DELIVERABLE

D1.1 Project Vision

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Introduction

Pollution is a major global problem. It causes a wide range of chronic diseases and millions of premature deaths worldwide. In the EU, hundreds of thousands of premature deaths are attributed to ambient air pollution. Pollutants of particular concern are particulate matter (PM2.5) and nitrogen dioxide (NO2) which, in 2019, contributed to 307,000 and 40,400 premature deaths respectively.[1]

When other consequences are factored in (e.g. lost workdays, higher healthcare expenditure, damage to buildings), the sense of urgency to address the problem becomes evident. Studies that attempt to put a price on air pollution show that inaction or a lack of action is more costly than efforts to curb it. One research study found that compliance with EU's legislation on air quality costs member states around €80 billion per year, whereas the cost burden of air pollution on health and economic activities is estimated to be in excess of €300 billion.[2]

It's clear that tackling something as complex as air pollution requires a multi-pronged strategy across many areas. At a fundamental level, steps need to be taken concerning changes to how we travel, produce energy, power our economies, build and heat our homes, manufacture goods, as well as what we eat and buy as consumers. Although environmental monitoring per se does not reduce air pollution, there are at least three ways in which it helps address the problem indirectly: 1) by enhancing our understanding of pollution's impact on people and planet, 2) by educating the public about pollution's harmful effects, and 3) by providing an evidence base for more informed policies and lifestyle choices.

Pollution monitoring in the EU has a long history. It was one of the earliest environmental concerns addressed by the former European Economic Community in 1973 as part of the first Environmental Action Programme.[3] Today, pollution monitoring is probably one of the most comprehensive and advanced sources of evidence that exist in various environmental domains. Nevertheless, a few shortcomings still remain that prevent robust use of pollution data in policy evaluations and impact assessments.

At the EU level, some of the information reported by member states is late or outdated. Moreover, the quality of data often varies and lacks comparability.[4] When dealing with local and regional scales, the granularity of data is not always sufficient to allow meaningful policy analysis. In part, this is due to the limited overview of air pollution in urban micro-environments, Because official monitoring stations tend to be few and far between, it is difficult to obtain good representative coverage of an entire city. Citizen science has the potential to fill this gap by providing high-resolution spatial and temporal data at the neighbourhood level. But, despite the concept being around for a few decades, citizen science is still considered a non-traditional data source in policy circles. Further efforts are needed to build its acceptance by decision makers at different levels of government.

[1] https://www.eea.europa.eu/publications/health-risks-of-air-pollution/health-impacts-of-air-pollution
[2] https://ec.europa.eu/environment/air/pdf/clean_air_outlook_economic_impact_report.pdf
[3] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:C:1973:112:FULL&from=EN
[4] https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=SWD:2021:141:FIN

Determined to make this happen, a pan-European consortium of 15 partners launched the COMPAIR project within the framework of Horizon 2020 programme. COMPAIR will engage the entire urban value chain in pollution monitoring and analysis, with a special focus on people from lower socioeconomic backgrounds and geographic contexts with less developed citizen science culture e.g. Eastern and Southern Europe. Thanks to COMPAIR, local stakeholders will get a comprehensive, accurate and easily accessible view of pollution in places not covered by official monitoring stations. They will be able to see how pollution affects them individually and what its broader impacts are, or will be in case of inaction, on the economy and environment. Leveraging these insights, members of the quadruple helix community will be able to co-create appropriate measures and strategies needed to set smart cities on a more carbon-neutral footing and reduce air pollution to levels that are considered safe for all.

To flesh out this ambition, a visioning session was organised at the kick-off meeting in November 2021 in Ghent. It offered partners a chance to activate their foresight skills and imagine how a better world would look if the project is successful. The session followed a workshop format, with three groups of between 6 and 10 participants working in parallel on tasks prepared in advance by the moderator. Each group had a mixed composition in terms of partner profile e.g. a pilot city, a technology provider, a research institute. This ensured strong interdisciplinarity within teams and helped gather diverse opinions on the multi-dimensional issue that is air pollution.

