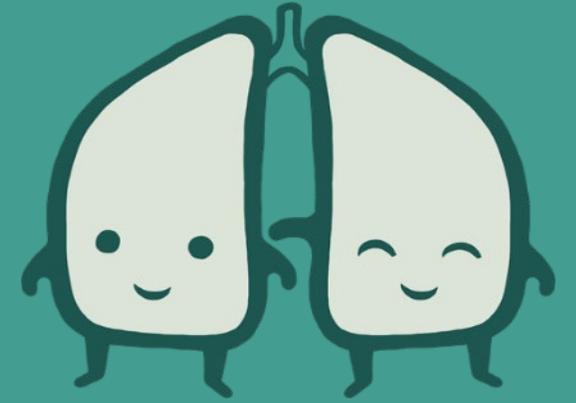


Best practices from Breathe London

Lessons learned from integrating hundreds of air quality sensors with the largest and most advanced regulatory monitoring network in Europe



**Imperial College
London**

MAYOR OF LONDON

**Bloomberg
Philanthropies**

 clarity

Session moderated by



MAYOR OF LONDON



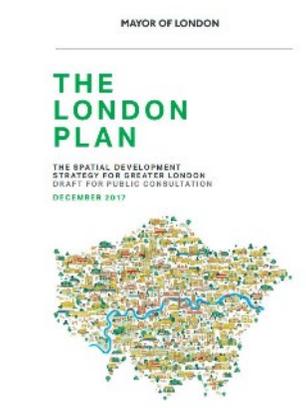
London's Breathe London network

Sara-jane Millar, Senior Policy and Programme Officer, Greater London Authority

Tackling London's toxic air is a Mayoral priority and we have integrated policies to do this



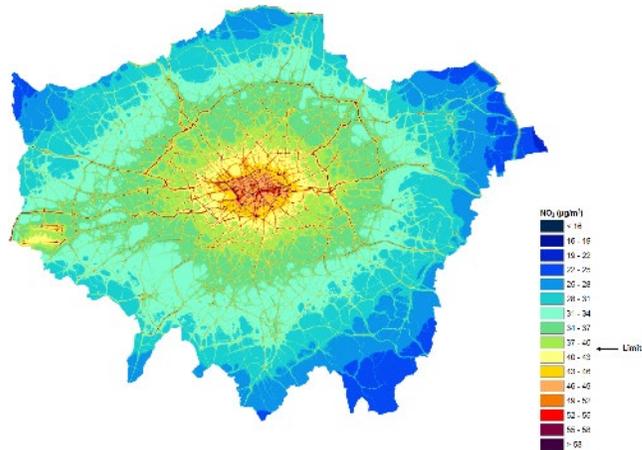
Population of 9.5 million
33 local authorities (boroughs)



“London will have the best air quality of any major world city by 2050, going beyond the legal requirements to protect human health and minimise inequalities.”

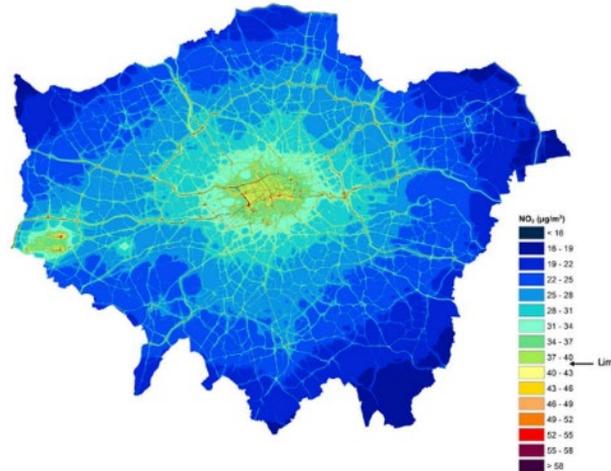
Our strategic approach

1. Reducing exposure of Londoners to harmful pollution [now]



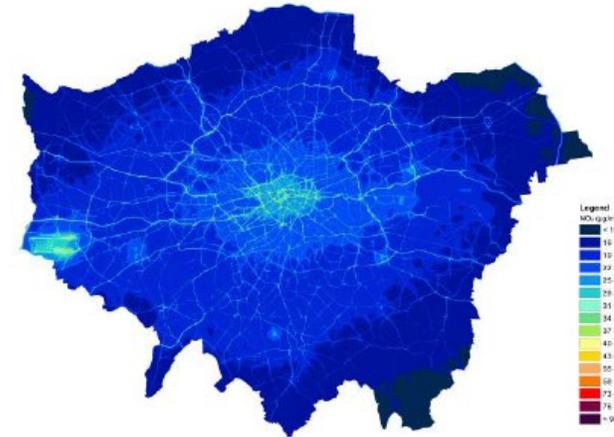
2016

2. Achieving legal compliance with UK and EU limits [by 2025]



2019

3. Establishing and achieving WHO [by 2030]



2025*

* Currently being remodelled

In 2019, air pollution contributed to premature deaths over 4000
Since central ULEZ 2019, seen a 44% reduction in NO₂ inside the central zone
Since ULEZ expansion in 2021 93% vehicles are compliant

