ locations. During the campaign, which was supposed to finish on 7 March, the lockdown to stop the spread of COVID-19 started earlier in Milan (on 24 February), while on 9 March the government of Italy imposed a national quarantine, restricting the movement of the population except for necessity, work, and health circumstances. This meant that the tubes had to be collected and returned to the collection points during the lockdown and due to the circumstances (strict lockdown and some people changing residency during this period), about a third was consequently lost (1.300 samples from the 3 cities were sent to the laboratory, that was closed at that time).

The novelty in this case was that the citizens could participate in three ways:

- As individual citizen;
- By involving a school or parenting committee;

⁽⁵⁰⁾ <https://www.cittadiniperlaria.org/no2-no-grazie-milano-ecco-a-voi-le-mappe-con-i-risultati-del-campionamento/>;
Accessed on 03.11.2020.

⁽⁵¹⁾ <https://www.cittadiniperlaria.org/nasce-la-prima-mappa-dellinquinamento-da-no2-dellaria-di-brescia-creata-dai-cittadini-per-i-cittadini-2/>; Accessed on 22.12.2020.

⁽⁵²⁾ <https://www.cittadiniperlaria.org/no2-no-grazie-roma-ecco-a-voi-le-mappe-con-i-risultati-del-campionamento/>;
Accessed on 22.12.2020.

⁽⁵³⁾ From the Dipartimento di Epidemiologia del Lazio (<http://www.deplazio.net/it/test-1>; Accessed on 26.03.2021.). Specifically support was provided by Carla Ancona and Massimo Stafoggia of the U.O.C. Epidemiologia Ambientale, Occupazionale e Registro Tumori (<http://www.deplazio.net/it/epidemiologia-ambientale>; Accessed on 26.03.2021.)

⁽⁵⁴⁾ <https://www.cittadiniperlaria.org/mappa-lurf-milano/>; Accessed on 26.03.2021.

⁽⁵⁵⁾ <https://www.salvaiciclistiroma.it/>; Accessed on 26.03.2021.

⁽⁵⁶⁾ <https://m.facebook.com/comitatovivibilitacittadina/>

⁽⁵⁷⁾ Bologna and Torino made the same campaign independently of Cittadini per l’aria, but in collaboration with them.

- By offering employees the opportunity to participate in the project for free as a Christmas gift.

The aim was again to carry out a scientific monitoring exercise where the data would be collected by the citizens and then processed by a laboratory. The maps resulting from this monitoring campaign ⁽⁵⁸⁾ will give each citizen information about the NO₂ concentrations of “their own” sampling tube.

The various competent Regional Environment Agencies (ARPA Lazio ⁽⁵⁹⁾, ARPA Campania ⁽⁶⁰⁾ and ARPA Lombardia) were involved and showed their willingness for support in this third campaign, supporting the tubes’ calibration process near the official monitoring stations. The scientific part of the project was finally led by a team of universities from Milan and Naples and by epidemiological health professionals from the Lazio Health System Epidemiological Department ⁽⁶¹⁾ in Rome. The maps of the citizen science campaign carried out in 2020 along with their relevant epidemiological impact modelling will be presented again to the municipal authorities in the three cities. Cittadini per l’aria feels that the cities Rome, Naples and Milan need to advance their regulations to curb NO₂ pollution at source, and that in Italy both at city, regional and national level improved enforcement and regulation is needed to achieve compliance with legal limits. The main aim of the maps is to provide political pressure to ensure that improved diesel bans in cities are implemented and respected.

The work with the three initiatives shows that communication is very important to keep people informed and involved. For example, in the first campaign, communication was driven by participants themselves and the journalists that were participating. Even though, Cittadini per l’aria would have liked to communicate more – and more efforts in communication were therefore placed in the third year – but the COVID-19 lock-down stopped all their activities. To complement these efforts, the NGO has carried out a series of webinars on air pollution, health impact and relevant solutions ⁽⁶²⁾.

5.2 Right to Clean Air, Clean Heat and Clean Air Farming ⁽⁶³⁾

Deutsche Umwelthilfe e.V. (Environmental Action Germany – DUH) ⁽⁶⁴⁾ is a not for profit, non-governmental environmental and consumer protection organisation in Germany. The association is entitled to instigate legal proceedings in line with the Act on Applications for an Injunction. DUH is a German member of the European Environmental Bureau (EEB). It also has the right to take legal action as an association in line with the German Environmental Appeals Act.

During its more than 40 years of work, DUH has been leading a large number of campaigns aiming at protecting the environment and the interests of consumers. Three recent initiatives: Right to Clean Air ⁽⁶⁵⁾, Clean Heat ⁽⁶⁶⁾ and Clean Air Farming ⁽⁶⁷⁾ are scrutinized below.