Workshop tasks were linked to key focus areas where the project wants to make a difference:

- **Mobilisation of the entire urban value chain** in tackling air pollution i.e. the quadruple helix model
- **Change in attitudes and behaviour** among individuals and groups needed to reduce air pollution
- **Technical and cultural change** needed to make citizen science data more robust and accepted by policy makers
- **Policy change** driven by the twin transition that all European cities and regions must embrace if they are to meet EU's digital transformation and Green Deal objectives.

Figure 1. Vision workshop

Ideas generated during the workshop were processed to create a vision for COMPAIR. To make it easier for partners and others to grasp the essence of the project, four short statements are presented first (one per focus area). An extended version pulling together key ideas from the four statements is provided separately afterwards. The section that follows ('approach') describes the vision building process. It introduces the reader to workshop tasks and offers a more detailed description of results that served as input to the vision statement.

1. COMPAIR vision

1.1 Vision Building Blocks

COMPAIR is a complex project enacting change over a number of different areas. The central defining vision elements are:

- ***Urban value chain:*** COMPAIR brings together members of the quadruple helix community to co-create effective place-based solutions to mitigate air pollution and other related urban challenges. The multi-stakeholder collaboration exhibits high levels of trust and inclusivity, with grassroot communities, researchers, industry experts and policy actors working side by side to make the vision of zero pollution a reality.

- ***Behavioural change:*** COMPAIR stimulates behavioural change by increasing environmental awareness among urban inhabitants. Commuters, car drivers, home owners, business managers and even climate sceptics develop a well-rounded understanding of how their action and inaction contributes to, or helps mitigate, climate change and air pollution in the city. Better awareness encourages people to engage in citizen science initiatives and improve their environment, for example switching to more sustainable everyday practices, and participating in urban policy making processes.

- ***Technical change:*** COMPAIR uses novel data collection and cloud calibration techniques as well as advanced data management processes to make citizen science data policy-ready. As a result, local and regional administrations have more fine grained information at their disposal to enact evidence-based policies. Moreover, as authorities trust the data quality they use citizen science as an additional datasource for policy making without fear of public humiliation and legal battles, as they know grassroot initiatives are working with, not against, them when it comes to air pollution.

- ***Policy change:*** COMPAIR unlocks insights from traditional and citizen science data by making information available through a Local Digital Twin. Not only does this help policy making become more data driven, experimental and forward-looking, it provides cities and regions with an enhanced capacity to monitor and simulate measures required to achieve carbon neutrality and zero pollution objectives within the framework of EU's Green Deal.

1.2 Vision Statement

The Vision Statement defines purpose and values of the project and will be used to help shape and guide the COMPAIR Consortium culture and delivery processes.

Inspired by its results, cities and regions across Europe are following COMPAIR's approach to tackle one of the most persistent 'wicked' challenges in the developed world: air pollution. Having tried to solve the problem with only public and private sector measures, new adopters are starting to realise that success is unattainable unless the full urban value chain is involved. This requires setting up a multi-stakeholder platform where representatives of research and civil society work alongside government and industry to co-define a collective approach to the problem.

From COMPAIR's best practice guide on stakeholder engagement, new adopters know that members of the quadruple helix community vary according to level of power and interest. While it might be tempting to dismiss those at the bottom end of the matrix (low power, low interest), these groups absolutely need to be part of the action, otherwise the full urban value chain is present in name only. A truly inclusive space is one where not only high-level categories are represented (policy, industry, research, society), but also groups that traditionally have been excluded from decision making structures either by choice or due to their disadvantaged position e.g. low-income status, migrant background. A successful citizen science initiative would ensure that i) people who have low interest at the beginning become supportive of project objectives as the initiative develops, and ii) those with low power are connected to and heard by those who can mobilise resources to catalyse change on the ground.