We are addressing the source of harmful emissions alongside monitoring and evaluation

- Addressing the source of harmful emissions:
 - Ultra Low Emission Zone (ULEZ)
 - Cleaner bus fleet
 - Zero emission capable taxis
 - Low Emission Zone (LEZ)
 - Investing in walking and cycling
 - Electric vehicle charging infrastructure
- We are monitoring air pollution with one of the worlds largest network of over 120 regulatory analysers
- Research Programme has helped build evidence and win public debate



But pollution remains a public health challenge

- People in deprived areas worst affected
- Coroners inquest concluded that air pollution was a main cause of the death of Ella Ado Kiss-Debrah
- Highlighted a need for greater awareness of the sources of information about air pollution and enlargement of monitoring capacity

Objective 4.1. Support and empower London and its communities, particularly the most disadvantaged and those in priority locations, to reduce their exposure to poor air quality.

Objective 11. To work with all relevant partners around actions to clean up air and mitigate the effects of air pollution. These will be informed by an understanding of the groups most likely to experience poor air quality.

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

Coroner says failure to reduce pollution levels to legal limits was factor in death of Ella Kissi-Debrah, who had severe asthma



Piloting sensor technology

- Convened by GLA & C40 (2018-20)
- Funded by the Children's Investment Fund Foundation via Clean Air Fund
- Delivered a consortium led by Environmental Defence Fund (2018-2020)
- Trialling 3 types of monitoring: fixed lower cost sensors at over 100 locations; mobile monitors on Google Streetview cars; wearable monitors

Impacts: detecting changing pollution levels in ULEZ; spike in pollutants at bus garage; decrease in NO₂ at School Streets



Transforming London's monitoring through a community sensor network



Breathe London objectives:

- Enhance London's monitoring capacity
- Combine Breathe London data with London's regulatory network
- Put monitoring in the hands of Londoners:
 - data access via the website;
 - buying into the network;
 - or via the community programme



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Democratising air quality data with London's Breathe London community programme



- A scalable network of c.300 air quality sensors.
 - 136 Mayor funded; 66 BP funded
- Designed to empower citizens with evidence to raise awareness, make interventions, or campaign for change
- Community programme offers 60 nodes to vulnerable communities including Black, Asian and minority ethnic Londoners or in areas with poor air quality, limited green space, or with high deprivation.

Community stories



Mar 31, 2022

Cadogan: Chelsea 2030 – Building a sustainable future

“This data will give us the tools to understand trends and patterns in air quality, and work in partnership with our community to improve it, for the benefit of public and planetary health.”

Data is only half the story; lessons learned

- Power of, and appetite for, data
- Focus on locations where people spend time
- Build in air pollution expertise
- Make the data come to life
- Involve the community
- Resource planning

Clean Air for Schools - Hackney



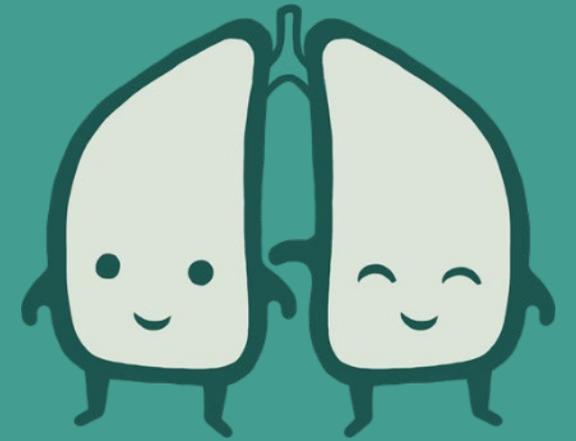
'The pathway towards lasting change is paved with the actions of passionate community members who are harnessing air quality data to effect change in the spaces where they live, breathe, work and play.'
Clean Air for Schools

What next...?

- Continuing to build the network
- Engaging with existing and new users
- Enhancing website and support for hosts
- Developing support offer for community groups e.g. how to mobilise action
- Scaling up (in Breathe Global)

Breathe London: Delivering a civic community network

Dr Ben Barratt, Imperial College London
ASIC, May 2022



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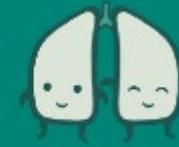
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Our delivery objectives for Breathe London



Breathe London
the community sensing project

- Create a network that empowers communities to monitor their own neighbourhood
- Be rapidly scalable and accessible to diverse users
- Be affordable with a sustainable funding model
- Provide robust air quality information trusted by authorities and communities
- Integrate with regulatory monitoring
- Produce meaningful contextualised data spatially and temporally consistent
- Provide engaging impactful interpretation, with open access to data

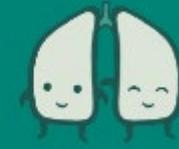


Not data for data's sake!

