

# Final Instruments

EC Technical Support Instrument Grant Agreement number  
101046124

Call: TSI-2021-SMARTCITIES-IBA

Topic: Citizens participation and green solutions in smart cities

Type of action: TSI-PJG

## **Deliverable 1.12: Final Instruments**

Delivery Year: 2023



*This project has received funding from the European Union's Technical Support Instrument (TSI) programme under grant agreement 101046124.*

## DOCUMENT INFORMATION

<b>Project Number</b>	101046124	<b>Acronym</b>	CitiMeasure
<b>Full title</b>	CitiMeasure - using citizen measurements to create smart, sustainable, and inclusive cities		
<b>Project URL</b>	<a href="https://citimeasure.eu/">https://citimeasure.eu/</a>		
<b>EU Project officer</b>	Aleksandra Marchewka		
<b>Deliverable Number</b>	D1.12	<b>Title</b>	<i>Final instruments</i>
<b>Work package Number</b>	1	<b>Title</b>	<i>Instrument development and pilots</i>
<b>Date of delivery</b>	<b>Contractual</b>	Month 23 <i>April 2023</i>	<b>Actual</b> Month 23 <i>April 2023</i>
<b>Dissemination Level</b>	Public		
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<b>Abstract (for dissemination)</b>	This report presents the final version of the three CitiMeasure instruments.		
<b>Keywords</b>	Final instruments, guidelines, comparability tool		
<b>Version Log</b>			
<b>Version as date</b>	<b>Author</b>	<b>Partner</b>	<b>Change</b>
2023_02_28	Mohammad Gharesifard	Eurocities	Refinement of the draft versions of the instruments
2023_03_31	Irene Vivas Lalinde	Eurocities	Initial document creation and inputs
2023_04_04	Loë Guthmann	Eurocities	Inputs to different sections of the document
2022_04_06	Brooke Flanagan	Eurocities	Final internal review
2022_04_26	Farida Polsbroek	BZK	Final external review

### To cite this document:

Gharesifard, M., Vivas Lalinde, I., Guthmann, L., Flanagan, B. (2023). D1.12 Final instruments. *Deliverable report of the CitiMeasure project (grant agreement No101046124), Brussels, Belgium.*

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## Acronyms

<b>BZK</b>	Ministry of the Interior and Kingdom Relations of Netherlands
<b>CS</b>	Citizen Science
<b>D</b>	Deliverable
<b>DG</b>	Directorate General
<b>DOI</b>	Digital Object Identifier System
<b>EC</b>	European Commission
<b>EU</b>	European Union
<b>ICTU</b>	Information Communication Technologies (ICT) Foundation
<b>ICL</b>	Imperial College London
<b>JRC</b>	Joint Research Centre
<b>NDRI</b>	Natural Disaster Research Institute
<b>NILU</b>	Norwegian Institute for Air Research
<b>RIVM</b>	Dutch National Institute for Public Health and the Environment
<b>SAMHE</b>	Schools Air Quality Monitoring for Health and Education
<b>Scivil</b>	Citizen Science Vlaanderen
<b>UCD</b>	University College Dublin
<b>ULB</b>	Université Libre de Bruxelles
<b>UK</b>	United Kingdom
<b>UWE</b>	University of Western England
<b>VITO</b>	Flemish Institute for Technological Research
<b>WG</b>	Working Group

# 1 Executive Summary

This report presents the final versions of the CitiMeasure instruments: the Guidelines on Behaviour & Policy Change, the Guidelines on Competencies for Digital Inclusion, both available online, and CitiAIR, an online inventory of air quality monitoring initiatives. It provides insights into how the instruments have been refined and an updated list of contributors to the co-creation process.

## 2 Introduction

### 2.1 ABOUT CITIMEASURE

Citizen measurement, or citizen science, initiatives contribute to a sustainable transition in European cities. By using an array of tools and instruments, citizens can play a role in the measurement and monitoring of indicators on air quality, temperature, soil moisture, biodiversity, or risk management, among many other environmental areas. Citizen measurement initiatives also can foster communications and interactions among stakeholders and contribute to the democratisation of science and policy. The CitiMeasure project (2021-2023) aims to bring together the experiences and expertise of European cities, organisations and networks in implementing citizen science initiatives (in the form of guidelines, toolbox, web-platform, Apps, etc.). The project builds upon the lessons learned from the Dutch City Deal WGs, a network of stakeholders working on the broader area of smart cities, including citizen measurement initiatives. The City Deals are an instrument of the Dutch Ministry of Interior Affairs and Kingdom Relations. One of these is the City Deal 'A smart city'. CitiMeasure builds upon these experiences and has used those to develop and pilot three 'instruments', namely:

1. An instrument that allows the outputs of different city measurement initiatives to be compared.
2. An instrument that safeguards the digital inclusivity of city measurement initiatives (maximising the opportunities for participation of interested individuals and communities).
3. An instrument that connects information to behaviour and policy change.

A 4th WG, Strategy and Oversight, focuses on providing strategic direction and ensuring cohesion of activities across the three Instrument Sub-Groups and the project in general. CitiMeasure is also raising awareness of the importance of citizen measurement initiatives and capitalising on the results and tools of similar citizen science projects by creating an online European Knowledge Centre with a repository of good practices.

### 2.2 PURPOSE OF THIS REPORT

This report includes the outputs of the work of the CitiMeasure working groups with more than 40 experts, researchers, and local representatives over one and a half years. It showcases the key elements of the final versions of the three CitiMeasure instruments, as well as insights into the refinement of the instruments. D 1.6 Prototype instruments provides more information about the methodology used, and D1.11 Final implementation plan describes the overall instrument development and piloting process.

## 2.3 STRUCTURE OF THIS REPORT

The final version of the guidelines produced by the Behaviour & Policy and Digital Inclusion working groups are presented in sections 3 and 4. These sections include screenshots of the final products with descriptions and the link to the web publications. Section 5 describes the interactive tool developed by the Comparability working group, named CitiAIR. The report concludes with section 6.

# 3 CitiMeasure Guidelines on Behaviour & Policy Change

## 3.1 FINAL OUTPUT

The **CitiMeasure Guidelines on Behaviour & Policy Change** [\[link here\]](#) aim to advance the understanding of policy and behavioural change aspects of citizen science. The final publication comes in the form of an interactive online document, presenting the final results in a visually engaging way.

The guidelines target those initiating citizen science projects and/or those who aim to study or improve current practices in existing citizen science initiatives. They include challenges and applications of citizen science and recommendations – 65 in total under ten overarching categories – for cities and citizen science initiatives on how to foster policy and behaviour change using citizen science.

The recommendations presented in the guidelines are built on a wealth of theoretical and empirical insights from 59 resources and 35 representatives from 19 European cities, and seven organisations, including academia and (non-)governmental organisations. As such, these guidelines reflect the collective understanding and experiences of a community with interest and expertise in the topic.

The Guidelines on Behaviour & Policy Change are one of three main CitiMeasure outputs presented in the [Knowledge Centre](#). They are displayed in tandem with [CitiAIR](#) (see section 5.1) and the Guidelines on Competencies for Digital Inclusion (see section 4.1).

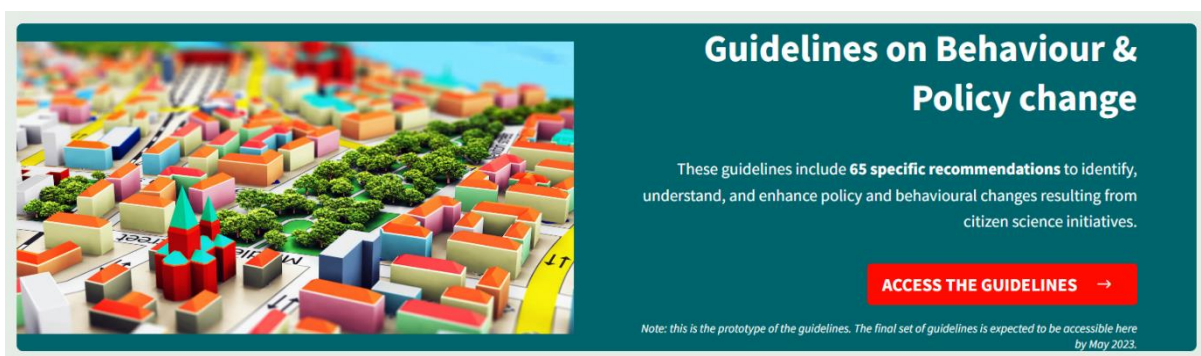


Figure 1: The Behaviour & Policy Guidelines in the Knowledge Centre

Via "Access the Guidelines," the user reaches the tool for Guidelines on Behaviour & Policy Change (see Figure 1).



Figure 2: Interface of the CitiMeasure Behaviour & Policy Guidelines

The landing page of the guidelines (Figure 2) presents the title of the publication, a short subtitle, an image of citizens working on a project, and the logos of the European Union, CitiMeasure and Eurocities.

There is a navigation bar at the top of the page through which the user can easily jump between different sections. Arrows on the right allow the user to turn pages or get to the end of the publication. On the top right, the user can look for keywords, share the publication on social media or via email, download it as a PDF file, or activate the full screen mode (see Figure 3).



Figure 3: Title page of a chapter

Every time a new page is opened, there is some form of micro-animation involved. A balance was struck between basic movement and functional interactivity, without taking away attention from the content. The objective here was to avoid the publication being mistaken for a PDF file.