Participation in several co-creation workshops with other stakeholders does not guarantee behavioural change. That is why COMPAIR tested a range of pathways to see which ones work best for different groups. Building on this knowledge, new local and regional initiatives leverage motivation and group dynamics to turn quiet residents into active citizens. Showing people that their actions matter, that data they collect will ultimately be used by public authorities to make better policies, provides a strong incentive in this regard. Additional measures can be used to convert specific groups e.g. clear demonstration of privacy and security standards in project tools (people distrustful of tech and digital newbies), community awareness platforms that emphasise local effects of climate change (climate sceptics).

Thanks to these efforts, the level of environmental awareness among city inhabitants increases substantially. Armed with a more in-depth understanding of the complex relationship between lifestyle choices, air pollution and climate change, people gradually abandon carbon-intensive activities in favour of greener alternatives. They change their travel and shopping habits. They try new ways of heating homes and cooking food. Many also show interest in civic participation, some for the first time. Climate change and air pollution become issues that people hold dear and want to do something about, including by measuring them through low-cost sensors.

Once frowned upon by public officials, data collected by citizens now carries the policy-ready label. To achieve that, COMPAIR had to introduce several innovations aimed at improving data quality from DIY and portable measurement devices. The main ones include a new

cloud calibration pipeline for continuous benchmarking to reference stations, as well as new processes to improve data curation, analysis, filtering and interoperability with third-party systems.

The integration of citizen science into policy making offers cities several advantages. It allows local policy makers to get a more complete view of pollution in urban micro environments. Trends and dynamics of ambient air quality can now be better assessed than before when only one source of information was used i.e. data from official reference stations. Once the true situation with air pollution is known, decision makers can make a more accurate assessment of its impact on human health, economy and the environment, and then use this information to respond accordingly with appropriate new measures.

Arguably, it is this novel monitoring framework which combines, among other things, citizen science data and advanced decision support tools like Local Digital Twins, that is COMPAIR's main legacy. The framework provides a robust digital monitoring and reporting system for public authorities to understand the state of air pollution at different spatial and temporal scales. This information can be leveraged to find out whether KPIs to be achieved as part of the Green Deal are being met and, if not, where additional progress is needed (pollution types, sources, sectors etc.), and how best to achieve it.

1.2 North Star

Unlike the longer term Vision Statement which projects 10 years plus into the future, the less-explicit North Star vision is one that provides a guidepost for the 3-year project. It should be used to open each project meeting to reinforce the project goal and ensure all work is guided by shared values so COMPAIR will deliver upon its promise of improving people's lives.

COMPAIR leverages the opportunity provided by citizen science (CS) to:

- **Increase the value of CS data through globally-relevant local urban use cases**
- **Enhance public participation in achieving Green Deal goals and targets**
- **Foster an open technical and policy environment that drives sustainable change.**

2. Approach

The vision presented above is a self-contained document. Those who want to learn about the process behind it are encouraged to read this section, which delves deeper into workshop tasks and results that were produced at the end of the visioning session.

Task 1: Quadruple helix

When it comes to air pollution, it is easy to point the finger at governments and businesses for not doing enough to address the problem, or to think of them as actors with ultimate responsibility to do something about it. This simplistic view, however, ignores the role of other stakeholders, notably research and civil society, in the fight against air pollution and climate change. COMPAIR believes that all four have something to bring to the table. If the ambition of zero air pollution is to be achieved, the entire urban value chain must be mobilised for a common cause.

Policy makers can provide the necessary regulatory framework along with incentives and "sticks" to induce the required change among citizens and businesses. Industry might conjure up images of polluting factories and fleet of trucks, but it's a broad category that includes many innovators who develop, test and adopt new technologies, business models and services that directly and indirectly contribute to pollution reduction, including by improving our knowledge of the problem and steps that can be taken to address it. The research community is important for its source of scientific methods needed for a robust measurement of air quality. It also serves as an important mechanism for knowledge transfer and capacity building among non-specialist groups who might have an interest but not necessarily the right skills to properly engage in air quality monitoring. Civil society, for its part, can be both a receiver and an influencer. It can incorporate best practices shared by the research community and then spread them further among grassroot groups with a view to building a community of local data collectors. In its capacity as an influencer, civil society can produce local champions to act as a bridge between citizens and policy makers. Civil society can also assume the role of a compliance watchdog, with an important task keeping the pressure on worst polluters and policy makers for their action or inaction.