Basis for all three initiatives was an increasing number of requests from citizens and a growing awareness/attention in the society in general about the topic of air pollution due to events as e.g., «diesel-gate» in 2015 or the increasing use of woodstoves. Air quality measuring campaigns by RBB

⁽⁵⁸⁾ Milan <https://www.cittadiniperlaria.org/no2-no-grazie-milano-2020/>; Accessed on 26.03.2021; Rome <https://www.cittadiniperlaria.org/no2-no-grazie-roma-2020/>; Accessed on 26.03.2021.; Naples <https://www.cittadiniperlaria.org/no2-no-grazie-napoli-2020/>; Accessed on 26.03.2021.

⁽⁵⁹⁾ <https://www.arpalazio.it/>; Accessed on 24.03.2021.

⁽⁶⁰⁾ <https://www.arpacampania.it/>; Accessed on 24.03.2021.

⁽⁶¹⁾ <https://www.deplazio.net/en/>; Accessed on 24.03.2021.

⁽⁶²⁾ WebinAir page <https://www.cittadiniperlaria.org/webinairi-cittadini-per-aria/>; Accessed on 26.03.2021.

⁽⁶³⁾ Information in this section is based on an interview with Dorothee Saar from DUH on 27.03.2020.

⁽⁶⁴⁾ <https://www.duh.de/englisch/who-we-are/>; Accessed on 03.07.2020.

⁽⁶⁵⁾ <https://www.right-to-clean-air.eu/en/project/right-to-clean-air/>; Accessed on 08.09.2020.

⁽⁶⁶⁾ <https://www.clean-heat.eu/en/home.html>; Accessed on 03.07.2020.

⁽⁶⁷⁾ <https://www.clean-air-farming.eu/de/start>; Accessed on 03.07.2020.

(regional tv channel ⁽⁶⁸⁾), TU Berlin (Technical University ⁽⁶⁹⁾) and DUH (passive samplers for NO₂) visualised the high level of pollution. In the past, there had been several unsuccessful initiatives where individual citizens tried to sue authorities due to often lengthy procedures. With its legal cases, DUH achieved a better “stand” for NGOs to take legal action in case EU law is affected. This results in higher chances of influencing authorities and ultimately, bringing them to court, than individual persons. Thus, many citizens have addressed DUH for help during the last years. As for today (2020), DUH has initiated lawsuits in 40 municipalities in Germany for violation of the implementation of air quality laws. Some of these cases are pursued in collaboration with ClientEarth ⁽⁷⁰⁾.

Right to Clean Air was initiated together with the Frank Bold Society ⁽⁷¹⁾ (Czech Republic) and co-funded by the European Union’s LIFE program. It arose from a number of lawsuits due to exceedance of limit values for PM, caused by traffic and heating with coal (Eastern Europe)/wood burning (Western Europe). The primary aim of the project was to sensitize environmental associations and citizens to participate in public consultation procedures to compile or revise air quality plans. Further objectives were the permanent compliance with NO₂ emission levels for the whole of Germany. The goal is the adaptation of EU’s AAQDs to WHO recommendations. Another aim was to improve awareness about fine dust and its threats to health even when not exceeding the limit values, to improve measures to reduce emissions of fine particles, control of efficiency and of exhaust emission tests.

In order to reach these objectives, DUH involved both, society and administrations. Society has been reached out to via information material, press work, petitions, and a number of (measurement) campaigns for citizens to participate (“Mitmachaktionen”). Information events and expert meetings have been arranged for authorities and other groups (e.g., “Fachgespräch Luftreinhaltung” in Berlin: open meeting several times a year with different focus topics for administration/authorities, associations, lawyers, other NGOs, etc). Use of social media, press conferences and press releases have further been used to trigger the public debate.

The project has been successfully finalized in November 2019. Success in this case means any newly implemented measure that contributes to stay within the limit values for air pollution as set out by the AAQD. During its lifetime, the question of clean air has gained new importance, primarily due to campaigning and the resulting pressure from civil society to comply with health-related thresholds in EU Member States. The project partners participated in the development of new criteria catalogues for EU’s green public procurement (GPP) for transport and public space maintenance. Air pollutant emissions are a major aspect of the GPP criteria. As a result of a number of expert talks on this topic, the project registered more than 30 municipalities that committed themselves to exclusively purchase Euro VI buses and to retrofit their bus fleet to emission standard Euro VI. The project has further been contributing to improve compliance with the European environmental legislation by e.g., providing information on measuring stations or court decisions in the respective countries. As a result of the massive media and information campaigns across Europe, increased awareness of and interest in air quality issues have been observed by the project. The project concludes that a total of about 60 million people could be reached through the project activities. In addition, the project responded to more than 2,000 individual inquiries by private persons. Project partners have been invited to numerous events in different EU Member States to inform about the consequences of air pollution and to explain the options for taking legal action to citizens’ action groups, NGOs and lawyers. Also national and regional specifics have been discussed. New air quality related activities have been reported in Member States where workshops have been held. Based on the project

⁽⁶⁸⁾ <https://www.rbb-online.de/fernsehen/>; Accessed on 03.11.2020.