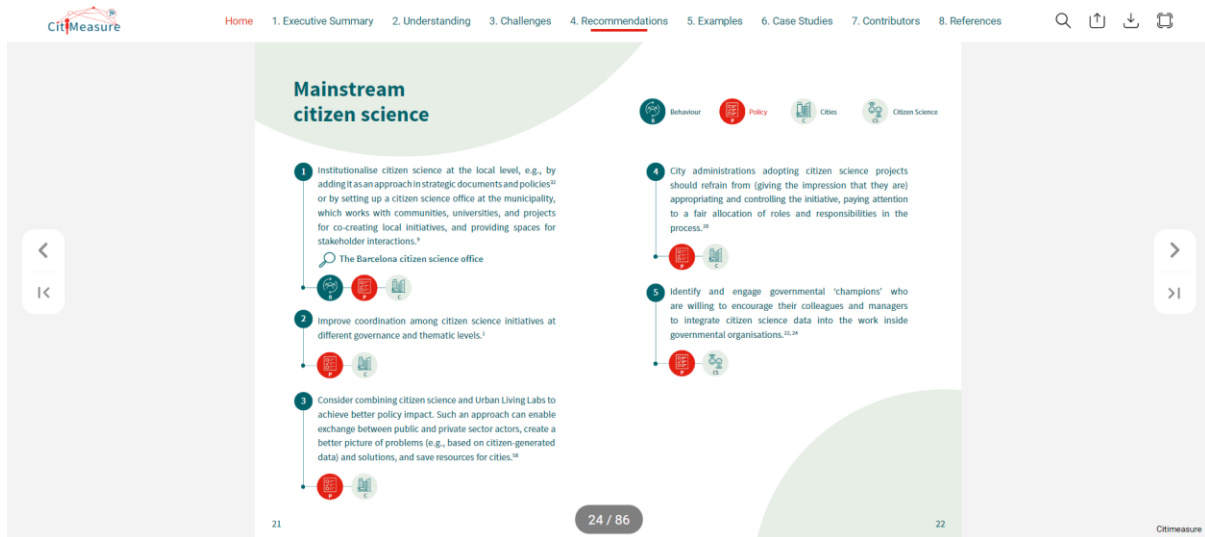


Figure 4: Recommendations developed by the CitiMeasure working group on Behaviour & Policy

Throughout the publication, icons are used to help guide the user (see Figure 4). The 65 recommendations are accompanied by concrete examples, the access to which is only a few clicks away (see Figure 5).

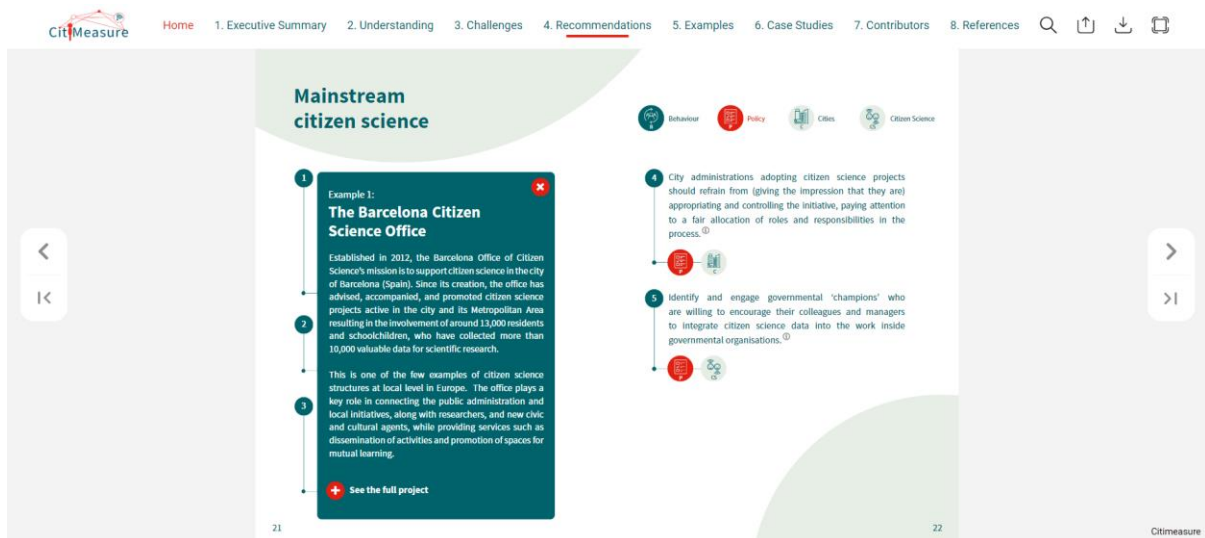


Figure 5: Examples of recommendations in practice

The project's colours – green, red, and grey – are applied strategically to provide clarity and distinguish between different sections of the publication (see Figures 6, 7, and 8).

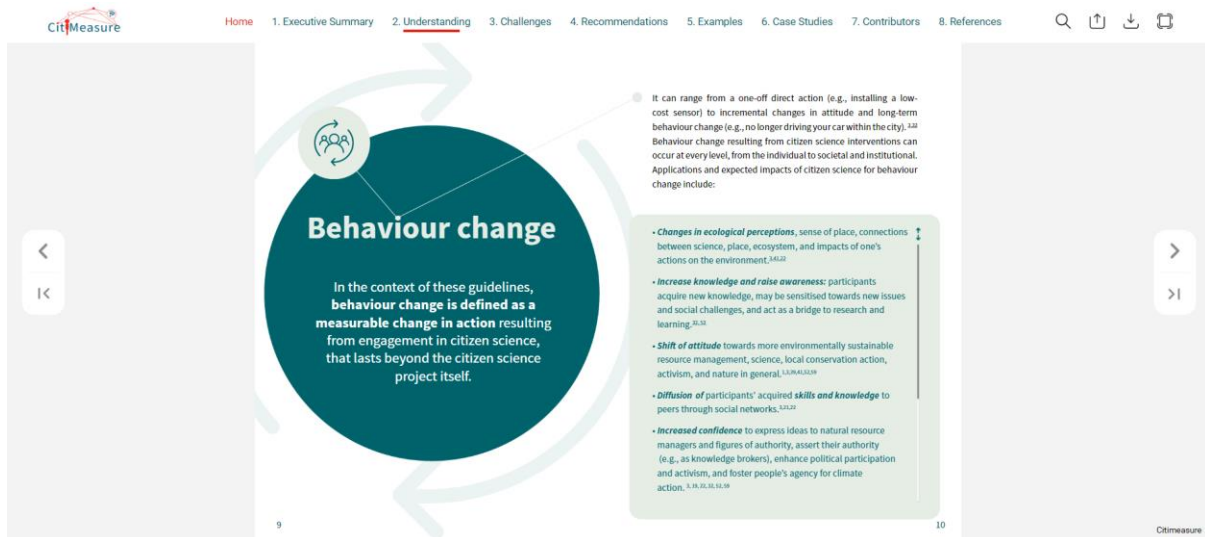


Figure 6: Behaviour change

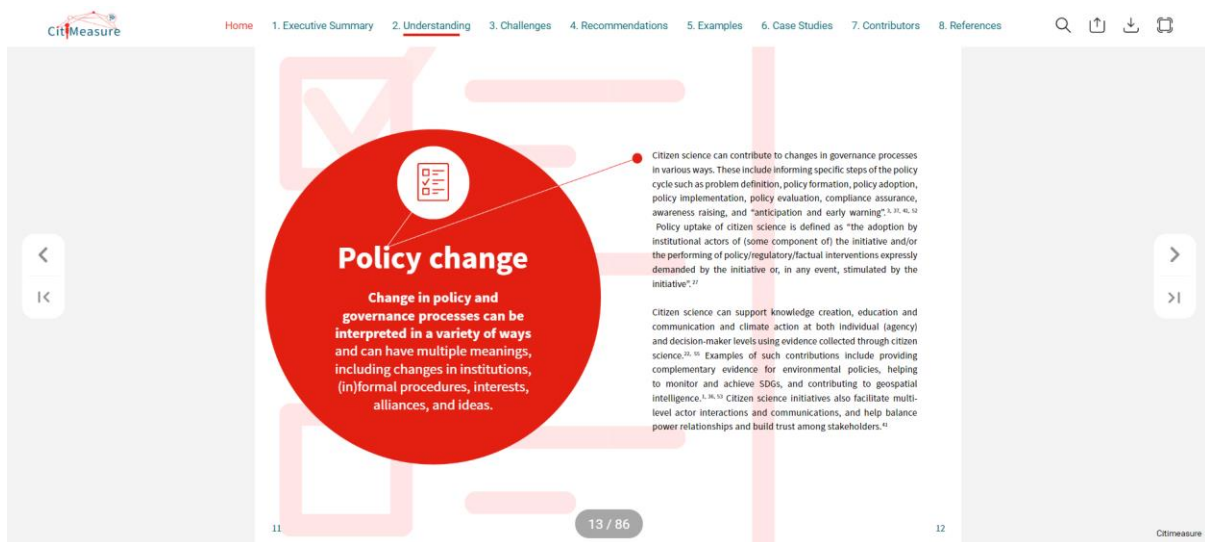


Figure 7: Policy change

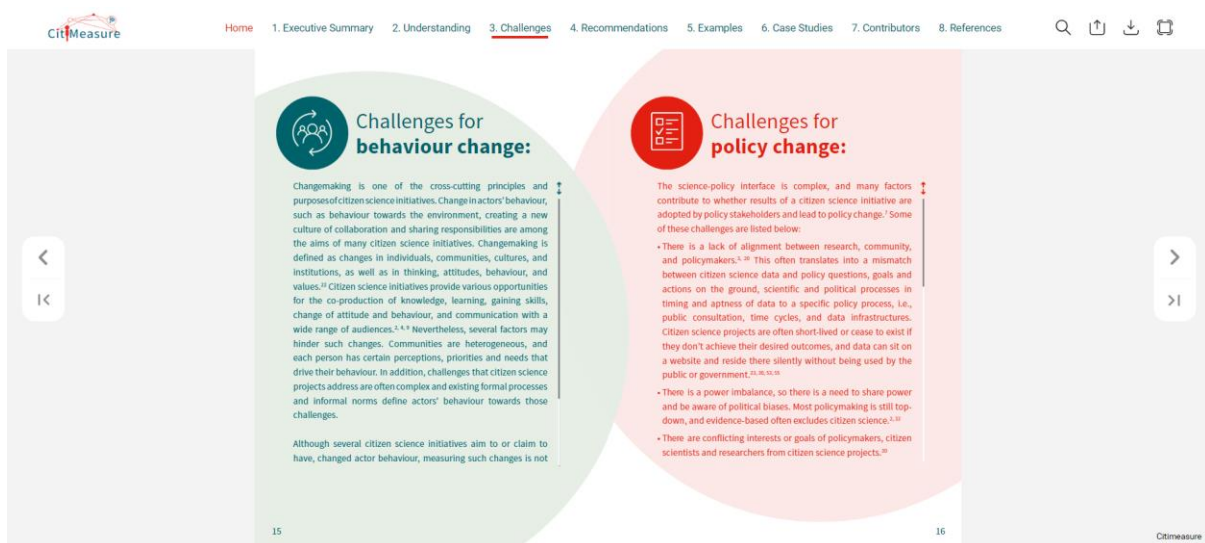


Figure 8: Common challenges for (behaviour and policy change

References are provided throughout the publication. A small grey information icon leads to a pop-up window displaying the relevant references (see Figure 9).