Using this general description as a base for discussion, the workshop teams had to identify specific examples of stakeholder groups (policy, industry, research, society) within the quadruple helix model. Next, the stakeholder groups had to be mapped onto the power/interest matrix, which is a four-quadrant typology that categorises stakeholders according to their interest and level of power. Power means influence over processes, data, policy, technology, communities, resources, and so on. It varies from low to high. Interest means interest in the project and topics related to COMPAIR. It also varies from low to high. According to the resulting typology, a stakeholder can be low power/low interest, low power/high interest, high power/low/interest, and high power/high interest.

1) Low power/low interest: This category includes stakeholders that have limited power to influence processes shaping social, economic and technological developments. Moreover, these stakeholders lack interest in topics related to global warming and air pollution.

Examples include climate change deniers and social groups for whom these topics are of secondary or even tertiary importance e.g. low-income households, immigrants, the elderly. Stakeholders in this category are seemingly unimportant to COMPAIR. But that couldn't be further from the truth. **The project is keen to engage them and, depending on circumstances and individual situations, strengthen their collective voice while at the same time piquing their interest in green objectives.**

2) Low power/high interest: This group may include stakeholders that had transitioned from the low power/low interest category due to a change in circumstances and/or increased interest in the topic. But there are also specific subgroups that are unique to it e.g. young people who generally have low power but widely support the green agenda; volunteers at environmental charities; cyclists; pedestrians; climate change activists; sensor developers. As their interest is already high, **COMPAIR should try to connect them with those who have high influence to catalyse local change.**

3) High power/low interest: Stakeholders in this category are generally quite influential but do not necessarily share the same green agenda as COMPAIR. Examples include oil and gas companies that have a stake in fossil fuels; certain right-leaning media organisations that question net zero, the speed at which the ambition is being implemented, and the proposed set of measures to achieve it; manufacturers of cars with internal combustion engine; insurance companies that see green transformation as less risky (to health, environment, economy) and therefore less profitable; government statistical offices that view citizen science data with some incredulity. The goal for COMPAIR is to **increase this group's level of interest and connect them with those from the low power/high interest category.**

4) High power/high interest: These stakeholders are decision makers that have the biggest impact on the project success, and so should be actively engaged and consulted. At the workshop, the most prominent examples identified in this category were public authorities, departments and officials dealing with some or all of the following: local and regional development, urban planning, environmental modeling, sustainable mobility. Also influential research institutes and think-tanks whose outputs generate a lot of media coverage were identified as belonging to this category. One interesting example that was suggested at the workshop was 'pharmacists and medical doctors' together with health insurance companies. A group that proposed them argued that they are high power/high interest because of their influence over patients' lifestyle choices. These professionals can elicit change in people's behaviour (e.g. by encouraging to do more walking or cycling) but also need a collection of best practice examples and local initiatives to refer to when making a recommendation. For them and other stakeholders in this category, **COMPAIR should be ready to provide validated pilot case studies as soon as they become available to amplify the message and maximise the impact of project results.** Where possible, the high power/high influence group should be connected to stakeholders with a low power status. Ideally, they will also provide a motivation for their peers with high power but low interest to endorse COMPAIR and its vision.

