

# Living Labs for air pollution control and prevention



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## Key Take-Aways

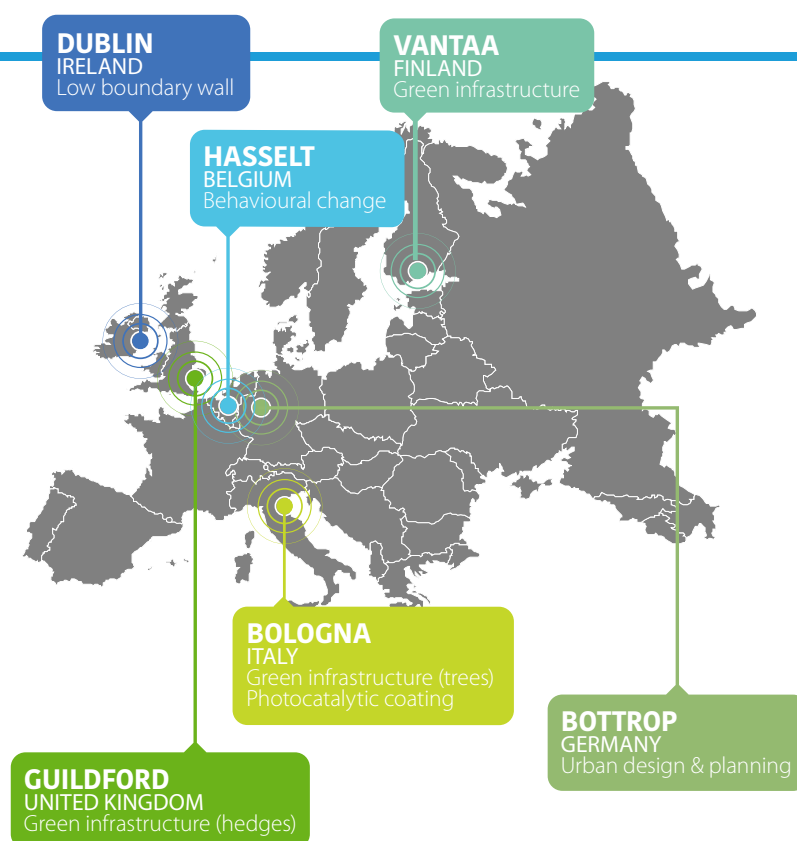
Living Labs bring together citizens, research institutions, businesses and public authorities to solve real-world challenges. By integrating research and innovation processes Living Labs enable value co-creation, experimentation and evaluation of innovative ideas in real-world environments. For example, the Living Lab approach allows us all to work together to tackle complex urban challenges such as air pollution in cities, driving policy change towards better health and well-being for everyone.

During the past three years, six iSCAPE Living Labs in Bologna-IT, Bottrop-DE, Dublin-IE, Guildford-UK, Hasselt-BE and Vantaa-FI have successfully raised citizen and stakeholder awareness across Europe through active

participant engagement and co-creation of innovative solutions to mitigate the effects of air pollution in cities.

The Living Labs engaged with their local communities in a collaborative process through interventions such as Passive Control Systems (low boundary walls, trees and hedge-rows, green walls and roofs, photocatalytic coatings, green urban spaces and road geometry interventions) and Behavioral Change interventions (actions to promote changes in transport mode choice and activity patterns), leading to the empowerment of the citizens as key collaborators in the process (see Figure 1 in the next page).

Experiences and knowledge acquired during the iSCAPE project can facilitate the design and implementation of similar initiatives by other European cities tackling air pollution and mitigating the adverse effects of climate change.