The Breathe London Network is an air quality sensing community made by Londoners for Londoners. Anyone can join.

[Learn more](#)

Managing accessibility at scale



Breathe London
the community sensing project

- Network cohesion – aim and context
- Hosting agreement – liability, insurance
- Sensor supply chain – shipping, calibration, deployment
- Siting and installation – infrastructure, power supply, health and safety
- Data management – ongoing hands-on support from a team of air quality professionals

For individuals



Anyone can join the Breathe London Network. Join a network of people passionate about improving air quality across London.

For community groups



Small, affordable and backed by Imperial College London, the Breathe London Node can empower communities to monitor and take action.

For business



Businesses and estates are joining the effort to help improve air quality for all. Find out how your business can get involved in the fight for cleaner air.

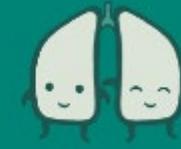
For local government



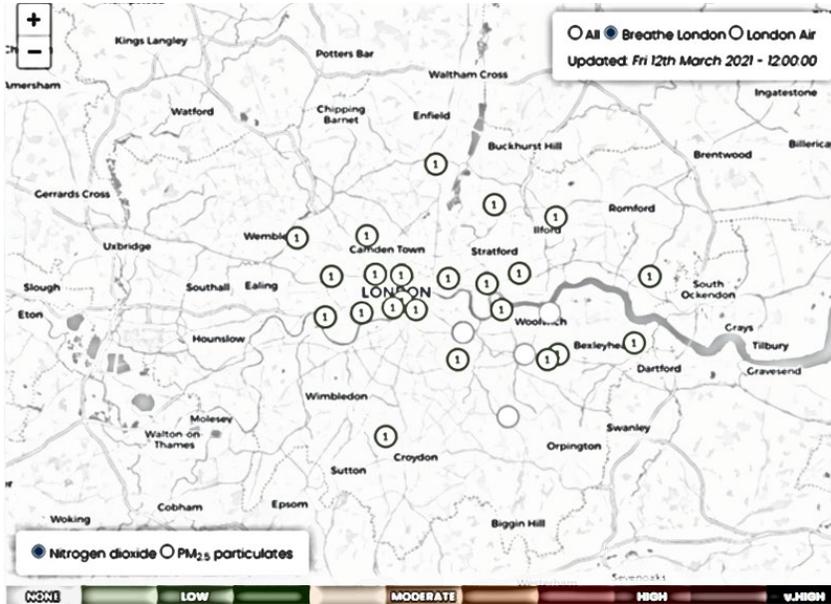
Small, light and affordable with tight integration with the London Air Quality Network; the Breathe London Node is a perfect complement to regulatory monitoring.