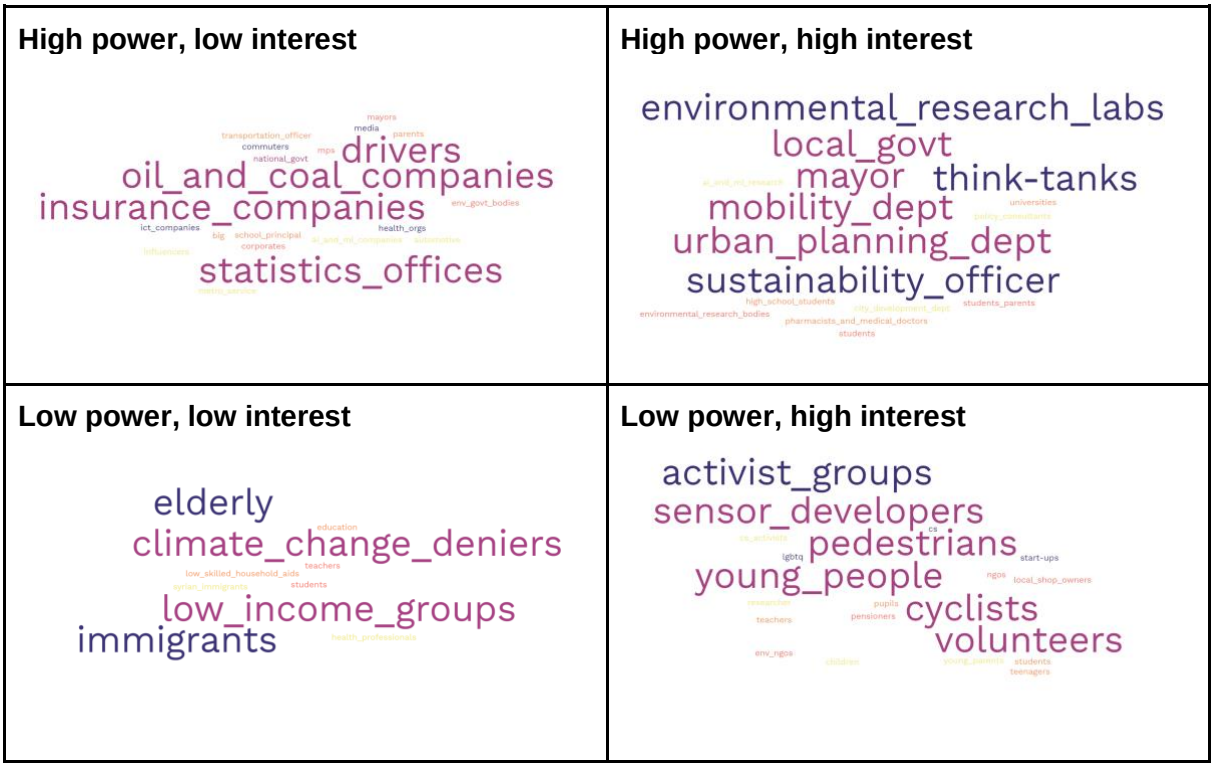


Figure 2. The power-influence matrix showing Task 1 results

Task 2: Behavioural change

This task sought to identify possible motives for people to change their behaviour in two areas: environmental awareness and civic participation. Environmental awareness is about understanding one's role in sustainable development. It's about how people treat the environment, how they contribute to, or help mitigate, climate change and air pollution through everyday choices. The participation dimension is concerned with how active people are in addressing these problems. Are they mostly complaining about them or do they take concrete steps to make the situation better, for instance by collecting citizen science data or attending round-tables with policy makers?

To promote behavioural change in these two areas, the workshop teams had to identify enabling factors that would allow i) quiet residents to become active residents, ii) people who are generally distrustful of technology to become avid data and tech users, iii) people in denial (e.g. about climate change) to embrace the net zero agenda, iv) someone who is used to making carbon-intensive choices to start thinking about their carbon footprint and eventually switch to green alternatives instead.

Quiet residents → active citizens

To help citizens become more active, inclusion centered co-creation workshops can be organised where local residents along with other members of the quadruple helix model jointly identify problems and their solutions. If citizens see that their actions matter, if data they collect is ultimately used by public authorities to make better policies, they will have a strong incentive to get involved in environmental monitoring.