⁽⁶⁹⁾ <https://www.tu.berlin/en/>; Accessed on 03.11.2020.

⁽⁷⁰⁾ <https://www.clientearth.org/>; Accessed on 03.11.2020.

⁽⁷¹⁾ <https://frankbold.org/>; Accessed on 26.02.2021.

activities, a number of measures have been implemented to improve urban air quality, such as ban on diesel vehicles, lowering of speed limits or cycles lanes replacing car lanes or parking space. The project provided further feedback on legal options regarding intended lawsuits and supported campaigns for air pollution control and its legal implementation. All these activities resulted in an effective cross-national network, ensuring that European legislation on ambient air quality was implemented more effectively in more EU Member States. Even though the project has been finalized, networking with other environmental organisations and activities with individual citizens or citizen groups across Europe will continue (DUH, 2020).

Clean Heat was a project by DUH and The Danish Ecological Council (now: Green Transition Denmark ⁽⁷²⁾); sponsored by EC's LIFE programme. It started in 2015 and finished in 2019, but it continues now based on donations. The initiative started as a consequence of an increased public interest in the topic of wood burning especially in rural, but also in suburban areas. The Clean Heat campaign had as initial aims to increase awareness among consumers and political decision-makers, to exchange experience, promote the implementation of ambitious regulations on both local, national and European level (including effective measurement procedures), to reduce emissions of private wood stoves by providing information for better handling and stove management, to promote alternatives to wood burning and to press ahead with an eco-labelling for stoves and boilers with fewer emissions. Clean Heat has involved the civil society through different communication activities, such as distribution of information material, press work (Internet, tv, magazines, exhibitions, videos), petitions and (measurement) campaigns for citizens to participate ("Mitmachkampagnen"). The activities included also interaction with the public administrations. Expert talks, workshops, networking and press work are just examples for these activities. The most prominent impact of Clean Heat was the initiation of a new eco-label for firewood stoves ⁽⁷³⁾, available since January 2020. Wood stoves can now be certified to a higher standard than the current statutory requirements, leading to a significant cut in pollutant emissions. They can receive the Blue Angel environmental label, Germany's official eco-label. This label contributes to the compliance with limit values, DUH's main measure for success ⁽⁷⁴⁾.

The last initiative presented here under the lead of DUH, is Clean Air Farming with the aim to reduce ammonia and methane emissions from agriculture. The project partners are France Nature Environment ⁽⁷⁵⁾, European Environmental Bureau (EEB), Lake Constance Foundation ⁽⁷⁶⁾ and DUH as coordinator, co-funded by the LIFE programme of the EC. It runs from 2018 until 2022. The link between agriculture, climate change and air pollution has received more attention in the recent past and led to the Clean Air Farming initiative with the main aim that policy makers and politicians should take action. Further objectives of the project are to raise awareness among meat and dairy industry associations and food sector operators and developing a common position; to involve civil society organisations in legislative processes and in the implementation of national air pollution control programmes (NAPCPs); to improve the curriculum of agricultural vocational training to inform future farmers about the impact of their own actions and to provide practical tools to prevent emissions; and to reduce food waste from meat and dairy products along the supply chain to increase overall resource efficiency in food production and reduce absolute emissions of methane and ammonia. Clean Air Farming is coordinating the participation of civil society organisations in the implementation and revision of the relevant guidelines and programmes through participation in public participation processes, media relations and position papers. The activities include petitions, information campaigns, round tables for associations of the meat and milk producing industry and actors of the food sector, and workshops and aim at integrating the topic (link between agriculture,

⁽⁷²⁾ <https://rgo.dk/>; Accessed on 26.03.2021.

⁽⁷³⁾ <https://www.blauer-engel.de/en/products/construction-heating/stoves-for-wood/>; Accessed on 08.09.2020.

⁽⁷⁴⁾ <https://www.clean-heat.eu/en/project/clean-heat.html>; Accessed on 08.09.2020.

⁽⁷⁵⁾ <https://www.fne.asso.fr/>; Accessed on 26.03.2021.

⁽⁷⁶⁾ <https://www.bodensee-stiftung.org/en/bodensee-stiftung/>; Accessed on 26.03.2021.

climate change and air pollution) in teaching plans within agricultural professions. The project activities are still ongoing; thus it is not possible to measure the initiative's success yet ⁽⁷⁷⁾.

⁽⁷⁷⁾ <https://www.clean-air-farming.eu/en/about/clean-air-farming>; Accessed on 08.09.2020.