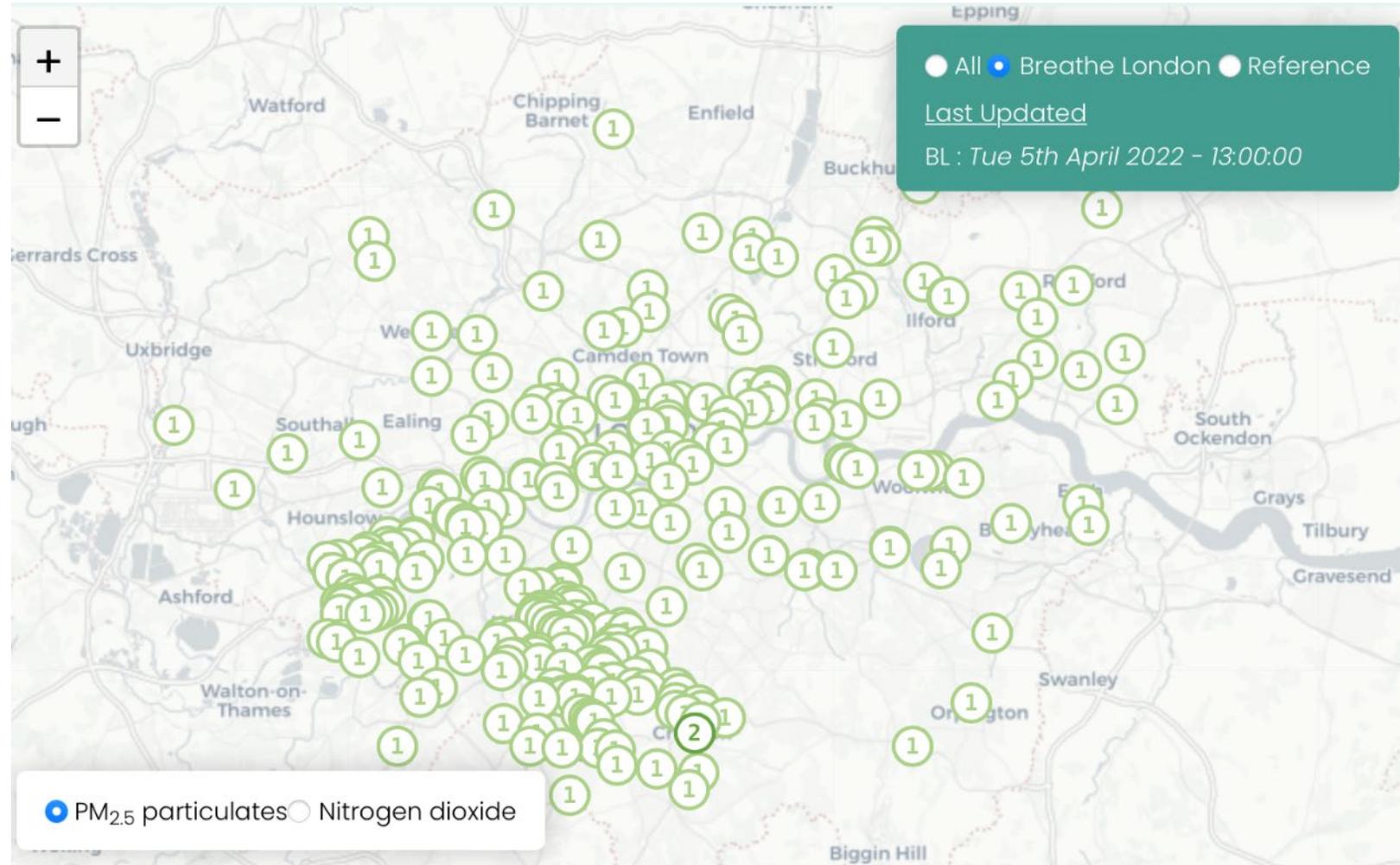
The first 12 months - rapid expansion



Breathe London
the community sensing project



Breathe London April 2021 (22 sites)

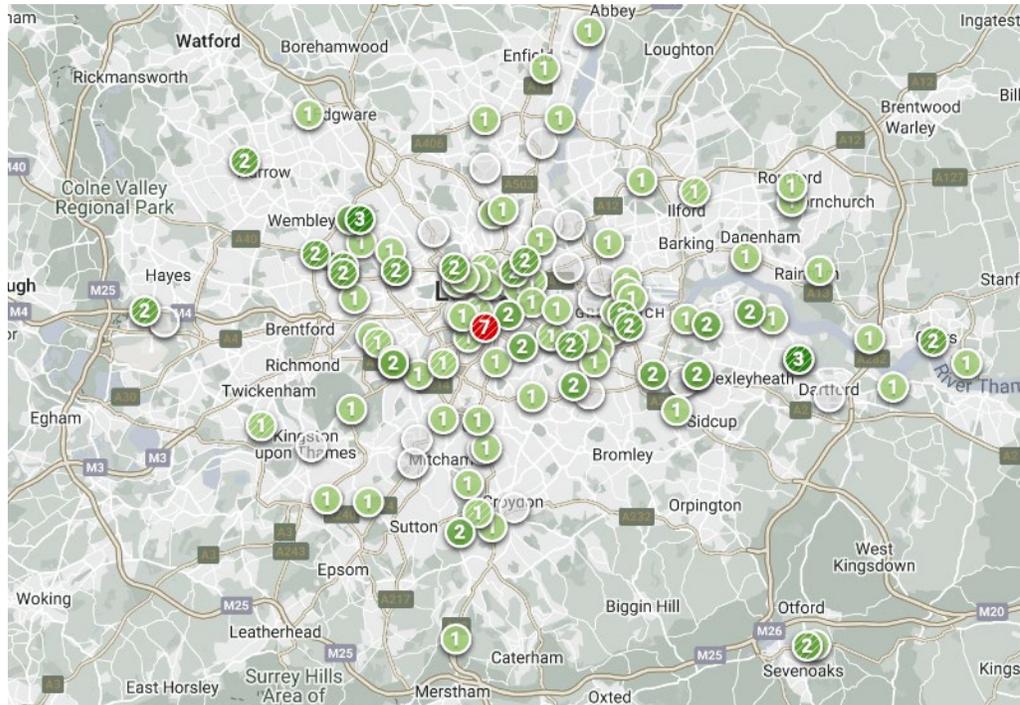


Breathe London April 2022 (294 sites)