An important motivating factor is group dynamics. As people work with peers to discuss common issues and obtain results with a wide societal impact, they become more embedded in the local community. Their sense of belonging increases and with it - a desire to do something useful for one's place and people who live there.

One of the workshop groups highlighted rewards as an impetus for participation. Depending on the target audience, rewards can vary from vouchers in local supermarkets to grades which can be offered to students for completing extracurricular activities. Presenting citizen science as something cool and fun can be an effective way of reaching young people. Using influencers on social media, local champions, community or religious leaders to spread the word about COMPAIR can also help in this regard.

Finally, emphasising emotional aspects of citizen science in TV documentaries and testimonials can activate the drive for civic participation not just among youth but other demographic groups as well e.g. migrants, the LGBTQ+ community.

Distrustful of tech → data and tech users

To help people overcome tech biases, COMPAIR would need to demonstrate that privacy and security standards have been properly integrated into all of its tools, apps and services. Short teasers explaining how the technology works and what benefits it can bring to different stakeholders should be developed before the public round starts. Some gifts (e.g. vouchers) can be considered by pilot teams to encourage digital newbies to test DIY sensors, SODAQ sensors or COMPAIR's AR apps, for example. Such incentives should be complemented with a targeted dissemination campaign comprising user stories, infotainment and training, to increase traction.

Some people might not have the required technical skills. They may not be familiar with any programming languages, visualisation techniques or different hardware components that a DIY sensor is made of. Still, it would be important to engage such groups in datathons, offering them a chance to provide a non-technical contribution during the event, which is equally important e.g. a local perspective on air pollution, ideas for a policy proposal.

Finally, all groups agreed that those COMPAIR tools that have a public facing interface should have an intuitive UI and an option to ingest crowdsourced data e.g. images or videos of air pollution. A gamification component can also be added (e.g. various smiley faces to evaluate air quality) to complement 'dry' environmental data with emotions that people experience with regards to air quality at a particular place and time.

Climate change deniers → pro-green transition

It might be too optimistic to believe that COMPAIR can easily sway the opinion of climate skeptics. After all, these people tend to disregard science or at least firmly believe that the role of human factors in global warming is overstated. Nevertheless, the workshop groups agreed that COMPAIR should be ready to engage climate change deniers with appropriate messaging and tools. In particular, it was noted that proximity factor should be emphasised in communication on climate change. So, for instance, instead of talking about melting glaciers, it would be better to emphasise local effects of climate change e.g. fires in Greece, flooding in Belgium. Another useful approach could be to demonstrate individual impact

through a community awareness dashboard. Such a platform would need to be transparent about the underlying data and formulas used to calculate individual footprint. To increase trust in results, there should also be a methodological note outlining strengths and weaknesses of the chosen approach, as well as a community forum for people to express their opinion on the subject, both negative and positive.

Carbon intensive choices → green choices

The final part of the block on behavioural change looked at the requirements for a transition to more sustainable choices, which can take many forms e.g. switching to electric vehicles, using more public transport and car sharing, installing solar panels, replacing gas boilers and coal burning with heat pumps, eating less meat, and so on. But what does it take to embrace the green transition? Workshop participants thought that it could be a mix of 'carrots and sticks'. The latter can include restrictions, taxes and fines on polluting products and practices, whereas incentives can range from VAT exemptions for bicycles, for example, to grants for energy improvements at home.

It was noted that equipping people with the right knowledge is important. People need to know both why an action is important and how to do it properly, especially if it's unfamiliar territory for them. In this regard, proponents of the green transition should emphasise the kind of benefits that the conversion would bring in the long-run (e.g. reduction in heating costs, better air quality), while also being transparent about any drawbacks that may surface in the short or medium term, and how to deal with them.