6 Court cases to protect the right to clean air

ClientEarth is a non-profit European environmental law organisation with offices in Brussels, London, Madrid, Berlin, Warsaw and Luxembourg (as well as Beijing and Los Angeles). ClientEarth uses the power of the law to develop legal strategies and tools to address major environmental issues, providing legal support and information to most of the environmental NGOs in Brussels (and beyond) and using the courts where necessary to enforce environmental law. The organisation is composed of programmes on Climate, Energy, Fossil Fuels Infrastructure, Trade, Oceans, Harmful chemicals, Plastics, Clean air, Wildlife, Forest, Agriculture and Environmental Democracy. Their work on air quality started in 2010 in the UK, right after the AAQD had entered into force in 2008. With the large majority of the air quality zones in the UK exceeding the limit values for nitrogen dioxide (NO₂) as set by the AAQD, in July 2011, ClientEarth brought proceedings against the Secretary of State for the Environment, Food and Rural Affairs, which was the competent UK authority for implementing the Directive. The case concerned the UK Government's failure to produce an air quality plan that would bring the UK into compliance with limit values for NO₂ in the shortest time possible. In 2014, following a referral for preliminary ruling from the UK Supreme Court on the correct interpretation of the Directive, the Court of Justice of the European Union (CJEU) set an important precedent for the right to clean air ⁽⁷⁸⁾. The CJEU affirmed the legally binding nature of air quality limits and held that the mere adoption of an air quality plan is not enough to comply with the Directive, if the content is not adequate to reduce air pollution in the shortest time possible. According to the CJEU ruling, both individuals and environmental NGOs have standing to enforce the Directive. The CJEU also clarified that, in case these actions are brought, national courts should review the content of air quality plans and provide a remedy. In 2015, the case returned to the UK Supreme Court which ruled in favour of ClientEarth and issued a mandatory order requiring the UK government to prepare new air quality plans by the end of 2015. This case was a major step towards the "Right to Clean Air" on EU level, and the beginning of the implementation of Clean Air Zones (CAZs) in cities throughout the UK (ClientEarth, 2015). The combination of legal actions, media attention and clean air campaigns has created the right conditions for implementing measures like the ultra-low emissions zone (ULEZ) in London, bringing about tangible reductions in key air pollutants. Within its first year London's ULEZ resulted in a 44% reduction in NO₂ roadside concentrations. The number of people in London living in areas exceeding air quality limits has fallen from 2 million in 2016 to 119,000 in 2019 (a 94% drop) ⁽⁷⁹⁾.

Since 2014, ClientEarth has been active in more than 80 court cases in France, Italy, Belgium, Germany, Czech Republic, Slovakia, Poland, Bulgaria, Hungary and Romania, supporting citizens and citizen groups in their fight for their right to clean air.

6.1 Belgium: Brussels and Flanders cases ⁽⁸⁰⁾

ClientEarth's court case against the authorities in Brussels differs to a certain degree from other court cases for enforcing citizens' right to clean air. It also challenges possible flaws in the air quality monitoring network. These developments started back in 2009 when the local authorities shut down the air quality monitoring station at Arts Loi, a busy road, for maintenance. The station was still shut down in 2015/2016. Moreover, despite a petition from several concerned citizens, the Brussels regional authorities failed to adopt an adequate air quality plan to address the breach of the limit values for NO₂ since 2010.

⁽⁷⁸⁾ Case C-404/13 R (on the application of ClientEarth) v Secretary of State for Environment, Food and Rural Affairs [2014] 2382.

⁽⁷⁹⁾ <https://www.london.gov.uk/press-releases/mayoral/dramatic-improvement-in-londons-air-quality>; Accessed on 26.03.2021.

⁽⁸⁰⁾ Information in this section is based on an interview with Ugo Taddei from ClientEarth on 09.07.2020.

In September 2016, ClientEarth and five individuals (Lies Craeynest, Cristina Lopez Devaux, Frédéric Mertens, Karen Goeyens⁽⁸¹⁾ and Karin De Schepper) started a court action concerning air pollution in Brussels. On top of requesting the adoption of an adequate air quality plan, the applicants challenged the reliability of the Brussels region's monitoring network. They requested the judge to order the installation of sampling points at appropriate locations in order to provide data on "the areas within zones and agglomerations where the highest concentrations occur" (pursuant to Article 7 and Annex III of the 2008 AAQ Directive). According to the applicants, the official monitoring network underestimated pollution levels in the agglomeration. Following a hearing in November 2017, the Court of First Instance of Brussels decided to stay the proceedings and refer the matter for preliminary ruling to the CJEU. In 2019, the CJEU confirmed in a ruling⁽⁸²⁾ that citizens and NGOs have the right to challenge the authorities to demand that monitoring of air pollution is done in accordance with the provisions in the AAQDs. The case has returned to the Brussels judge, who issued the final ruling in January 2021: "*The Brussels regional government has breached EU law by failing to correctly monitor and protect the health of its citizens against harmful levels of air pollution. The authorities have been ordered to take immediate action to address the issue.*"⁽⁸³⁾.