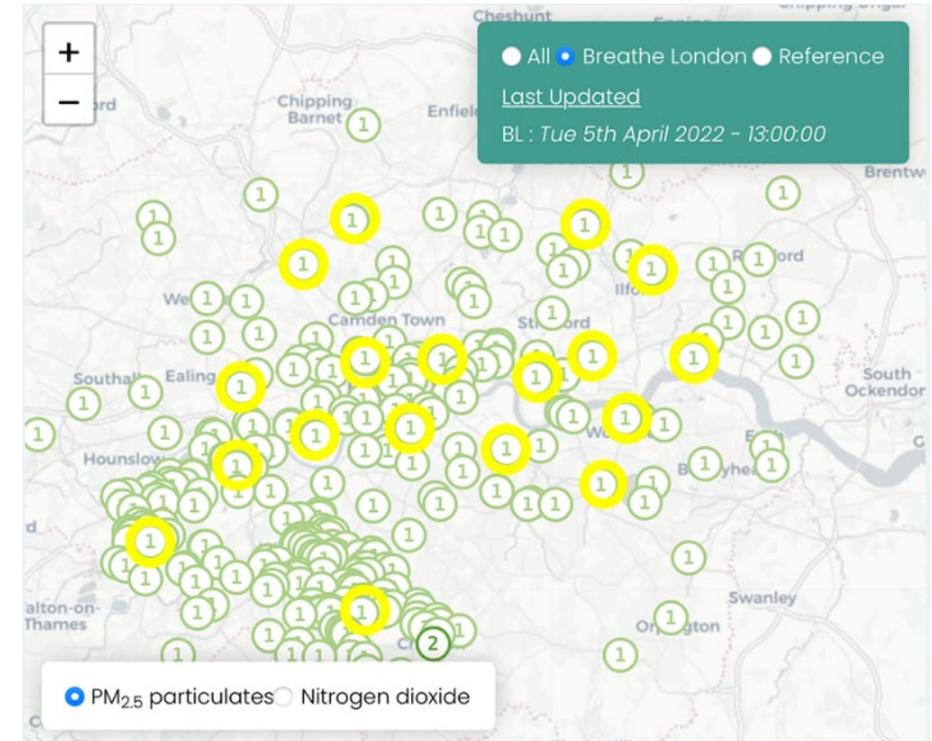
Trusted measurements

- Synergy with regulatory monitoring network (LAQN)
- QA/QC, siting protocols, data sharing...



London Air Quality Network (LAQN)

www.londonair.org.uk

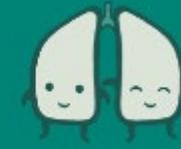


Permanent co-located sites

www.breathelondon.org



Dynamic precision and accuracy scaling



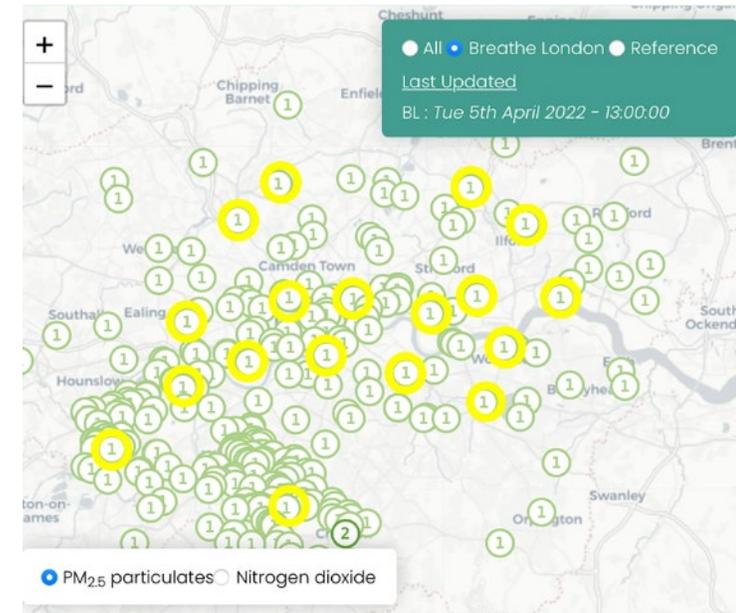
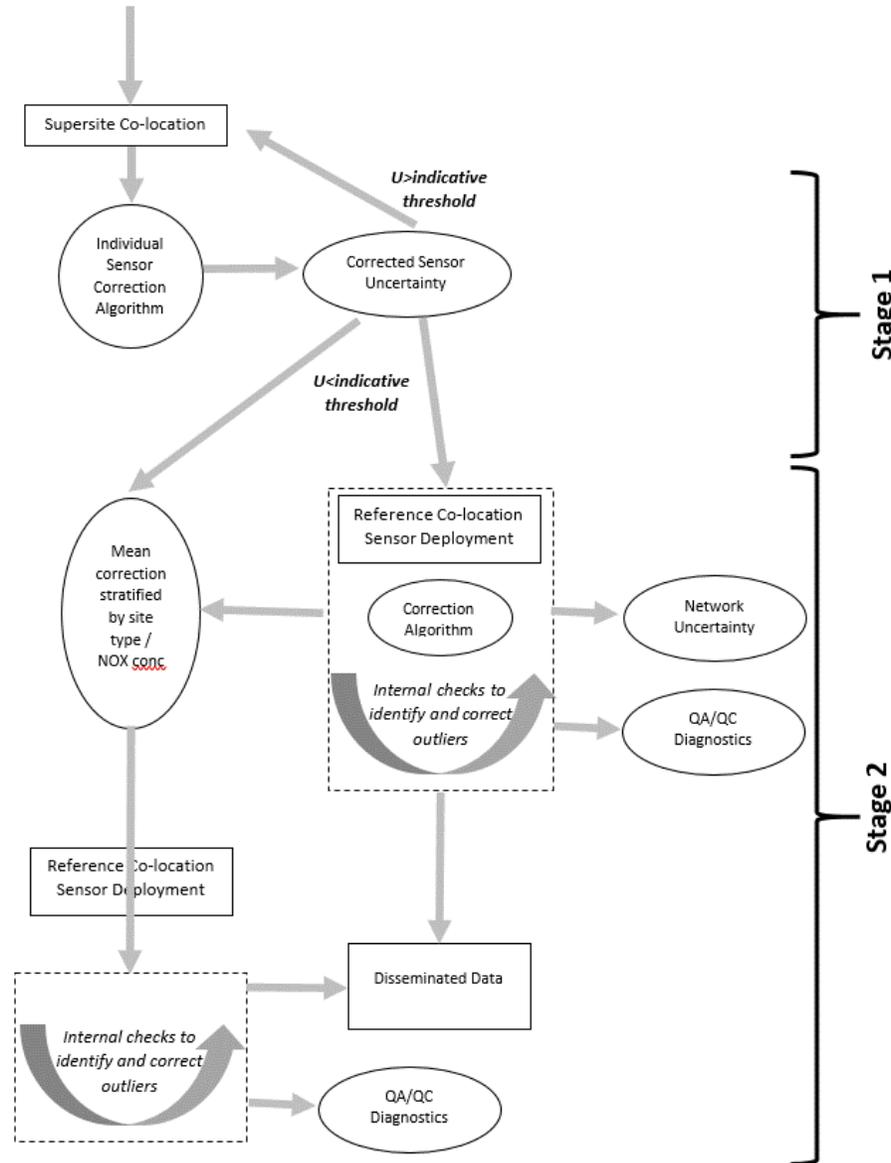
Breathe London
the community sensing project