As with other dimensions of behavioural change, the role of leaders was emphasised as crucial for driving transition to sustainable choices. Community champions, religious leaders, celebrities or local activists that command respect among peers can, by endorsing certain behaviours, change the way people think about the environment and their role in driving sustainable development. During the upcoming stakeholder mapping task, COMPAIR should identify and try to leverage leaders locally, as well as distant public figures e.g. social media influencers.

COMPAIR's efforts to stimulate behavioural change would also benefit from the review of established theories and practices. One theory in particular that is worth considering is Theory U developed by MIT.[5] It includes five stages: co-initiating, co-sensing, presencing, co-creating, and co-evolving. The journey through the U develops seven essential leadership capacities needed to address the root causes of today's social, environmental, and spiritual challenges. These capacities include holding the space of listening, observing, sensing, presencing, crystallising, prototyping, and co-evolving.

Task 3: Technical change

Citizen science data is often criticised for being low quality and unreliable, hence the low uptake by policy makers. To brainstorm pathways for marking citizen science data more attractive, a task on technical change was introduced at the workshop. The goal was to

[5] https://www.presencing.org/aboutus/theory-u

encourage participants to think about ways in which citizen science data could be improved during the project so that it lends itself to urban policy making.

Quality is an important but not the only challenge that may hinder the adoption of citizen science data by public authorities. The fear of public outcry and court battles that may ensue following the publication of findings exposing drawbacks in government policy is another major barrier. Those readers who tend to downplay this factor are reminded of a recent court ruling on air pollution in Brussels. Everything started in 2016, when a few citizens together with an environmental charity brought a case against the government for breaching maximum levels of fine particulate matter (PM10) and nitrogen dioxide (NO2) pollution, which mainly come from road traffic.[6] Fast forward to 2021, the court ruled that the government of the Brussels capital region had flaws in its air pollution monitoring which put residents' health at risk, and ordered the authority to install more monitoring stations or face daily fines for non-compliance.

On the one hand, we should be happy that civil society won in this case. On the other hand, outcomes like this one might strengthen the negative perception of citizen science among policy makers, who could start viewing well-intentioned grassroot environmental monitoring initiatives as an attempt to shame or even sue them for any negative consequences that their measures might have caused. For COMPAIR, it's important to prevent project activities from being seen in this light. Participants were therefore asked to propose strategies for integrating citizen science data into urban policy making without alienating public authorities.

Ways to improve the quality of citizen science data

Most of the recommendations to achieve this include technical measures, such as:

- Validation and calibration of citizen science data using data from official monitoring stations
- New processes to improve data curation, analysis, filtering and interoperability with third-party systems
- A cloud calibration pipeline for continuous benchmarking to reference stations
- Use of dynamic data sources to minimise manual interference and potential for inaccuracies

Among the non-technical measures, workshop groups highlighted the need for better training on data collection and the addition of NO2 sensors to the citizen science network.

Ways to integrate citizen science data in urban policy making

First, it might be useful to corroborate accuracy by providing access to validation reports. Once the technical teams in public authorities give their endorsement, policy makers would be more willing to make informed decisions based on citizen science data. For citizen science data to be attractive, it must also have something that official monitoring data lacks e.g. better snapshots of air pollution in urban micro environments. This unique selling point should always be emphasised when communicating with public authorities.

Ideally, citizen science data would be readily available for viewing and downloading on an open access web portal, where official and citizen science datasets can be turned on and

[6] https://www.politico.eu/article/court-finds-brussels-regional-government-not-doing-enough-to-fight-air-pollution/

off, mixed and matched, at will in a few clicks. Both dataset types can be used at hackathons to create innovative apps and services for the city. Hackathon results or standalone citizen science findings can generate a lot of media interest. When this happens, local teams should refer to news articles to demonstrate the potential of citizen science data to be a force for positive change.

Ways to work in tandem with public authorities on the above

The main recommendation here is to involve them in project activities from the outset using a participatory approach. Just like citizens, policy makers should be engaged in all project stages, from problem formulation to solution development and results validation. How to deal with findings that might be considered too sensitive should be discussed in advance. If public authorities see that there is no intention to name and shame them or, worse, to hold them accountable for action or inaction, chances are they view citizen-led air monitoring in a positive light, as something that genuinely helps them solve a problem, not something that tries to create more problems for them.