This new CJEU ruling paves the way for new legal actions on air quality issues at a moment when people across Europe are increasingly engaging in citizen science projects that independently assess air quality and question official information provided by authorities. The potential of combining citizen science and legal actions is clearly shown by a follow-up case that Greenpeace Belgium started while the preliminary reference was pending before the CJEU. In particular, in May 2018, around 20,000 individuals took part in a citizen science project (Curieuze Neuzen – see chapter 2) in the Flanders region in Belgium to measure NO₂ concentrations near their houses⁽⁸⁴⁾. The measurement campaign revealed that concentrations of NO₂ exceeded limit values in many more areas than actually Belgian authorities had captured through their official monitoring network. On 10 October 2018, the President of the Dutch-speaking Court of First Instance of Brussels ordered the Flemish Region to communicate these additional data to the Commission and adopt a new air quality plan⁽⁸⁵⁾. In July 2020, following an enforcement action pursued by Greenpeace, the Dutch-speaking Court of First Instance found that the Flemish government had failed to comply with the ruling by the adoption of an adequate air quality plan and it issued a financial fine of Euro 265,000 that will keep growing by Euro 1,000 for each further day of breach.

These examples show that litigation is an important instrument for citizens and citizen groups in their endeavours to enforce their right to clean air. Even if pressure has to be imposed upon authorities over a long period of time, without litigation many steps would not have happened, as also the next example shows.

6.2 Za Zemiata, Friends of the Earth Bulgaria⁽⁸⁶⁾

Za Zemiata⁽⁸⁷⁾, Friends of the Earth Bulgaria, is an environmental non-governmental organization based in Sofia, Bulgaria. It was founded in 1995 and since that time, has been working on many environmental topics, including air quality. They work (i) with citizens and local citizen groups to

⁽⁸¹⁾ Ms Goeyens is now deceased, however, and her case has been taken up by Stefan Vandermeulen.

⁽⁸²⁾ Case C-723/17 *Lies Craeynest and Others v Brussels Hoofdstedelijk Gewest and Brussels Instituut voor Milieubeheer*, ECLI:EU:C:2019:533.

⁽⁸³⁾ <https://www.clientearth.org/latest/press-office/press/clientearth-and-brussels-residents-win-five-year-legal-battle-for-clean-air/>; Accessed on 26.03.2021.

⁽⁸⁴⁾ See CurieuzeNeuzen Vlaanderen, <https://2018.curieuzeneuzen.be/vlaanderen-2018/in-english/>; Accessed on 26.03.2021.

⁽⁸⁵⁾ *Nederlandstalige Rechtbank van eerste aanleg Brussel*, 10 October 2018, TMR 2018, 706-729.

⁽⁸⁶⁾ Information in this section is based on an interview with Ivaylo Hlebarov from Za Zemiata and Agnieszka Warso-Buchanan from ClientEarth on 13.07.2020.

⁽⁸⁷⁾ <https://www.zazemiata.org/>; Accessed on 08.08.2020.

provide support and help in their fight against air pollution locally; (ii) with legislative and litigation efforts; and (iii) with researchers to provide relevant research on air pollution and its negative effects on health, both locally and nationally. Za Zemiata is also member of the EEB.

Their activities within air quality started for full in the end of 2016/beginning of 2017. At that time, they gave lectures on air pollution and its effects on health together with Greenpeace Bulgaria⁽⁸⁸⁾. In addition, they provided experimental low-cost PM sensors, aiming at engaging people to measure air pollution. In technical workshops, Greenpeace and a local technology company focusing on robotics also built PM sensors. However, since they were not as accurate as desirable, the NGOs informed the workshop participants that the sensors would only provide indicative measurements. People should keep this in mind when installing the sensors at their homes. In 2016 and 2017, Bulgaria experienced cold winters, which led to increased heating with coal and wood and thus, increased air pollution. People realized the increasingly polluted air that was also visible at international web pages that showed high air pollution values for Bulgaria, especially for Sofia. This caused citizens to ask the authorities for explanations, something that was not unnoticed by the media. As a result, Za Zemiata participated in the public consultations about a new air quality plan for Sofia in 2017, which was supposed to be in operation since January 2015. The plan was not of satisfactory quality according to Za Zemiata. The CJEU came with a ruling in 2017, posing infringement procedures for Bulgaria. With the threat of financial fines, the attention of the European Commission and the media, Bulgarian authorities were under pressure.