Stage 1 – precision scaling

- Batch co-location at supersite for 10 days prior to deployment
- Corrected to 'reference node' or rejected if outside U limits

Stage 2 – accuracy scaling

- Dynamic correction using categorised co-located nodes
- MLR corrects for daily variation in RH, O₃ and PM composition
- Real time network-wide scaling

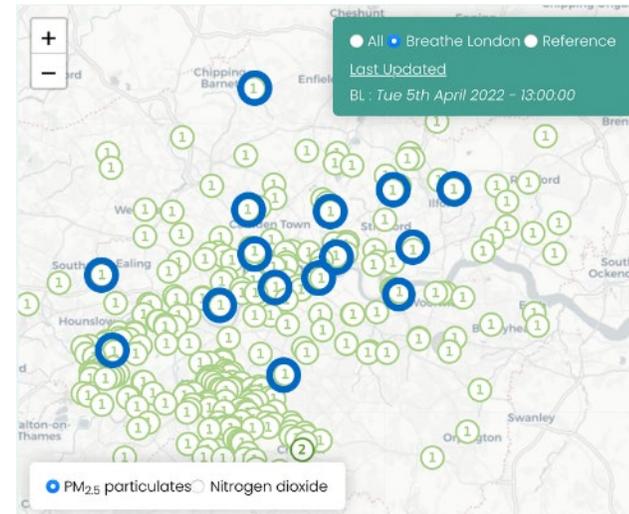


Community-focused knowledge transfer

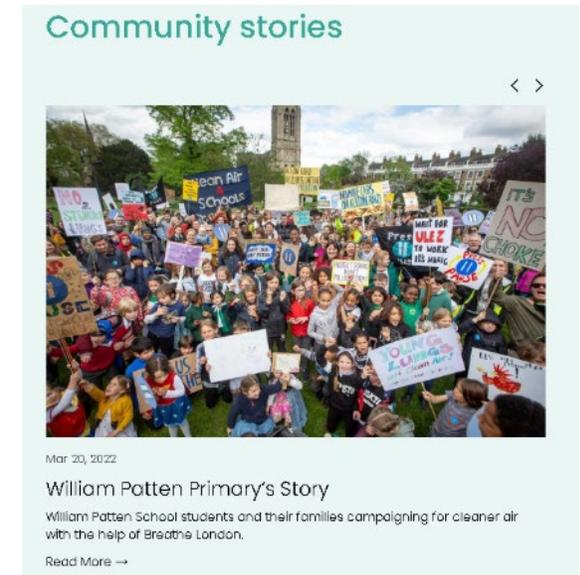
- Builds on 28 years of information for Londoners
- User stories for awareness & education
- Assessing standards & monitoring change
- Local Authorities, Businesses, Developers...
- Funded Community Programme