Task 4: Policy change

A major transformation of the EU's economy is underway. The European Green Deal, announced by the Commission in 2019, sets out to make economic development more sustainable by decoupling growth from fossil fuels. The scope of this legislative package is massive. It covers everything from agriculture to transport to the built environment. This means that literally everyone - governments, businesses and households - will be affected by the green transition one way or the other.

Although air quality is not a key focus of the policy, the Green Deal does call for better monitoring, reporting and prevention of different kinds of pollution (e.g. air, water, soil) to build a healthy planet for all.[7] In support of this ambition, the Commission recently adopted the EU Action Plan Towards Zero Pollution for Air, Water and Soil. This document is important for COMPAIR for two reasons. First, it explicitly acknowledges the role of Local Digital Twins in helping cities tackle complex environmental and planning challenges:

> *"Local Digital Twins are also powerful means to improve the resource management and decision-making of cities and communities in order to, for example, pursue their zero pollution ambitions."*

Second, the Action Plan includes several targets to be achieved by 2030, some of which are worth keeping in mind when designing COMPAIR's digital tools. In total, there are six objectives that aim to reduce:

1. by more than 55% the health impacts (premature deaths) of air pollution
2. by 30% the share of people chronically disturbed by transport noise
3. by 25% the EU ecosystems where air pollution threatens biodiversity
4. by 50% nutrient losses, the use and risk of chemical pesticides, the use of the more hazardous ones, and the sale of antimicrobials for farmed animals and in aquaculture

[7] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52019DC0640

5. by 50% plastic litter at sea and by 30% microplastics released into the environment
6. significantly total waste generation and by 50% residual municipal waste

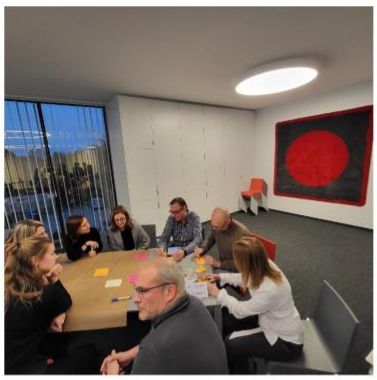
Those most relevant to COMPAIR are O1 and O2. With regards to O1, key indicators for measuring health and environmental impacts are exposure to PM2.5 and NOx. With regards to O2, the indicator looks at the number of people experiencing high noise levels i.e. above 55 dB Lden. COMPAIR would be well-advised to integrate these KPIs into technical outputs to demonstrate alignment with and contribution to high-level EU missions.

3. Conclusion

Having a clear vision is vital for any project that wants to leave a lasting impact. At COMPAIR, we use vision to imagine how a better world would look if the project is successful. A picture with four impact areas emerges. It would be a world 1) where grassroot communities, researchers, industry experts and policy actors work side by side to make the vision of zero pollution a reality, 2) where people are increasingly aware of their impact on the environment, so much so that they abandon carbon-intensive choices in favour of greener alternatives and become actively involved in environmental monitoring as citizen scientists, 3) where public authorities use data collected by citizens with confidence, and 4) where cities and regions benefit from advanced decision support systems to check if they are on track to reaching Green Deal objectives.

The vision statement is a lighthouse that will guide our efforts in the years to come, whether it's engaging with stakeholders, working on project deliverables, or motivating partners to go out of their way to make COMPAIR a success. That said, the vision is never fixed. Internal changes within the project, ground-breaking results, major external shocks like the ones we have witnessed since 2020 all can necessitate changes to the original version. So, to ensure its relevance, we will be reviewing our vision statement at least once a year against progress made and any megatrends driving change globally.

Appendix A: Vision workshop results








Appendix B: Vision factsheet