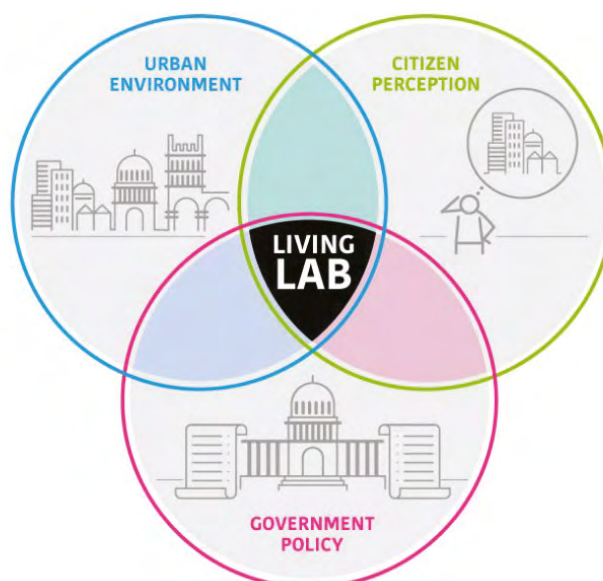
**Figure 1:** The iSCAPE Living Labs and their areas of intervention.

**“If I walk through the green streets, then I think how nice it is when everything is green.”**

Citizen of the city of Bottrop

## iSCAPE Living Labs

The iSCAPE Living Labs connected a great variety of urban stakeholders, facilitated collaboration and sharing of multidisciplinary knowledge as well as the experience to advance air pollution remediation strategies and solutions. By connecting city stakeholders, including citizens and community groups, the Living Labs facilitated joint value creation accounting for the needs and desires of all parties involved in a collaborative setting.



**Figure 2:** The challenges related to air quality in the six iSCAPE cities.

The challenges related to air quality in the six iSCAPE cities can be clustered in three groups (see Figure 2): (1) the **urban environment** challenges included topographical location, urban density, vicinity to the airport or industrial heritage areas, historic city structures and **city infrastructures** based on car traffic. (2) Influenced by citizen perceptions, the main cultural and behavioural challenges in the iSCAPE cities were identified as car use culture, poor understanding or misconceptions of the problem and behaviors needed for change, an overall poor understanding of the invisible problem of air pollution or the willingness for change. (3) Further challenges were determined by **government policy** such as a gap between scientific research and government legislation, disagreement and lack of coordination among government bodies, lack of support from central government and misleading or unreliable measurements of air quality.

The iSCAPE Living Labs tackled these challenges through a multi-method approach. This approach ensured that measures such as behavioral interventions, for example, were co-created from the citizen-led as opposed to the top-down perspective, in addition to enabling active participation of all the local representatives from Academia, Business, Civil Society and Government.

The engagement of stakeholders in the six cities created the basis for cooperation during the iSCAPE project but also for potential future collaborations. For example, by actively engaging city stakeholders throughout the project, the “Wandering Trees” campaign of engaging citizens in collaboratively planning, choosing and physically moving the trees around the city of Bottrop will continue to be run in 2020 and beyond.

iSCAPE Living Lab experiences and innovative solutions for improving air quality in Europe are shared on the project website [www.iscapeproject.eu/](http://www.iscapeproject.eu/), including a collection of Living Lab tools and methods - citizen stories, engagement guides, toolkits and plans - as well as an overview of the iSCAPE sensor platform developed during the project and enabling citizens to get involved in measuring air pollution locally.

**“I felt that we had achieved something really positive, and look forward to future cooperation.”**

Liz Critchfield, Secretary to the Burpham Community Association.

## Multi-method approaches to engagement in iSCAPE Living Labs

Achieving the required level of realism and citizen and stakeholder engagement in experimentation and co-creation requires a careful selection of human-centred approaches, choosing the right activities for the correct target audience and matching the desired aims.

In Bottrop, the “Wandering Trees” parade (Figure 3) was an annual event where dozens of trees were moved from the city center to the surrounding locations, chosen by and transported by citizens themselves in a ‘parade’. The event was preceded by stakeholder workshops to determine the route and location of the trees, types of trees, maintenance. Similarly, playful co-creation and co-design approaches were utilized in Dublin (Figure 4),



involving different citizen groups in designing the low boundary walls. The events utilized for example LEGO® bricks in workshops and involved children throughout the project.

**Figure 3:** iSCAPE Living Lab Bottrop: Wandering Trees parade.



**Figure 4:** iSCAPE Living Lab Dublin: Citizens designing a low boundary wall.



Informational and interactive approaches were demonstrated in the cities of Bologna and Guildford. In Bologna several experimental campaigns to measure air quality in the pilot locations were performed, exploring both the effects of trees in street canyons and photocatalytic coating on air pollution control (Figure 5). Real time data and informational events involved citizens throughout the process. At the same time in Guildford, the pilots focused on displaying air pollution information while monitoring to inform citizens about air pollution in an engaging way, demonstrating the effect of green infrastructure on air pollution control (Figure 6). Co-creation activities included participatory mapping for green infrastructure in Guildford.