In the same year, a private initiative started to distribute PM sensors from the German initiative Luftdaten (see Table 2) first in Sofia, later in other places. At that time, out of the six official monitoring stations in Sofia, only one was measuring PM_{2.5} within the city area. The monitoring equipment was not installed at the most polluted areas and the air quality information was difficult to understand, once it was provided by the authorities upon request. The private initiative managed to expand their sensor network to more than 1.000 sensors over the whole country. One of them was also installed in Pernik, a town just outside of Sofia. In this place, use of coal and wood for domestic heating is very high; in addition, there is an old coal-powered power-plant nearby. The sensor was deployed in the city centre, displaying the pollution data on a big screen to the public. Due to the local activities of Greenpeace in Pernik, Za Zemiata became member of the local advisory council⁽⁸⁹⁾ and started consultations with the municipality, resulting in an air quality plan that was adopted there at the end of 2019. The NGO is also providing support to local citizen groups in cities outside Sofia, like Plovdiv, Pernik, Ruse etc., to put pressure on local authorities to adequately address air pollution.

Za Zemiata started also a series of lectures on health effects of air pollution. They were first delivered as physical lectures in some of the bigger cities in Bulgaria, later as webinars and became very popular, also among groups that had no direct connection to environmental activism. Za Zemiata has also good contact with established NGOs that cover different aspects of citizen engagement. A medical doctor (pulmonologist) provided access to health experts and medical doctors to inform them about health effects of air pollution. This has led to more scientific work in Bulgaria about air pollution and human health, e.g., the Bulgarian Academy of Science⁽⁹⁰⁾ has now a research focus on health effects of air pollution and this topic is finally also being discussed at national health conferences. Za Zemiata is also working with university researchers to obtain pollution information for different locations.

Za Zemiata is part of a group of claimants that initiated one class action lawsuit against the municipality of Sofia, challenging the lack of air quality plans and the lack of action by the

⁽⁸⁸⁾ <https://www.greenpeace.org/bulgaria/>; Accessed on 25.03.2021.

⁽⁸⁹⁾ Cities in Bulgaria which have to prepare air quality plans are obliged by law to have this council. Za Zemiata is also in the advisory council of Sofia.

⁽⁹⁰⁾ <http://www.bas.bg/en/>; Accessed on 25.03.2021.

municipality. In order to pay the incurring costs, the group started a crowd funding campaign which covered the expenses to pay for the required expertise in court. Together with some citizens, the NGO challenged air quality plans of Sofia and Plovdiv, but the cases were dismissed by the courts who denied legal standing to NGOs and citizens. These cases received help of ClientEarth and are the basis for an infringement procedure launched by EC in the first half of 2020. Za Zemiata had initiated another court case against national authorities in order to make air quality data from the national monitoring network publicly accessible – to comply with both the Aarhus Convention and the EU law. Over more than two years, several court cases have been fought out, resulting in the decision that national authorities have to deliver hourly air quality data to citizens and citizen groups. Za Zemiata is now pushing the authorities to make both historic and real-time data freely accessible through a web page, easily accessible by everybody. This would also guarantee for more transparency since the way air quality data is presented now by the authorities is not always understandable.

Bulgaria is having increased public health challenges due to the negative effects of air pollution on human health. Because of high consumption of coal and wood for heating and power production, EU air quality limit values are breached many times. However, until recently, some local authorities were still disputing negative effects of air pollution. Za Zemiata is therefore working on the involvement of citizens in developing new air quality plans, to help to shape what measures should be put in place. The NGO has been involved in discussions about a national air quality plan, which was accepted in 2019. They work further on their involvement in policy making at both national and local level via the air quality plans. The involvement of NGOs in this kind of work is, however, rather the exemption. There is a strong push from parts of the government to restrict access to environmental justice, access to funds to NGOs and especially access to funds from abroad, which is strengthened by new national laws.

Za Zemiata is aiming at the development of an influential air quality movement, built on strong citizen engagement and capacity building among local groups. The Polish initiative “Smog Alert”⁽⁹¹⁾ is a good example of developing such a citizen’ movement. It is still a long way to go to guarantee access to justice and the right to clean air in Bulgaria. But the NGO is on a good way, not least thanks to the infringement procedures posed by the European Commission. Sentences by CJEU are important for NGOs to have a pressure on national authorities. Establishing a large citizen movement in Bulgaria would also provide bottom-up pressure to the national authorities. With support of both national and international media, the work for clean air in Bulgaria continues.

This chapter provides only a small piece of the big picture where citizens in Europe take initiative and claim their right to clean air. More examples can be found, for instance, at the web pages of the Right to Clean Air⁽⁹²⁾ project or on the web pages of ClientEarth⁽⁹³⁾.

⁽⁹¹⁾ <https://www.polishsmogalert.org/>; Accessed on 08.09.2020.