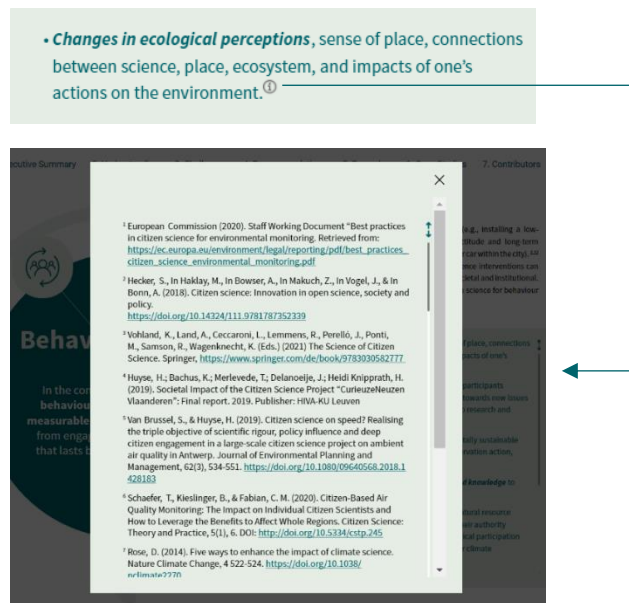


Figure 9: References

The amount of time users want to invest in studying the publication is entirely up to them. Its format makes it easy to obtain a quick grasp of the content, and simultaneously allows users to linger and investigate the publication in full depth. While the title of the guidelines suggests that the target group is arguably specific, anyone with an interest in citizen science will benefit from the guidelines.

## 3.2 BACKGROUND

### 3.2.1 About the CitiMeasure Behaviour & Policy working group

The Behaviour & Policy working group is one of the three CitiMeasure working groups which developed an instrument to foster sustainable, inclusive, and smart cities. The group was initially formed through a call for expressions of interest, and it remained open throughout the instrument development and pilot phases. The working group reached a total of 36 members from different cities, governmental, research and other organisations (see Figure 10). The Vision and Objectives, as well as the co-creation process, are set out in D1.6 Prototype instruments. This deliverable focuses on the refinement process that took place between the submission of the draft instruments (D1.6) in May 2022, and the final version presented here.

Cities	(Non-) governmental and research organizations
<ul style="list-style-type: none"> <li>• Apeldoorn</li> <li>• Barcelona</li> <li>• Capelle aan den IJssel</li> <li>• Dublin</li> <li>• Ghent</li> <li>• Helsinki</li> <li>• Maribor</li> <li>• Milan</li> <li>• Piastow</li> <li>• Porto</li> <li>• Prague</li> <li>• Roeseleare</li> <li>• Rumia</li> <li>• Sittard – Geleen</li> <li>• Sofia</li> <li>• Thessaloniki</li> <li>• Torino</li> <li>• Warsaw</li> <li>• Zwolle</li> </ul>	<ul style="list-style-type: none"> <li>• ICTU</li> <li>• Joint Research Centre (JRC)</li> <li>• Norwegian Institute for Air Research (NILU)</li> <li>• Citizen Science Vlaanderen (Scivil)</li> <li>• The Green Land</li> <li>• University of Munster</li> <li>• University of Western England (UWE)</li> <li>• Natural Disaster Research Institute (NDRI)</li> <li>• INOVA+</li> <li>• University of Leon</li> <li>• Imperial College London</li> </ul>

Figure 10: Cities and (non-)governmental organizations that are member of the CitiMeasure Behaviour & Policy working group (updated)

Besides the Inception Meeting, seven co-creation sessions were organised during the instrument development phase (see D1.6 Prototype instruments for more details). In the pilot phase, three additional co-creation sessions were organised to share updates about the pilots and extract insights to refine the prototypes. A final co-creation meeting was organised at the beginning of 2023. Figure 11 presents a summary of the main discussions in each of these meetings.

#### First pilot co-creation session (June)

- Feedback to pilot plans

#### Second pilot co-creation session (September)

- Feedback to pilot implementation
- Visualisation of the guidelines

#### Third pilot co-creation session (November)

- Refinement of the guidelines
- Training material

#### Final meeting (Jan/Feb 2023)

- Feedback to mockup version of the guidelines
- Feedback to overall process

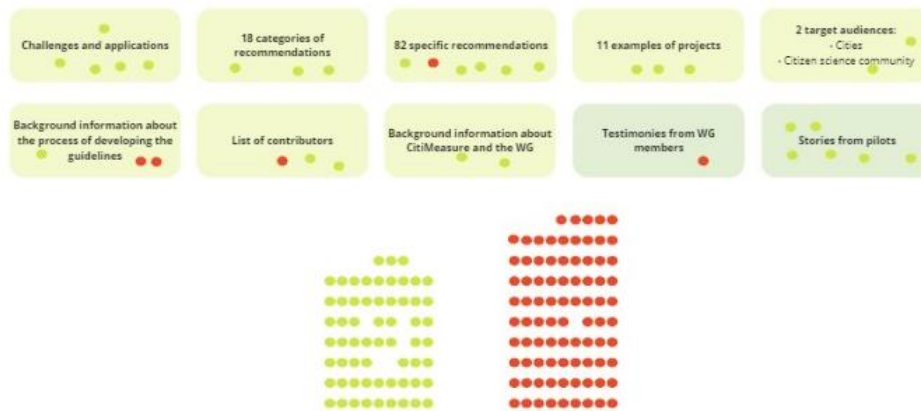
Figure 11: Key outputs of the CitiMeasure co-creation sessions in the pilot phase

### 3.2.2 Refinement of the Behaviour & Policy guidelines

In the co-creation sessions during the pilot phase, members were updated about the implementation of the pilots, and reflected about different ways to visualise the prototypes. The prototype of the Guidelines on Behaviour & Policy change (included in D1.6) was refined in consultation with the working group members. To facilitate these discussions, the programme Miro was used (see Figure 12).

### Link to the publication

Below you will find the different elements of our guidelines (in yellow), and also additional elements that might be included (in green). Please use the ● to indicate which are the **KEY elements that should be included in the web publication**.



What techniques, i.e. colour coding, icons, etc. would you use to **visualise the key elements** in the web publication?

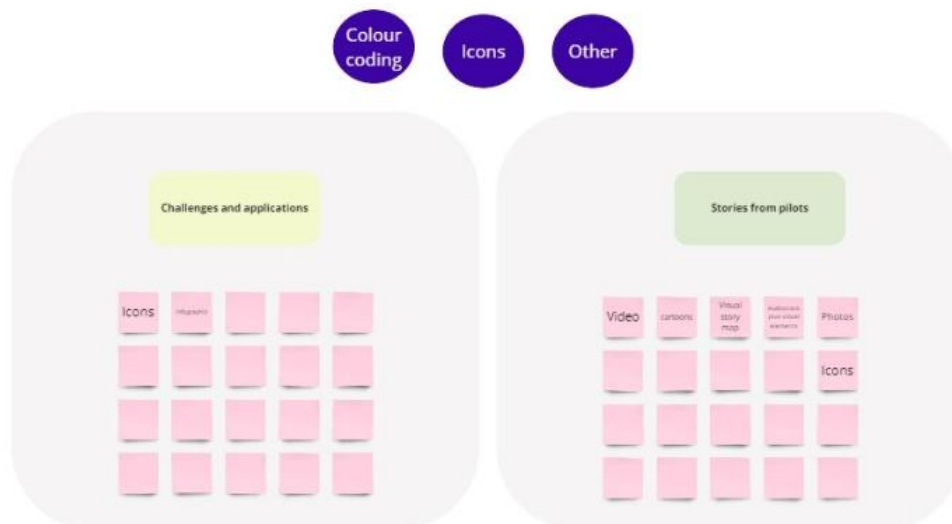


Figure 12: Miro exercise to discuss the refinement of the B&P guidelines.

In parallel, the CitiMeasure team worked with an external company to design the web publications based on the existing prototype. The company provided a non-interactive draft of the Guidelines on Behaviour & Policy Change which was presented at the final Behaviour & Policy working group meeting for feedback (see Figure 13).



Figure 13: Miro exercise to provide feedback to the mock-up

A small task force of volunteers from the working group was created to finalise the refinement of the guidelines. A template was provided to send feedback about the usability and user-friendliness of the web publications (see Table 1).

## Feedback

### Visualisation of Guidelines for CitiMeasure

<b>Intuition</b>
How satisfied are you with the navigation? Click or tap here to enter text.
Did everything work as you expected it to? Click or tap here to enter text.
If not, what was counter-intuitive? Click or tap here to enter text.
<b>Functionality</b>
Did you face any challenges while using the tool? Click or tap here to enter text.
Did you find the information you were looking for? Click or tap here to enter text.
What changes would you make to increase user friendliness? Click or tap here to enter text.
<b>Overall</b>
Did the tool meet your expectations? Click or tap here to enter text.
What do you like? Click or tap here to enter text.
What don't you like? Click or tap here to enter text.
Any other comments, questions, or suggestions? Click or tap here to enter text.

Table 1: Template to provide feedback

The final instrument is expected to be published in April 2023, and will be launched in an online webinar on 4 May 2023.

## 4 CitiMeasure Guidelines on Competencies for Digital Inclusion

### 4.1 FINAL OUTPUT

The **CitiMeasure Guidelines on Competencies for Digital Inclusion** [\[link here\]](#) aim to advance the understanding of the issue of "competencies" for inclusion in increasingly digitalised citizen science initiatives. Their visualisation aligns with the Guidelines on Behaviour & Policy Change: it uses the same logic and design. It, too, comes in the form of an interactive online document.

The guidelines are primarily developed to guide those who are interested in identifying, understanding, and enhancing capacities and competencies required for digital inclusion of different actors in citizen science projects. This includes cities, organisations, researchers, and practitioners who are involved in initiating citizen science projects, and/or those who aim to study or improve current actor inclusion practices in existing citizen science initiatives.

The guidelines result from a co-creation process led by Eurocities in close collaboration with the CitiMeasure Digital Inclusion working group members. The final product therefore reflects the collective understanding and experiences of 24 CitiMeasure working group members from seven European cities and nine organisations with interest and expertise in the topic, and is built on a wealth of theoretical and empirical insights from 39 resources.