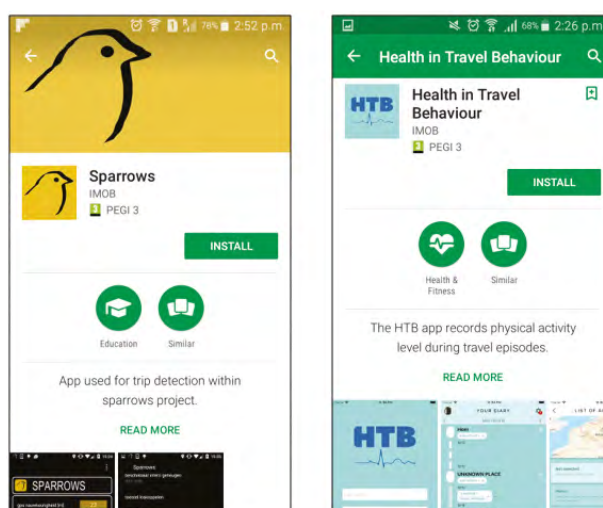
**Figure 5:** iSCAPE Living Lab Bologna: Set-up of experimental campaign.



**Figure 6:** iSCAPE Living Lab Guildford: Students involved in air pollution measuring activities.



In Hasselt travel behavior experiments were conducted by recording daily activity patterns of participants through a mobile application (Figure 7). Customized information was produced on individual exposure to air pollutants as well as an individual's contribution to CO<sub>2</sub> emissions. The behavioral studies in travel behavior were used to test their impacts of a variety of policies.



**Figure 7:** iSCAPE Living Lab Hasselt: Mobile applications for recording travel behaviour.

**Figure 8:** iSCAPE Living Lab Vantaa: students working on simulations.



Joining forces with the Finnish Science Centre Heureka, the Vantaa Living Lab reached 1.035 students through a summer camp for the ‘future city planning’. The colourful drawings of children on the future cities were transformed into micro-climatological simulations and the analysis of the results was shared with the participants for a discussion (Figure 8).

The iSCAPE Living Labs share a number of lessons learnt from their experiences in working with stakeholders:

**Careful preparation is needed for the user engagement and co-creation activities**, supported by expert training and capacity building sessions. The early involvement of citizens, city administration and the press is crucial to the success of the Living Lab.

**Collaborate and join efforts with other organisations, events, initiatives or projects**, combining resources, expertise and reach can be mutually beneficial for all. Gain a wider reach and participation by combining networks and sharing events.

**Think about the variety of the audience**; in iSCAPE many Living Labs have engaged children in various activities. Children are an important and vulnerable group in relation to air pollution and can share their lessons learnt for years ahead.

**Open questions are particularly effective**, avoid over-managing the discussion. Encourage participants to communicate and discuss, empowering their voice in the process.

**Provide information in a clear and visual way**, simplifying materials from too much detail in a way that is easy for the citizens to understand. Change your language where necessary, to communicating with each stakeholder group according to their interests and level of expertise in the topic.



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## Highlights

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- Creation of multiple and diverse stakeholder relationships with sustainability plans for the post-project phase.
- Involvement of more than a thousand citizens in the six urban pilots, including children, students and adults.
- Promotion of pro-environmental behavioural changes within the population.
- Increased consensus among all stakeholders on air pollution measurement, control and prevention strategies.
- Development of new ideas and promising concepts to tackle air pollution, co-created with local citizens through the iSCAPE living labs, such as informational displays.
- Increased collective awareness and knowledge of air pollution and its impact for healthier cities.

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## Recommendations

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The evidence gathered in the iSCAPE Living Labs demonstrated the pivotal role of citizen intelligence and local stakeholder engagement in developing new and innovative policies, actions and strategies for air pollution prevention and control in European cities.