⁽⁹²⁾ <https://www.right-to-clean-air.eu/en/project/right-to-clean-air/>; Accessed on 08.09.2020.

⁽⁹³⁾ <https://www.clientearth.org/>; Accessed on 08.09.2020.

7 Conclusions and lessons learned

While in the first decades of European efforts to clean the air, the active stakeholders were industry representatives, in the last decades there is more focus on local air quality which mostly is the responsibility of city administrations and there seems to be an increased interest and participation of the public. This report focuses on air quality information that is publicly available and the measures designed to raise public awareness and abate air pollution from the side of authorities. It presents also efforts of the civil society to gather evidence that would lead to improvements in air quality and also to influence measures to get those improvements. This report shows that citizens' awareness can impact air pollution both, directly through citizen activities and indirectly through influencing public authorities.

7.1 Public authorities

The increasing concern amongst European citizens about environmental issues, in particular air pollution, has resulted in two main challenges for public authorities: (1) they are increasingly challenged about how they provide information about air quality to the public and (2) they are increasingly confronted with legal action against them by citizens/citizens' initiatives that claim their legal rights for clean air.

Public authorities are aware of the importance of informing about air quality in order to raise awareness, both amongst citizens but also amongst policy makers and public administrations. In order to succeed, targeted information campaigns should not be limited to air quality issues only, but should also include effects on health, in combination with practical tips on how to avoid bad air quality or how to reduce air pollution by changing mode of transportation, heating, etc. (EEA, 2019b; URBAN AGENDA FOR THE EU, 2017). Raising awareness and educating citizens about environmental issues is a step towards sustainability, especially when this leads to empowering people to actively make demands to the authorities. Most cities recognize that citizens' demands are important drivers of environmental actions and leads to cooperation of different stakeholders. At the same time, effective citizen participation leads to broader environmental awareness, which can result in changes in attitude and behaviour. Some cities even go a step further by recognizing that it is not only communication that is an essential prerequisite for sustainability, but also civic engagement, public participation and cooperation across institutions (EEA, 2020b). Improved cooperation between different agencies and administrations has been

identified as positive action to oppose silofication and enable implementation of effective measures to improve air quality (Hyland and Donnelly, 2015; URBAN AGENDA FOR THE EU, 2017).

Examples of European networks of cities:

ICLEI – Local Governments for Sustainability

<https://www.iclei.org/>

Eurocities network

<https://eurocities.eu/>

C40 CITIES

<https://www.c40.org/>

Covenant of Majors for Climate and Energy EUROPE

<https://www.covenantofmayors.eu/>

European Green Capital Network

<https://ec.europa.eu/environment/europeangreencapital/applying-for-the-award/egc-network/>

European Green Leaf Network

<https://ec.europa.eu/environment/europeangreencapital/europeangreenleaf/egla-network/>

Examples for EU programmes or initiatives:

ELENA – European Local Energy Assistance

<https://www.eib.org/en/products/advising/elena/index.htm>

LIFE programme

<https://ec.europa.eu/easme/en/life>

UIA – Urban Innovative Actions

<https://uia-initiative.eu/en>

URBACT

<https://urbact.eu/>

Public perception is shaped by a multitude of factors, both extrinsic (e.g., values and attitudes towards the environment) and intrinsic (e.g., perceptions of benefits to both self and society) (EEA, 2020b; Jaensirisak, 2003). Public acceptance is generally higher where public knowledge and perceptions are high, where alternatives and economic incentives are available (ETC/ATM, 2013a). As the example from Stockholm shows, the demonstration of effectiveness of measures is also a powerful tool in changing public opposition to measures requiring changes from the citizens (Eliasson, 2014). In the case of London, clear communication of political manifestos, strong political commitment and leadership was another key success factor for the implementation of unpopular measures (Åkerman et al, 2011). This demonstrates that socio-cultural context is a crucial factor for public authorities to take into consideration while introducing new measures to improve air quality. A benchmarking system for examples of good practice to encourage public information and awareness raising campaigns, such as a Code of Good Practices for cities' Air Quality Action plans as suggested in the URBAN AGENDA FOR THE EU (2017), could be a useful tool for public authorities. However, one always needs to consider how to translate best practices from elsewhere into national/regional/local practices. For this purpose, membership in networks for dissemination of knowledge, sharing of best practices and peer-to-peer learning have been demonstrated to be of advantage for the cities (EEA, 2020b). Examples of such networks can be found in the text box.