The Guidelines on Competencies for Digital Inclusion are one of three main CitiMeasure outputs presented in the [Knowledge Centre](#). They are displayed in tandem with [CitiAIR](#) (see section 5.1) and the Guidelines on Behaviour & Policy Change (see section 3.1).

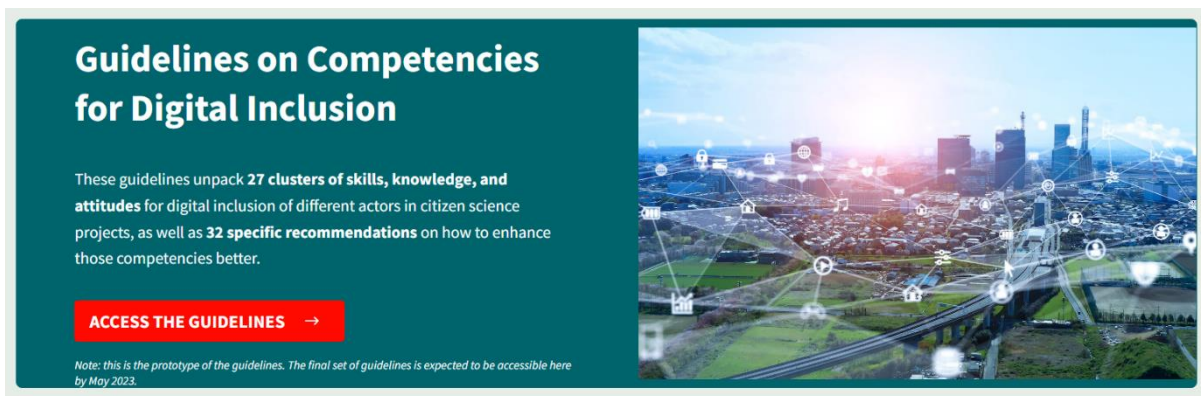


Figure 14: The Digital Inclusion Guidelines in the Knowledge Centre

Again, a click on "Access the Guidelines" in the Knowledge Centre will redirect the user towards the visualised guidelines (see Figure 14).



Figure 15: Interface of the CitiMeasure Digital Inclusion Guidelines

As can be seen from Figure 15, the interface of the Digital Inclusion Guidelines is in correspondence with the Behaviour & Policy interface. The ribbon on top of the publication uses the same categories, with chapter 3 being an exception (“Competencies Framework” in Digital Inclusion rather than “Challenges” in Behaviour & Policy).

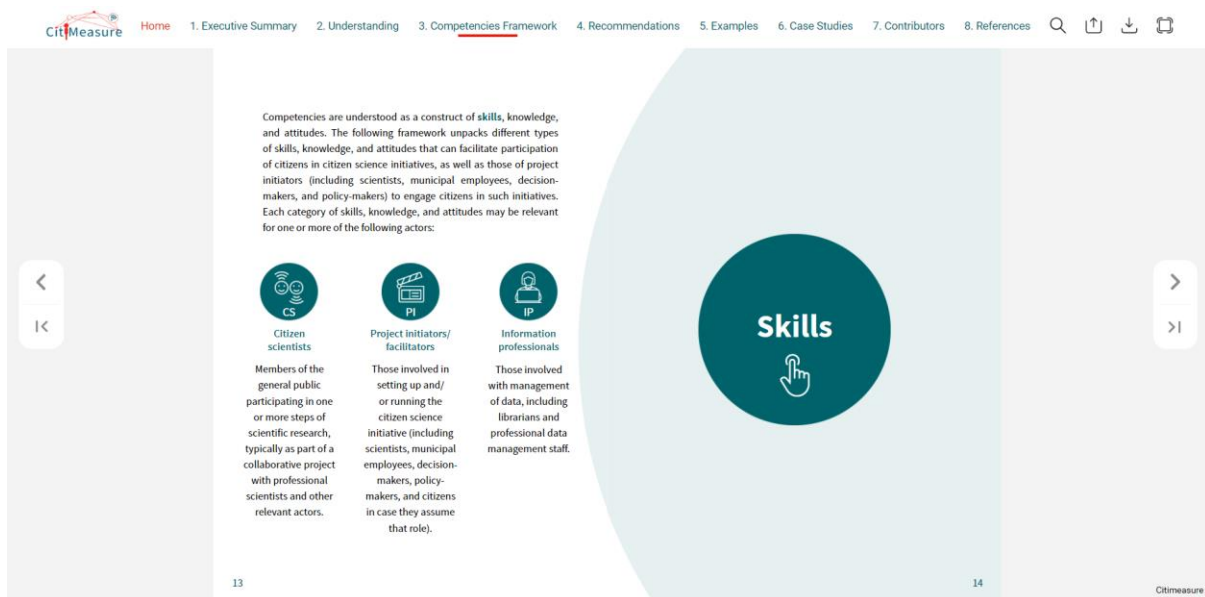


Figure 16: The Competencies Framework (Chapter 3)

Chapter 3 presents the competencies framework developed by the working group members. They defined competencies as a construct of skills, knowledge, and attitudes. Throughout the framework three different icons clarify who the competencies presented are relevant for (see Figure 16).

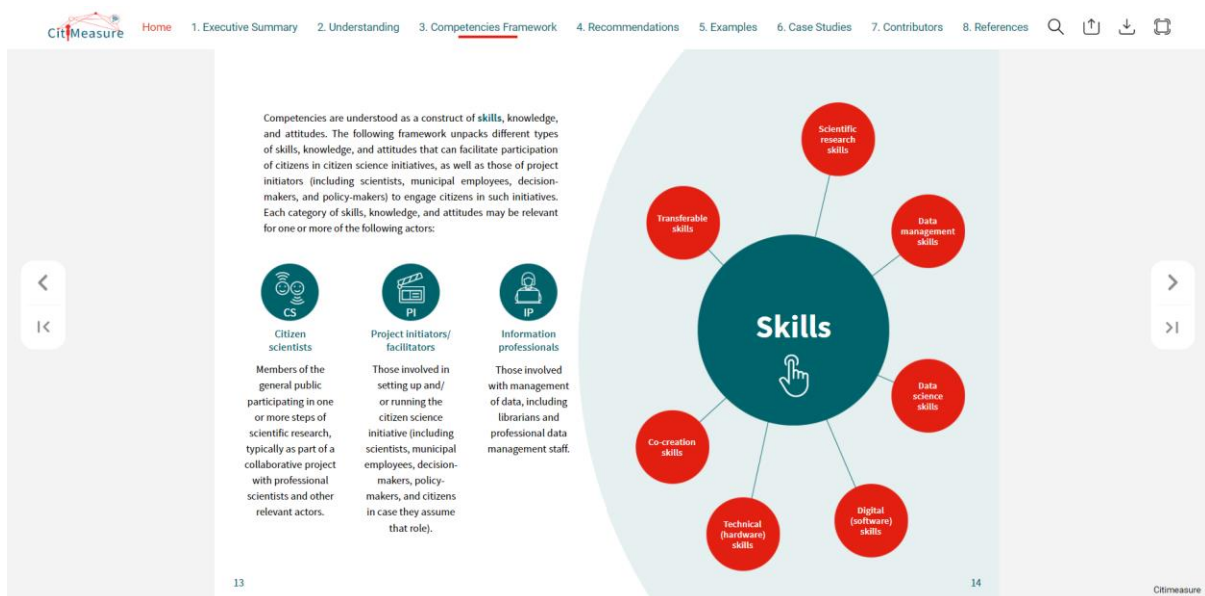


Figure 17: Mind map of skills

The large “skills” circle invites the user to click on it. Once clicked upon, a mind map opens with different skills categories (here: transferable skills, scientific research skills, data management skills, data science skills, digital (software) skills, technical (hardware) skills, and co-creation skills).



The same logic applies to the “knowledge” and “attitudes” sections (see Figures 18 and 19).

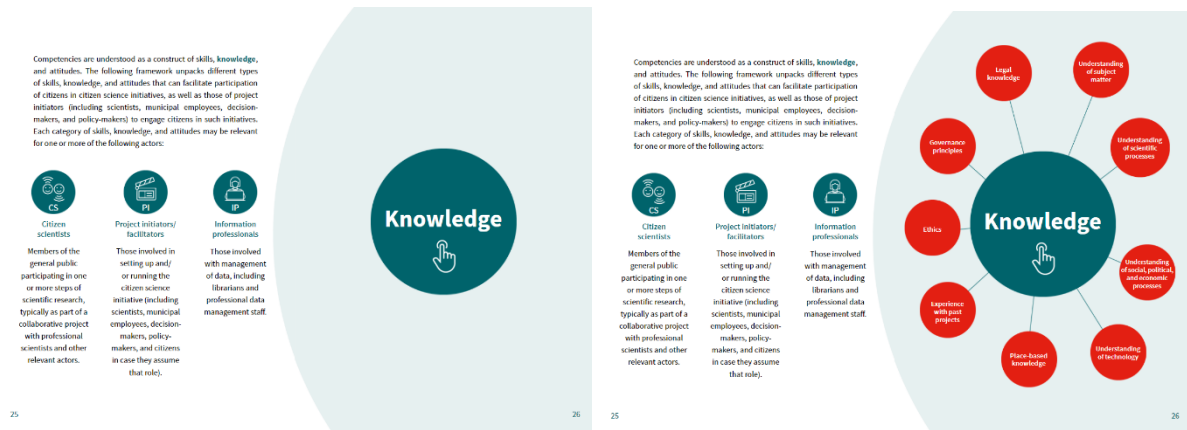


Figure 18: Knowledge section



Figure 19: Attitudes section

The three sections are then explored in more detail. Figure 20, for instance, shows how the respective elements in "knowledge" are explained using "think of" examples. A small icon next to titles or the body text invites users to open a list of references (see Figure 9). Below the titles, icons indicate to which actors (citizen scientists, project initiators/facilitators, and information professionals) the elements are most relevant (see Figure 20).



Figure 20: Example of different elements in "knowledge"

Much like the Guidelines on Behaviour & Policy Change, the Guidelines on Competencies for Digital Inclusion are relevant for anyone interested in citizen science. The user-friendly presentation of the content encourages users to explore the pages, be it just for a few minutes or in greater detail.