Communities



Hospitals



Schools





Feeding NYC Health Care Workers



Convening Mayors to Support COVID-19 Recovery



Strengthening Global Climate Activism



Advancing Cutting-Edge Research



Increasing Sustainability in Cities



Improving Transportation and Road Safety



Increasing the Number of Black Doctors



Protecting the Oceans



Fighting for Clean Air



Retiring Coal Plants Globally



Supporting Communities with Best of Bloomberg Volunteers



Advancing College Access and Success



Training Health Care Workers in Africa



Spurring Community Volunteering



Helping Cities Respond to COVID-19

From cover of Bloomberg Philanthropies' 2020 Annual Report

Bloomberg Philanthropies

Bloomberg
Philanthropies

Air Pollution

WHY TAKE IT ON?



- Air pollution is a **major threat to public health and leading cause of death**
- We believe in the **power of data, technology and partnership with cities** to underpin efforts to tackle air pollution
- Bloomberg supports **technical expertise and data research** to help cities improve their air quality monitoring and tackle the issue

OUR STRATEGY



STRONGER
EVIDENCE AND DATA



PUBLIC HEALTH
AWARENESS



POLICY ENGAGEMENT
AND ADVOCACY



PEER-TO-PEER
LEARNING

Europe

WORKING WITH CITIES TO IMPROVE AIR POLLUTION MONITORING AND POLICIES

Paris, France

- Partnered with the city to **install 150 air quality sensors in schools** and gather localized data to inform policy decisions.



Milan, Italy

- Partnered with the city to **install low-cost sensors at 50 schools and 10 priority locations.**



- Launching **educational campaign in schools**

London, UK

- We partnered with the city to deploy a network of 196 sensors, providing communities access to data



Brussels, Belgium

- We partnered with **Brussels-Capital Region Government** to tackle air pollution.

- Supporting **innovation, research, citizen engagement, and education** programs.



Asia

Partnered with Indian government on air quality in 2019. **Launch of India's National Clean Air Program** - with target to reduce air pollution by 20-30% by 2024



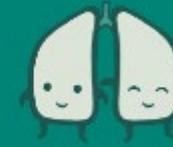
Working in over **10 Indian cities** to support clean air action plans and research on sources of pollution

Launched **partnership with the city of Jakarta** and Governor Anies Baswedan in 2020 to help the city tackle air pollution



Governor has officially **instructed actions to reduce pollution**, such as public transit use, ban on older vehicles, installing solar panel roof top on buildings, etc.

Breathe London: Community Programme



Breathe London
the community sensing project



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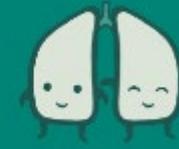
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Philanthropies

clarity

Andrew Grieve
Imperial College London
ASIC May 2022



What is the programme?

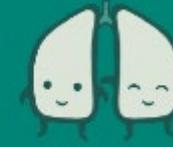


Breathe London
the community sensing project

- Funded sensors for communities (Bloomberg Philanthropies)
- 60 sensors over 3 years.
- Aiming to reach disadvantaged communities.
- Geographic & demographic spread.
- Empower communities to improve air quality in their neighbourhood.



How did we go about it?



Breathe London
the community sensing project

- Broadly targeted social advertising.
- On-the ground leafleting, libraries, community hubs, doctor surgeries, supermarkets, coffee shops
- Online application process
- 43 applications
- Independent judging panel