7.2 Citizens and citizen groups

European citizens are aware of air pollution issues in their countries. As Eurobarometer reports show, citizens have been identifying air pollution as one of the main reasons for concern since 1999. Recent Eurobarometer reports focusing on air pollution show that the majority of EU citizens are aware of air pollution problems in their country, but they do not feel well enough informed about this issue. The survey from 2019 also indicates that EU citizens have started changing their behaviour by carrying out at least one individual action to reduce harmful emissions into the air. Nevertheless, the majority still sees public authorities and industry as having more responsibility for implementing actions to improve air quality than for example households (EC, 2013 and 2019).

During the last decade, citizens and citizen groups have increasingly exercised their right to clean air by different means. One means is through citizen science activities. These activities can raise awareness and nudge behavioural change, but they have also the potential to bring about political decisions leading to improved air quality in cities, as the example from Milan shows (see 5.1). The examples of Brussels and Flanders (see 6.1) show that scientifically reliable measurements collected by citizen scientists can actually trigger changes in air quality monitoring and obtain the adoption of more effective air quality plans.

Member States are legally bound to transpose the AAQDs into national law. When there are breaches of the AAQDs, citizens can pursue litigation before the national courts. Court cases may end up referred to the Court of Justice of the European Union for a preliminary ruling, when the national judge needs clarification on the interpretation of the provisions of the AAQDs. The examples presented in this report from Germany, Belgium and the UK show that both individuals and citizen groups can succeed. Infringement procedures by the European Commission and media attention have proven to put additional pressure on national authorities to comply with the AAQDs. NGOs can have a stronger position than individual citizens and have other means to lobby and influence policy

Examples of tools for citizens:

The Clean Air Handbook. A practical guide to EU air quality law.

<https://www.documents.clientearth.org/download/6758/>

Legal actions for clean air

[https://www.right-to-clean-air.eu/fileadmin/Redaktion/Downloads/Right-to-Clean-](https://www.right-to-clean-air.eu/fileadmin/Redaktion/Downloads/Right-to-Clean-Air_Europe_Backgroundpaper_2019_english_final.pdf)

[Air_Europe_Backgroundpaper_2019_english_final.pdf](https://www.right-to-clean-air.eu/fileadmin/Redaktion/Downloads/Right-to-Clean-Air_Europe_Backgroundpaper_2019_english_final.pdf)

Legal actions on clean air. Summary 2016-2019

https://www.right-to-clean-air.eu/fileadmin/Redaktion/Downloads/Laymans_report_ENG_Right_to_clean_Air.pdf

makers and public authorities. The DUH, for example, successfully raised enough public awareness through media and other campaigns about air pollution from wood burning and activated other stakeholders which resulted in a new eco-label for firewood stoves. Client Earth's litigation and campaigns in the UK contributed to the implementation of the Ultra-low emission zones (ULEZ) in London, bringing about tangible reductions in key air pollutants. Client Earth could also successfully support citizen groups in several countries, including Bulgaria, Belgium, France, Germany, Italy, the Czech Republic, Hungary, Poland, Slovakia and Romania to pursue legal actions to fully implement the AAQDs in their home countries.

7.3 Towards European cleaner air

The Aarhus Convention from 1998 grants citizens the rights to access information, participate in decision-making in environmental matters and to seek justice ⁽⁹⁴⁾. Directives 2004/107/EC and 2008/50/EC provide the legal framework for air quality in Europe, including setting of legal standards (maximum concentrations of air pollutants in ambient air) and the obligation of authorities to adopt air quality plans that shall include all adequate measures to achieve compliance with those legal standards, whenever they are exceeded. In a number of important rulings, the CJEU has clarified that citizens and NGOs must be able to rely on the provisions of the Directives, if necessary, by taking their governments to court. This is also referred to as "Right to Clean Air

". As the examples described in this report indicate, to move towards fulfilment of this right, there is a need to adopt new ways of collaboration between the civil society and public authorities that would allow an integration of knowledge and approaches available to stakeholders. In this report, we provide a perspective on the "state of the play" on information of air quality and examples from the work of public authorities and civil society. In this way, we are providing what we believe is much needed input towards building the new collaborations that can ultimately realize our Right to Clean Air. EC's Communication on Access to Justice and a related legislative proposal amending the Aarhus Regulation (EC, 2020a,b) to allow for better public scrutiny of EU acts affecting the environment seem to be first steps towards institutionalizing the new collaborations.

⁽⁹⁴⁾ <https://ec.europa.eu/environment/aarhus/>; Accessed on 24.03.2021.

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European Topic Centre on Air pollution,
transport, noise and industrial pollution
c/o NILU – Norwegian Institute for Air Research
P.O. Box 100, NO-2027 Kjeller, Norway
Tel.: +47 63 89 80 00
Email: etc.atni@nilu.no
Web : <https://www.eionet.europa.eu/etcs/etc-atni>

The European Topic Centre on Air pollution,
transport, noise and industrial pollution (ETC/ATNI)
is a consortium of European institutes under a
framework partnership contract to the European
Environment Agency.