## 4.2 BACKGROUND

### 4.2.1 About the CitiMeasure Digital Inclusion working group

The Digital Inclusion working group is one of the three CitiMeasure working groups developing an instrument to foster sustainable, inclusive, and smart cities. The group was initially formed through a call for expressions, and it remained open throughout the instrument development and pilot phases. The working group reached a total of 27 members from 7 cities, and 11 governmental, research and other organisations (see Figure 21).

The Vision and Objectives, as well as the co-creation process, are set out in D1.6 Prototype instruments. This section focuses on the refinement process that took place between the submission of the draft instruments (D1.6) in May 2022, and the final version presented here.

Cities	(Non-) governmental and research organizations
<ul style="list-style-type: none"> <li>• Barcelona</li> <li>• Debrecen</li> <li>• Milan</li> <li>• Murcia</li> <li>• Roeselare</li> <li>• Rumia</li> <li>• Sofia</li> </ul>	<ul style="list-style-type: none"> <li>• ICTU</li> <li>• Joint Research Centre (JRC)</li> <li>• Leiden University</li> <li>• Norwegian Institute for Air Research (NILU)</li> <li>• Rotterdam University of Applied Sciences</li> <li>• Scivil</li> <li>• The Green Land</li> <li>• Universidad Pompeu Fabra</li> <li>• University College Dublin (UCD)</li> <li>• Universite Libre de Bruxelles (ULB)</li> <li>• Imperial College London (ICL)</li> </ul>

Figure 21: Cities and (non-)governmental organizations that are member of the CitiMeasure Digital Inclusion working group (updated)

Besides the Inception Meeting, seven co-creation sessions were organised during the instrument development phase (see D1.6 Prototype instruments for more details). In the pilot phase, three additional co-creation sessions were organised to share updates about the pilots and extract insights to refine the prototypes. A final co-creation meeting was organised at the beginning of 2023. Figure 22 includes a summary of the main discussions in the different Digital Inclusion working group meetings.

<b>First pilot co-creation session (June)</b> <ul style="list-style-type: none"> <li>• Feedback to pilot plans</li> </ul>
<b>Second pilot co-creation session (September)</b> <ul style="list-style-type: none"> <li>• Feedback to pilot implementation</li> <li>• Visualisation of the guidelines</li> </ul>
<b>Third pilot co-creation session (November)</b> <ul style="list-style-type: none"> <li>• Refinement of the guidelines</li> <li>• Training material</li> </ul>
<b>Final meeting (Jan/Feb 2023)</b> <ul style="list-style-type: none"> <li>• Feedback to first mock up of the guidelines</li> <li>• Feedback to overall process</li> </ul>

Figure 22: Key outputs of all the CitiMeasure Digital Inclusion co-creation sessions in the pilot phase

#### 4.2.2 Refinement of the Digital Inclusion guidelines

The prototype of the Guidelines on Competencies for Digital Inclusion was refined in consultation with the working group members. In the co-creation sessions during the pilot phase, members were

updated about the implementation of the pilots, and reflected about different ways to visualise the prototypes. To facilitate these discussions, the programme Miro was used (see Figure 23):

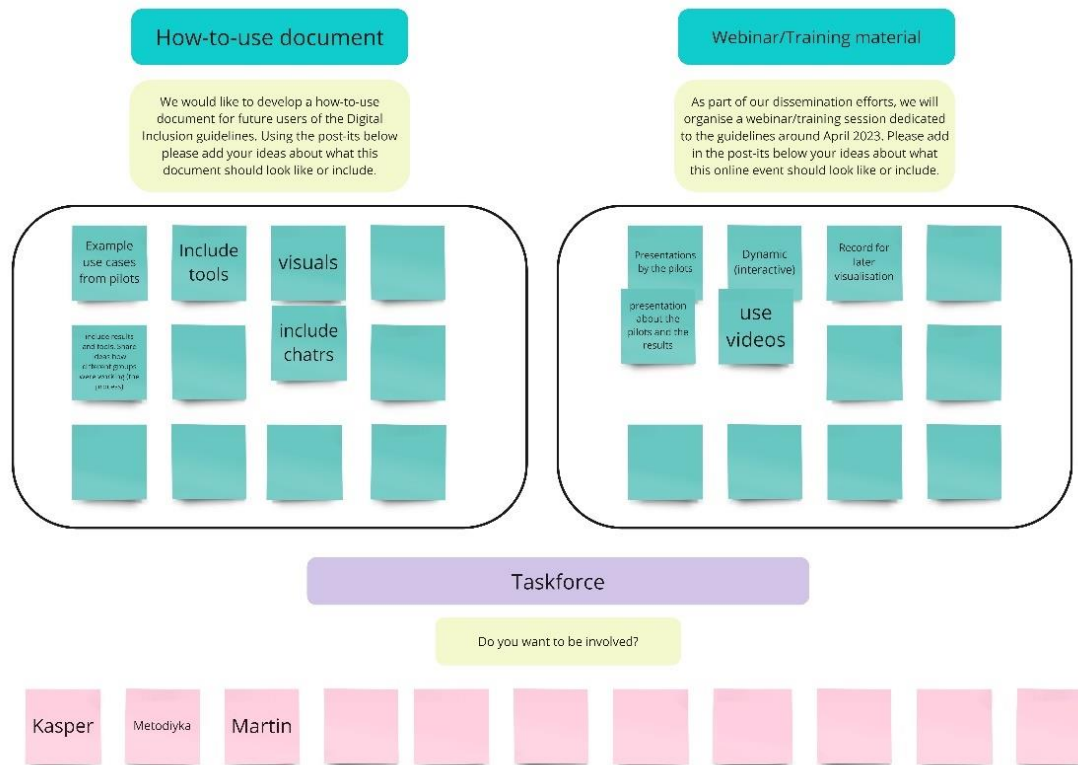


Figure 23: Miro exercise in the third co-creation meeting during the pilot phase

In parallel, the CitiMeasure team worked with an external company to design the web publications based on the existing prototype. The team simplified the text provided in D1.6 Prototype of the instruments, especially regarding background and methodological information. The company provided a non-interactive draft of the Guidelines on Competencies for Digital Inclusion which were presented at the final Digital Inclusion working group meeting for feedback (see Figure 24). A small task force of volunteers from the working group was created to finalise the refinement of the guidelines. A template was provided to send feedback about the usability and user-friendliness of the web publication (see Table 1). The final instrument is expected to be published in April 2023, and will be launched in an online webinar on 4 May 2023.



Figure 24: Miro exercise to provide feedback to the first Digital Inclusion mockup version of the guidelines

## 5 CitiAIR: An inventory of participatory air quality monitoring initiatives

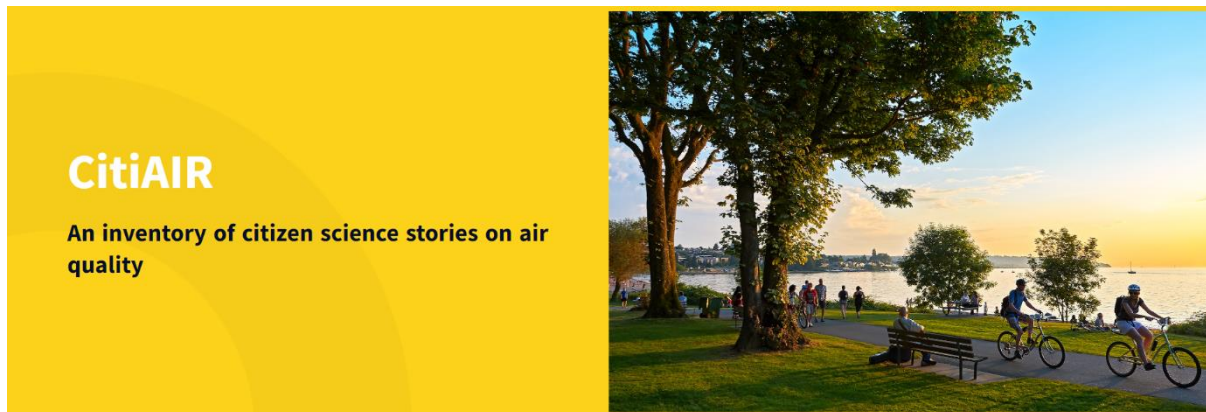
### 5.1 FINAL OUTPUT

The **CitiAIR interface** consists of five different elements:

1. Main landing page
2. Section explaining the mission of the tool
3. Section inviting organisations to submit their air quality initiatives
4. Section informing about the number of initiatives, organisations, and sensors used
5. Interactive map displaying all submitted CitiAIR initiatives

#### a) Main (landing) page

The [landing page of the online tool](#) (see Figure 25) displays the name of the instrument – CitiAIR – and provides a short description of its raison d'être.



*Figure 25: Landing page of the tool*

CitiAIR can easily be accessed from the [CitiMeasure Knowledge Centre](#). Users are invited to access the inventory, submit the story of their initiative, or explore additional training material (see Figure 26).