The following recommendations apply to local policy makers for replicating this experience and find new ways to tackle the challenges related to urban climate:

### 1. Multi-stakeholder Participation

In Living Labs, all stakeholders (private, public, academia, citizens) work together in collaboration, sharing knowledge and resources, creating value across the entire ecosystem with and for all involved.

### 2. Active Citizen Involvement

Citizens are placed at the center of the innovation process, focused on designing solutions not only for their needs and desires, but most importantly with the residents themselves. iSCAPE Living Labs share a variety of lessons learnt in how to connect with local communities, available at [www.iscapeproject.eu](http://www.iscapeproject.eu).

### 3. Real-life Environment

Moving experimentation from a laboratory setting to the real-life environment brings the innovation process closer to reality, engaging citizens and stakeholders in their natural physical, technical/informational, social and task contexts. The iSCAPE Living Labs highlighted the importance of taking the experiments to the streets, experimenting, monitoring and engaging at the urban level.

### 4. Co-creation

In a co-creation process different sources of knowledge and perspectives are brought together through the engagement of various stakeholders,

including citizens. Through co-creation all actors in the Living Lab are placed on an equal playing ground, creating trusting relationships, inclusive results and a sense of ownership for all parties involved.

## 5. Multi-Method Approach

The engagement of a variety of stakeholders with diverse perceptions, expertise and needs requires a Multi-Method Approach. iSCAPE methods, tools and experiences are publicly available and share guidelines, tips and lessons learnt on Living Lab methods.

## Keywords to remember

### Living Lab:

A citizen-centred urban innovation ecosystem, based on systematic user engagement in real-life settings through a wide variety of methods and tools, with the participation of multiple stakeholders in the co-creation of innovations.

### Passive Control Systems:

Green and built urban infrastructure for air quality and/ or urban thermal comfort improvement, including e.g. low boundary walls, trees and hedges, green walls and roofs, photocatalytic coatings, green urban spaces and road geometry interventions.

### Behavioural Change Interventions:

Actions and initiatives taken to influence individual behaviour in a specific domain such as mobility, energy conservation, recycling, pollutant exposure reduction.

## Read More

The content presented herein is based on the following key project deliverables: **D1.1** 'Report on challenges and opportunities in iSCAPE Cities' (February 2017), **D2.2** 'Implementation plans for the iSCAPE Living Labs' (May 2017), **D2.5** 'Community Feedback Report' (March 2019), **D5.5** 'A plan for extending the life of the Living Labs beyond the project' (August 2019) and **D7.11** 'Living Labs for air quality knowledge and policy package'.

All reports are available on the iSCAPE project website: [www.iscapeproject.eu](http://www.iscapeproject.eu)

## Impressum

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## The iSCAPE project

iSCAPE aimed to reduce urban air pollution and the negative impacts of climate change by leveraging sustainable passive control systems, behavioural change initiatives and the Living Lab approach.

For more information: [www.iscapeproject.eu](http://www.iscapeproject.eu).

### iSCAPE partners:

University College Dublin



University of Bologna



University of Surrey



Finnish Meteorological Institute



Hasselt University



TU Dortmund University



JRC - Joint Research Centre - European Commission - Institute for Environment & Sustainability



Institute for Advanced Architecture of Catalonia - FabLab Barcelona



T6 Ecosystems S.r.l.



Nanoair Solutions S.r.l.



Future Cities Catapult Ltd.



Dublin City Council



Regional Agency for Prevention, Environment and Energy of Emilia-Romagna



European Network of Living Labs



Trinity College Dublin



## Smart Control of Air Pollution - Policy Briefs

The Smart Control of Air Pollution - Policy Briefs series summarises key outcomes of the iSCAPE project with a clear policy orientation, to provide practical information to EU local decision-makers and other urban stakeholders. They cover the following topics:

- No. 1** Living Labs for air pollution control and prevention
- No. 2** iSCAPE manifesto for citizen engagement in science and policy
- No. 3** Effectiveness of travel behavioural change interventions
- No. 4** Simulating change in urban air quality and climate conditions
- No. 5** Urban strategies and interventions for planning healthier cities
- No. 6** Improving air quality and climate with green infrastructure
- No. 7** Air quality sensing and real time reporting in cities
- No. 8** Introducing infrastructural passive control systems in cities
- No. 9** Citizen Science: a collaborative approach to air pollution control