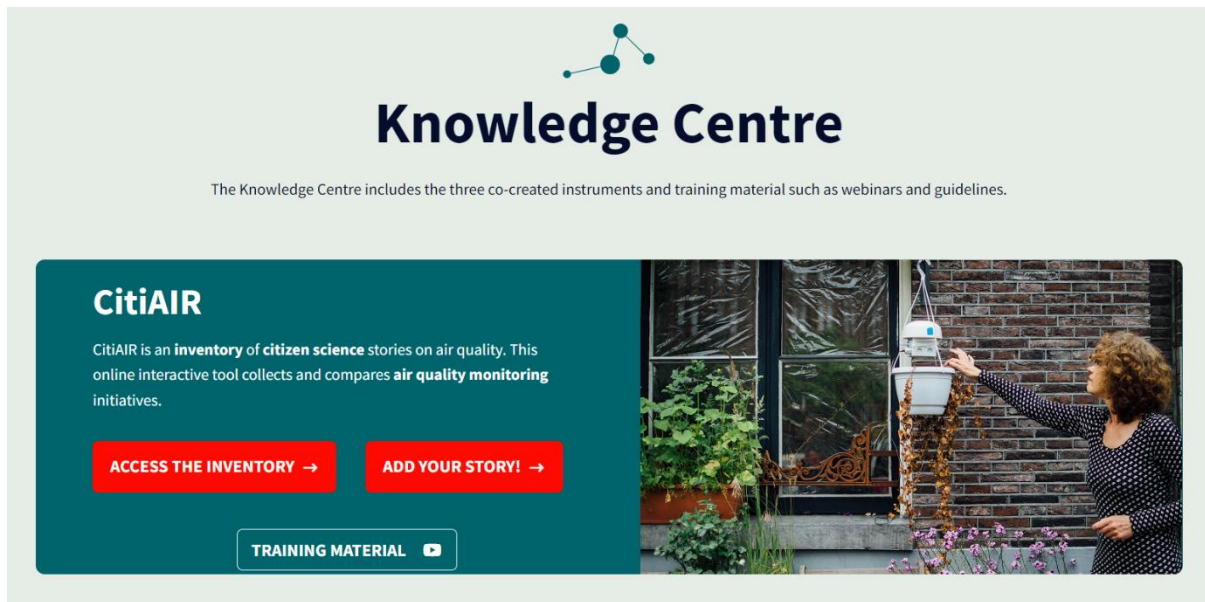


Figure 26: CitiMeasure Knowledge Centre

## b) Mission of the tool

The CitiMeasure comparability tool pursues three main goals:

- Identify and co-create an inventory of air quality monitoring activities of different (European) cities and organisations
- Facilitate knowledge sharing between city officials and citizen science initiatives regarding air quality measurements
- Pilot and consolidate the CitiMeasure tool to facilitate the comparability of air quality data

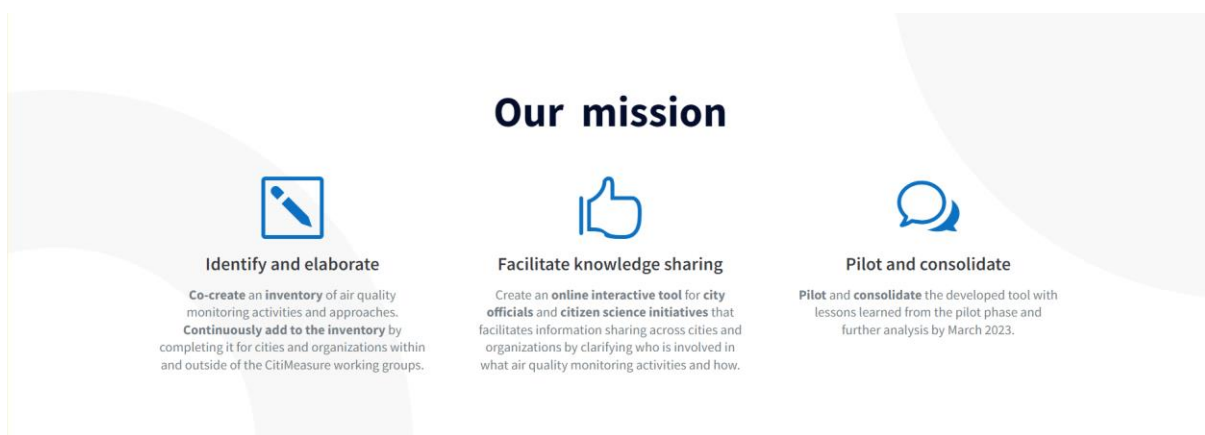


Figure 27: Summary of the CitiMeasure Comparability working group mission

### c) Share your story

In the "share your story" section, organisations are invited to submit their initiatives. The banner includes a button saying "[I want to share my story.](#)" Once users click on the button, they are redirected to a new page asking them to fill in the details of their initiative. The questionnaire seeks information about key characteristics of the project, technical details, data use, and contact details.

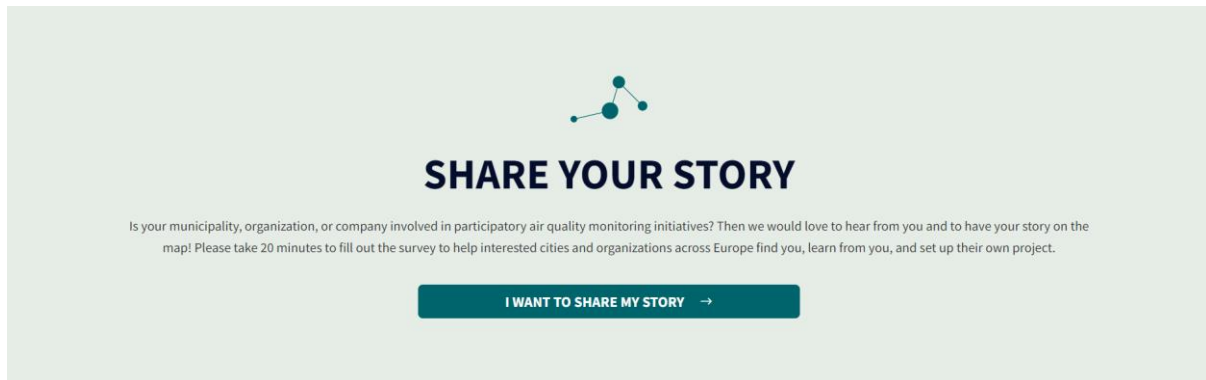


Figure 28: Share your story

### Step 1: Your organisation

\*\*\* indicates required fields

**Step 1 of 5 - Your organization**

20%

**First Name**

**Last Name**

**Email \***

**What is the name of your organization? \***

**Website/URL**

**What best describes the type of organisation that you are representing? \***

City

**Where are you based? \***

Street Address

City

ZIP / Postal Code

Country

[Save and continue later](#) [Next](#)

Figure 29: Step 1 – Your organisation

The main objective here is to gather information about the organisation in charge of the initiative. The user is asked to provide the information presented in Figure 29. The dropdown list below the question, “What best describes the type of organisation you are representing?”, includes the following options:

- City administration
- Government organisations
- National or International Non-Governmental Organisations
- Community-Based Organisation/Civil Society Organisation
- Private company
- Academia
- School
- Other

The question, “How would you describe your organisation’s mission?”, is important to understand the nature and main objective of an organisation. The information gathered is used in the interactive map to filter initiatives and organisations.

## Step 2: Your initiative

\*\*\* Indicates required fields

Step 2 of 5 - Your initiative 40%

What is the name of your initiative? \*

How would you describe the main mission of your initiative? \*

<input type="checkbox"/> Measure/monitor air quality	<input type="checkbox"/> Measure personal exposure	<input type="checkbox"/> Smart/sustainable mobility
<input type="checkbox"/> Raise awareness/education	<input type="checkbox"/> Advocate for air quality policies	<input type="checkbox"/> Environmental justice
<input type="checkbox"/> Commercialize air quality sensors	<input type="checkbox"/> Air quality modelling	<input type="checkbox"/> Other

Please provide a short description of your initiative (What is being done? Who is participating? What are your main goals?) This text will appear on the main page. \*

Who is participating, who is your target audience?. Max 80 words.

Max: 80 words

Who is your main audience? \*

<input type="checkbox"/> Citizens	<input type="checkbox"/> Schools	<input type="checkbox"/> Non- Governmental Organisations
<input type="checkbox"/> Media	<input type="checkbox"/> Cities	<input type="checkbox"/> Other government administrations
<input type="checkbox"/> Private sector	<input type="checkbox"/> Universities and/or research institutes	<input type="checkbox"/> Other

If possible, provide the list of partners involved in the initiative.

Max: 100 words

How is this initiative funded?

<input type="checkbox"/> Fully funded European project	<input type="checkbox"/> Partially funded European project	<input type="checkbox"/> Municipality programme
<input type="checkbox"/> Association initiative	<input type="checkbox"/> Private programme	<input type="checkbox"/> Other

Please provide an estimation of the total budget of the initiative (in €):  What is the status of the initiative? \*

What is the duration of the initiative?

How many participants (citizen scientists, volunteers, etc.) have been involved (approximately)?  Website that presents your initiative

Please share any other relevant/interesting links about your initiative:

Max: 100 words

Please upload a picture to illustrate your initiative

No file chosen

Accepted file types: jpg, png, Max. file size: 4 MB.

Figure 30: Step 2 – Your initiative

The objective of this step is to gather general information about the initiative, including the main target audience and the context in which the initiative operates (see Figure 30). In the budget



question, users have the option to choose from “zero to €10,000” through to “more than €1,000,000.” Under the duration of the programme, users can choose from “less than a month” to “more than a year.” In the participants question, users can choose from “0 to 25 participants” to “over 5000.”

### Step 3: Technical details

\*\*\* indicates required fields

#### Step 3 of 5 - Technical details

60%

#### Technical Details

In this step, you will provide information about the devices you have used in the initiative. By adding new equipment, you will provide information about a specific device. For example, if you used three different devices, we invite you to fill in this form for each. If your time is limited, please provide information about the most relevant one.

Name of the equipment	Brand
There are no equipments.	

**Add Equipment**

Figure 31: Step 3 – Technical details

While the first two steps provide contextual and descriptive information about the project and the organisation running the project, steps 3 and 4 focus on the technical aspects of the air quality measurements. Step 3, in particular, aims to extract information about the equipment (see Figure 31).

#### Add Equipment

\*\*\* indicates required fields  
Name / Brand of the equipment used in your initiative

Name of the equipment \*

Brand

If the same as the name, just copy paste

The number of these devices used in your initiative (estimated): \*

Origin \*

Commercial product  DIY product - we bought parts  
 DIY - from a dedicated provider  Innovative sector: we have created the device  
 Other

Measured parameter (you can select several) \*

PM1  PM2.5  PM10  
 NO2  NO  Temperature  
 Humidity  CO2  VOC  
 O3  H2S  SO2  
 Noise  Black Carbon  NH3  
 UFPs (Ultrafine particles)  Other

Are there any other technical details you would like to share?

Communication type

Data logger  2G-3G  Bluetooth  
 LoRa  SigFox  WiFi  
 Ethernet  Not relevant  Other

Energy type

Solar  Not relevant (passive tubes, for example)  Battery  
 Regular power plug  USB  Other

Does your device allow SD cards?  
 Yes  No

Temporal resolution \*

Where are you measuring air quality? \*

Indoor  Outdoor  Both

Device's location \*

Street - public domain  Street - private domain  Mobile - Bike mounted  
 Mobile - Person mounted  Mobile - Car mounted  Home  
 Public building  Other

Level of expertise required to operate

What is the approximate market price per unit?

Are there any other costs related to this equipment?

Are there any setup/installation costs? If possible, provide a figure

Are there any maintenance costs? If possible, provide a figure

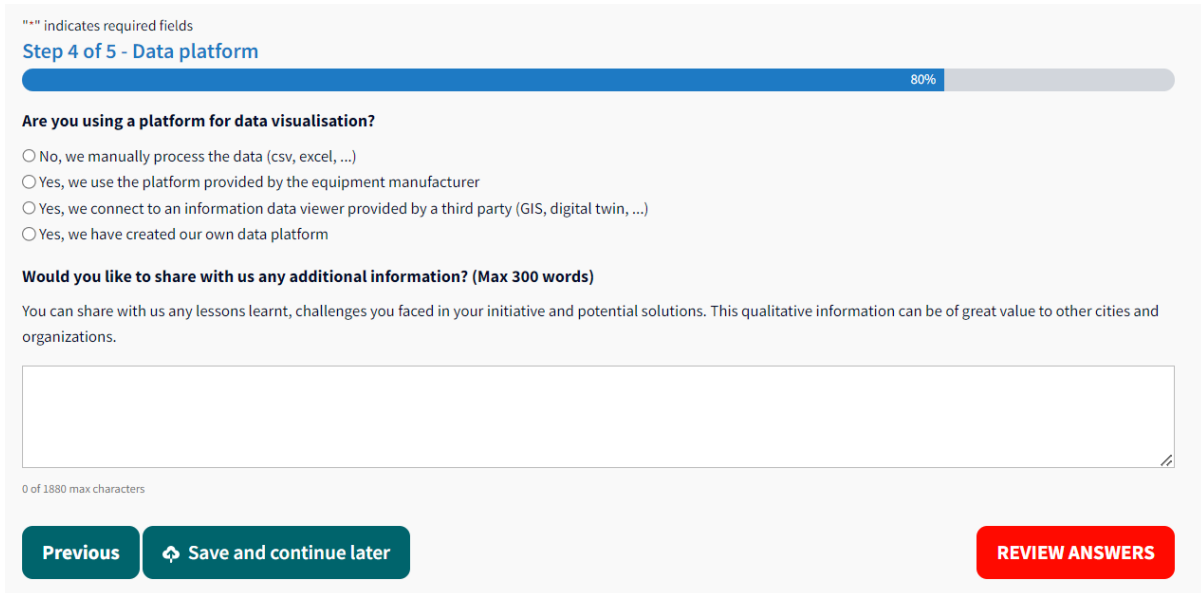
Example: 350€ / year

**Cancel** **Add Equipment**

Figure 32: Step 3.1 – Add equipment

The level of expertise ranges from “simple if you take time to read the documentation” to “have to be an expert – requires special training.” Users need to add new equipment by clicking the button at the bottom (see Figure 31). In this additional form, users will be able to include the name and brand, as well as the origin of the equipment and the measurement parameters (see Figure 32). The new equipment will thus be added as a row in a table.

#### Step 4: Data platform

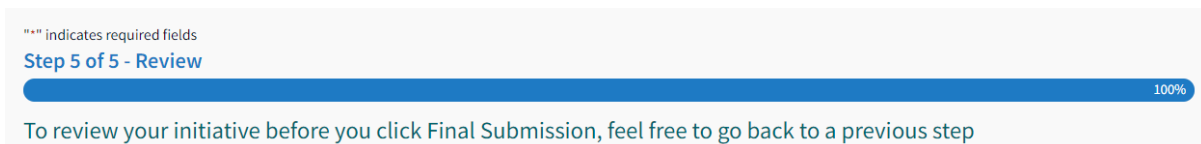


Form titled "Step 4 of 5 - Data platform" with a progress bar at 80%. It includes a question: "Are you using a platform for data visualisation?" with four radio button options: "No, we manually process the data (csv, excel, ...)", "Yes, we use the platform provided by the equipment manufacturer", "Yes, we connect to an information data viewer provided by a third party (GIS, digital twin, ...)", and "Yes, we have created our own data platform". Below this is a text area for "Would you like to share with us any additional information? (Max 300 words)" with a character count of "0 of 1880 max characters". Navigation buttons include "Previous", "Save and continue later", and "REVIEW ANSWERS".

Figure 33: Step 4 – Data platform

The main objective of this step is to collect information about the management of air quality data: its usage, visualisation, and quality control (see Figure 33).

#### Step 5: Review



Form titled "Step 5 of 5 - Review" with a progress bar at 100%. It contains the text: "To review your initiative before you click Final Submission, feel free to go back to a previous step".

Figure 34: Step 5 – Review

In this last step, users are asked to review the information they provided once again (see Figure 34). Should they spot a mistake or incomplete information, they can easily intervene. Once everything is in order, the user can opt for “final submission” for their initiative to become part of CitiAIR.

#### d) CitiAIR in numbers

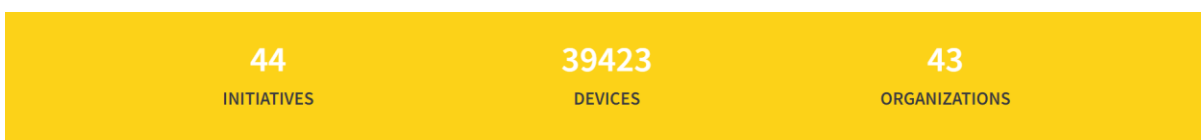


Figure 35: CitiAIR in numbers

“CitiAIR in numbers” serves as an introduction to the interactive map. It provides users with an idea of the magnitude and reach of CitiAIR (see Figure 35).

e) The tool: An interactive map

## DISCOVER INSPIRING INITIATIVES

Note: the map and initiative information display the location of the organisations in charge of the initiative

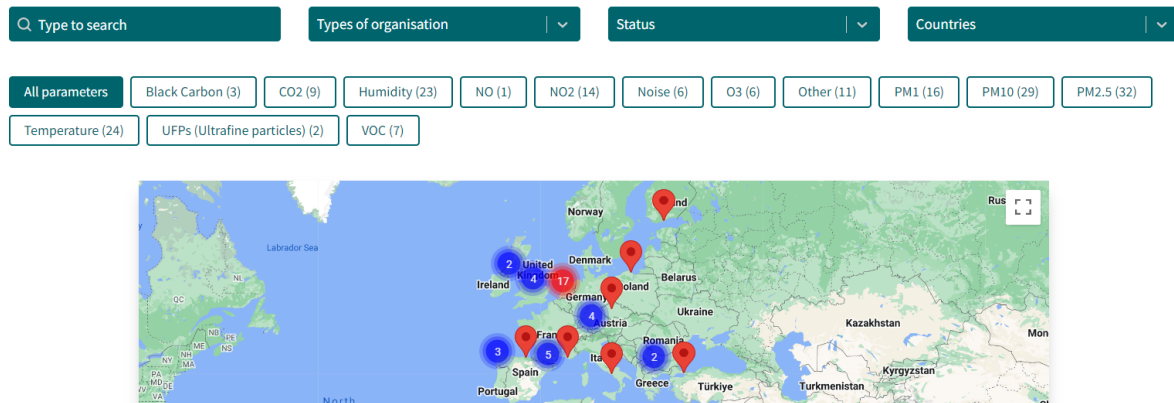


Figure 36: Interactive map

The tool comes in the form of an interactive map. Different initiatives are represented using a location identifier. Users can then click on each initiative or filter initiatives by choosing categories from the drop-down menu where they can sort initiatives by organisation type, status (ongoing; inactive/ended), and country (to date: Netherlands [9], Spain [7], Belgium [6], UK [4], France [3], Italy [3], Greece [2], Ireland [2], Portugal [2], Austria [1], Czech Republic [1], Finland [1], Germany [1], Poland [1], and Türkiye [1]) (see Figure 36).

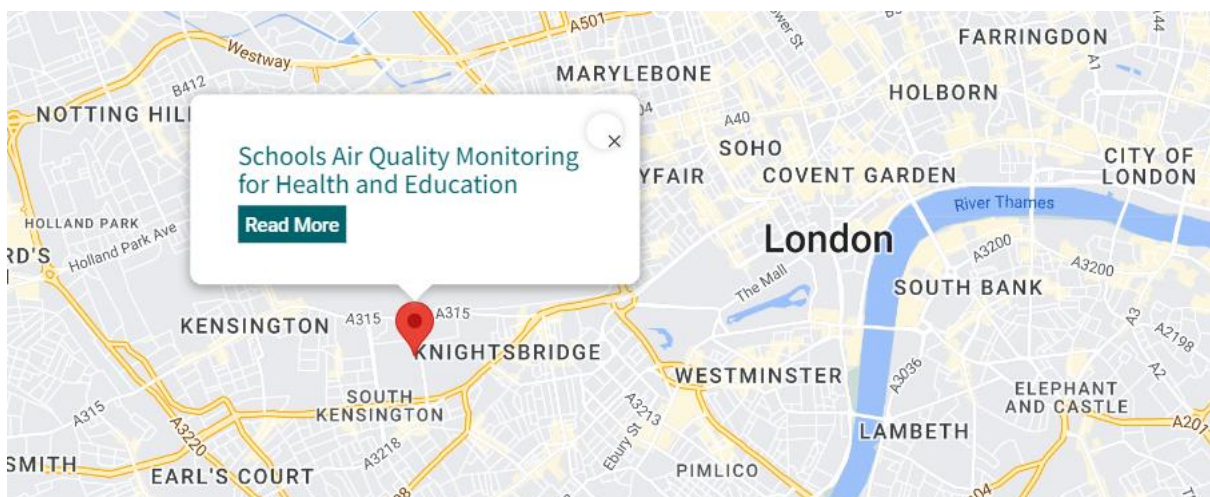


Figure 37: Example of a CitiAIR initiative in London, UK


The “Read More” button directs users to a separate page where users can find out more about the respective initiative (see Figure 37). The information displayed here is based on the questionnaire the initiatives submitted online.

NOV 30, 2022

## Schools Air Quality Monitoring for Health and Education

[Share this initiative](#)

[Twitter](#) [LinkedIn](#)



Initiative    Technical details    Data platform    Organization

**What is the name of your initiative?**

Schools Air Quality Monitoring for Health and Education

**How would you describe the main mission of your initiative?**

Measure/monitor air quality, Raise awareness/education, Air quality modelling


**Please provide a short description of your initiative (What is being done? Who is participating? What are your main goals?) This text will appear on the main page.**

SAMHE brings together pupils, teachers, scientists from 6 institutions across the UK and is supported by the UK Governments' Department for Education. SAMHE will establish a network of air quality monitors in schools across the UK, creating an unparalleled dataset which will help researchers better understand schools' indoor air quality and provide evidence for better national policies and practice. This will enable pupils to interact with real world data about their environment and gives them agency to take informed action.

Figure 38: Example of a SAMHE, a participatory initiative for better air in schools


Users can switch between four different tabs (as a result of the information gathered in the questionnaire) (see Figure 38).

At the end of the page, other initiatives are displayed (see Figure 39).



### Other Initiatives

Humidity PM10 PM2.5 Temperature



**KADIKÖY BELEDİYESİ**

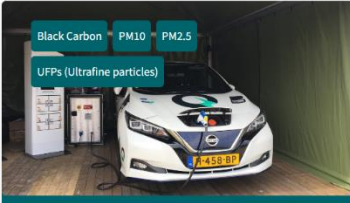
**Increasing Resilience in Community Adaptation Process Project**

**Location:** İstanbul, Türkiye

**Description:** With the establishment of the "Kadıköy

Black Carbon PM10 PM2.5

UFPs (Ultrafine particles)




**AirQon**

**Location:** Breda, Netherlands

**Description:** AirQon is initiative that makes us of EV-cars instead of dieselgenerators specially to provide festivals with sustainable energy, due to all the problems during

NO2



**CitieS-Health**

**Location:** Barcelona, Spain

**Description:** CitieS-Health aimed to put citizens' concerns at the heart of research agenda on environmental epidemiology by tackling health issues

Figure 39: Example of a SAMHE, a participatory initiative for better air in schools

If numerous initiatives exist in a region, they are clustered. This way, users can identify particularly active regions right away. Once they click on the blue circle, the map zooms in on the respective initiatives (see Figure 40).

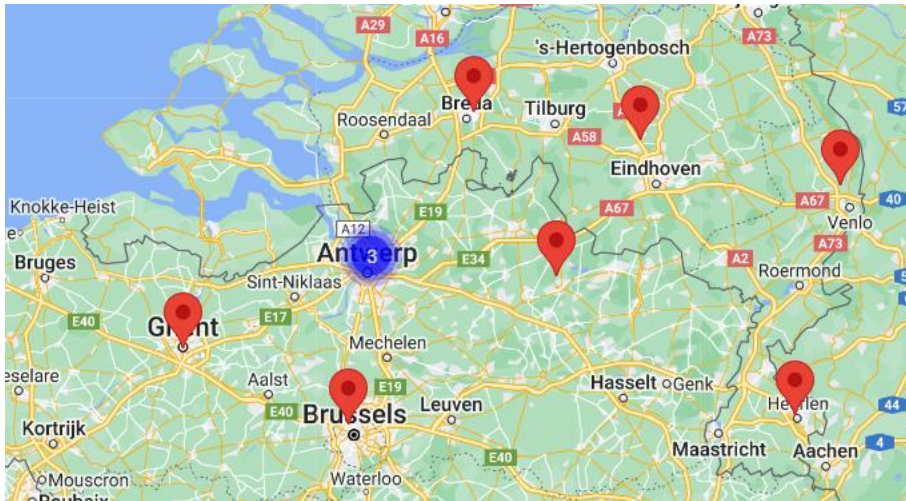


Figure 40: Example of clusters

If users do not want to engage with the map, they can simply browse through the different initiatives in list form (see Figure 41).

<p><b>AIR-HERITAGE</b></p> <p><b>Location:</b> Portici, Italy</p> <p><b>Description:</b> AIR-HERITAGE aims to design and implement effective, participative policies to improve the City of Portici air quality. The project developed and used an extensive air quality monitoring network, consisting of fixed regulatory monitoring stations, mobile monitoring stations and portable air quality monitors for citizens, to assess current levels of air pollution in the city. Monitoring data and tools have been fused and form an integral part of the Decision Support tool developed to inform policy makers and citizens.</p> <p><b>List of parameters measured:</b> NO2, Temperature, PM1, PM2.5, PM10, Humidity, O3, Other</p> <p><a href="#">Read more</a></p> <p>January 27, 2023</p>	<p><b>DivAirCity</b></p> <p><b>Location:</b> Rocafort, Spain</p> <p><b>Description:</b> DivAirCity is a 4 year project, funded by the EC under the H2020 programme, within the scope of the Sustainable Development Goals, valuing diversity and social inclusion to achieve innovative, creative, culture- driven, green and carbon neutral urban society. DivAirCity addresses the equation of social inequality, health conditions and air pollution in cities. It involves 26 EU organisations and 68 external stakeholders from all five continents and creates replicable pilots starting from 5 EU cities.</p> <p><b>List of parameters measured:</b> PM10, NO2</p> <p><a href="#">Read more</a></p> <p>January 25, 2023</p>	<p><b>MortselAir</b></p> <p><b>Location:</b> Mortsel, Belgium</p> <p><b>Description:</b> Milieuraad Mortsel is promoting the installation of sensors designed by/managed by <a href="https://sensor.community/">https://sensor.community/</a> by the citizens</p> <p><b>List of parameters measured:</b> PM2.5, PM10, Temperature, Humidity</p> <p><a href="#">Read more</a></p> <p>January 23, 2023</p>
<p><a href="#">Load more (35)</a></p>		

Figure 41: Initiatives in list form

## 5.2 BACKGROUND

### 5.2.1 About the CitiMeasure Comparability working group

The Comparability working group is one of the three CitiMeasure working groups developing an instrument to foster sustainable, inclusive, and smart cities. The group was initially formed through a call for expressions, and it remained open throughout the instrument development and pilot phases. Currently, the working group has 27 members from 7 cities, and 11 governmental, research and other organisations. The Vision and Objectives, as well as the co-creation process, are set out in D1.6 Prototype instruments. This section focuses on the refinement process that took place between the submission of the draft instruments (D1.6) in May 2022, and the final version presented here.

Cities	(Non-) governmental and research organizations
<ul style="list-style-type: none"> <li>• Antwerp</li> <li>• Barcelona</li> <li>• Belfast</li> <li>• Debrecen</li> <li>• Ghent</li> <li>• Maribor</li> <li>• Milan</li> <li>• Rumia</li> <li>• Torino</li> </ul>	<ul style="list-style-type: none"> <li>• Acoucite</li> <li>• Air Parif</li> <li>• Air Sentinels</li> <li>• ICTU</li> <li>• Civity</li> <li>• Dutch National Institute for Public Health and the Environment (RIVM)</li> <li>• Fab Lab Barcelona</li> <li>• Flemish Institute for Technological Research (VITO)</li> <li>• Kunak</li> <li>• Loco Labs</li> <li>• Norwegian Institute for Air Research (NILU)</li> <li>• Sensor. Community</li> <li>• Sensor2School</li> <li>• University College Dublin (UCD)</li> <li>• University of Aveiro</li> </ul>

Figure 42: Cities and (non-)governmental organizations that are member of the CitiMeasure Comparability working group

Besides the Inception Meeting, six co-creation sessions were organised during the instrument development phase (see D1.6 Prototype instruments for more details). In the pilot phase, two additional co-creation sessions were organised to share updates about the pilots and extract insights to refine the prototypes. A final co-creation meeting was organised at the beginning of 2023. Figure 43 presents a summary of the main discussions in each of these meetings.

#### First pilot co-creation session (June)

- Feedback to pilot plan
- Branding

#### Second pilot co-creation session (September)

- Final feedback to the CitiAIR tool

#### Final meeting (Jan/Feb 2023)

- Feedback to overall process

Figure 43: Key outputs of all the CitiMeasure co-creation sessions in the Comparability working group

## 5.2.2 Refinement of the online tool

The working group worked in an iterative way and provided feedback to the tool as the work evolved. The team used the programme Miro to discuss updated versions of CitiAIR, decide on the branding and provide overall feedback on the tool (see Figure 44).

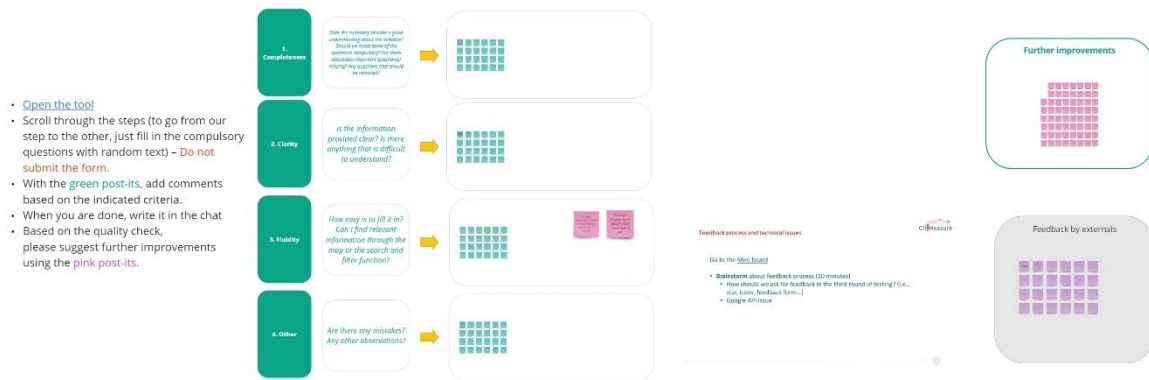


Figure 44: Miro exercise to validate the final version of CitiAIR

## 6 Concluding remarks

The current report presents the final online versions of the three CitiMeasure instruments: the Guidelines on Competencies for Digital Inclusion, the Guidelines on Behaviour & Policy Change and the CitiAIR comparability tool. These products resulted from a one-and-a-half-year co-creation process. The instruments are built upon many resources and past experiences in the field of citizen science and reflect the collective knowledge of more than 40 experts, researchers, and city representatives. The ambition of CitiMeasure is that these instruments become a valuable source of guidance and information for both existing and future citizen science initiatives, especially those with an urban focus.

All three instruments are now available in the Knowledge Centre section of the CitiMeasure website. The Guidelines on Competencies for Digital Inclusion and Behaviour & Policy Change will be officially launched at a webinar in May 2023. More information about this webinar will be included in D2.3 Three webinars. The instruments will be added to different citizen science platforms and online repositories, including [Scivil](#), the [City Deal toolbox](#), and the [EU- Citizen.science](#) platform. More details about these efforts to ensure the sustainability of the instruments will be reported in D2.5 Knowledge Centre Business Plan.