Free air quality sensors for communities

YOUR AIR, YOUR COMMUNITY, YOUR IDEAS

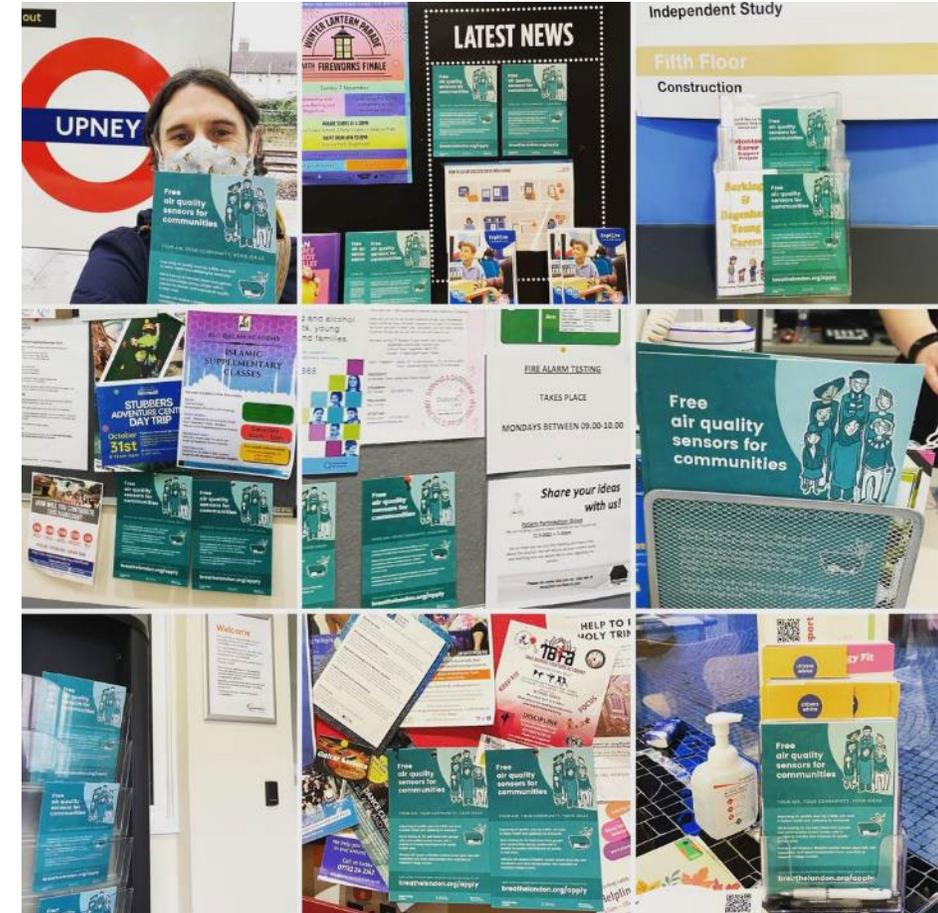
Improving air quality, even by a little, can lead to better health and wellbeing for everyone.

We're looking for the best ideas from groups and communities across London with a passion to monitor and improve air quality in their area.

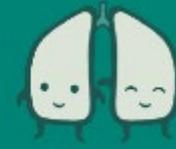
Winners will receive a Breathe London sensor plus help with installation and data interpretation from scientists at Imperial College London.

Apply online or overleaf before December 3rd for your chance to win
breathelondon.org/apply

Imperial College London clarity Bloomberg Philanthropies



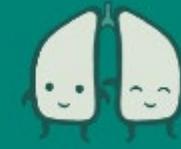
First 10 groups



Breathe London
the community sensing project



Early success & engagement



Breathe London
the community sensing project

Redbridge mum wins bid for playground air quality monitor

Redbridge mum has won a bid to install an air quality monitor at a children's playground in South West London.

Ms. [Name] has secured a grant from the local council to fund the purchase of a monitor. The monitor will be installed at the playground, which is used by many local children. Ms. [Name] is a mother of three children and has been campaigning for better air quality in the area for some time.

The monitor will provide real-time data on air quality, which will be made available to the public. This will help to raise awareness of air quality issues and encourage people to take steps to reduce their own carbon footprint.

Ms. [Name] is a member of the local community group and has been working with the council to secure the grant. She is delighted to have won the bid and is looking forward to seeing the monitor installed at the playground.



Life on one of the UK's most polluted high streets where murky air plagues locals

Locals have started measuring the amount of pollution in their area.

Over 500 people have taken part in the project, which aims to raise awareness of air quality issues and encourage people to take steps to reduce their own carbon footprint.

The project has been a success, with many people reporting that they are now more aware of air quality issues and are taking steps to reduce their own carbon footprint. The project has also helped to raise awareness of air quality issues in the area and has encouraged people to take steps to improve air quality.



What does the future of air pollution in London look like? | 5 News

CLEAN AIR BAYSWATER

STOP PRESS!

We are delighted to announce the official launch of **Clean Air Bayswater**

We would like to invite you to our launch event on Wednesday 15 June 7:00 - 8:00 pm at St Stephen's Church, Westbourne Park Road.

The key speaker at the event will be Dr Gary Fuller, Lecturer in Pollution at Imperial College, London. He will tell us more about air pollution and how we can minimise our exposure to it. He will also take questions from the audience.

Welcome to our community group
Championing clean air in our neighbourhood

Air pollution impacts our lungs, heart and brain, irrespective of age.

So our aim is to improve our health, well-being and the air we breathe by encouraging everyone living or working in Bayswater to join in, and take some simple steps to reduce air pollution in our area.

Join our 12-month programme to learn more about the health implications of air pollution, make some small changes and importantly have some fun together.

Please click here to find out what you can do, whether you are a resident, business, school or GP.

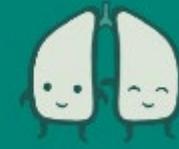
Together we can make a difference.

CLEAN AIR BAYSWATER. Love your Lungs. Heart. Brain. TAKE ACTION NOW!

Co-funded and supported by Imperial College's Breathe London Network and Westminster City Council



Evaluation



Breathe London
the community sensing project



Dedicated researcher/community support person.



Follow-up meetings through programme.



One-on-one interviews with all groups.



Capture successes & challenges through course of programme.



Best practices from Breathe London

What makes city-scale air sensor networks successful?

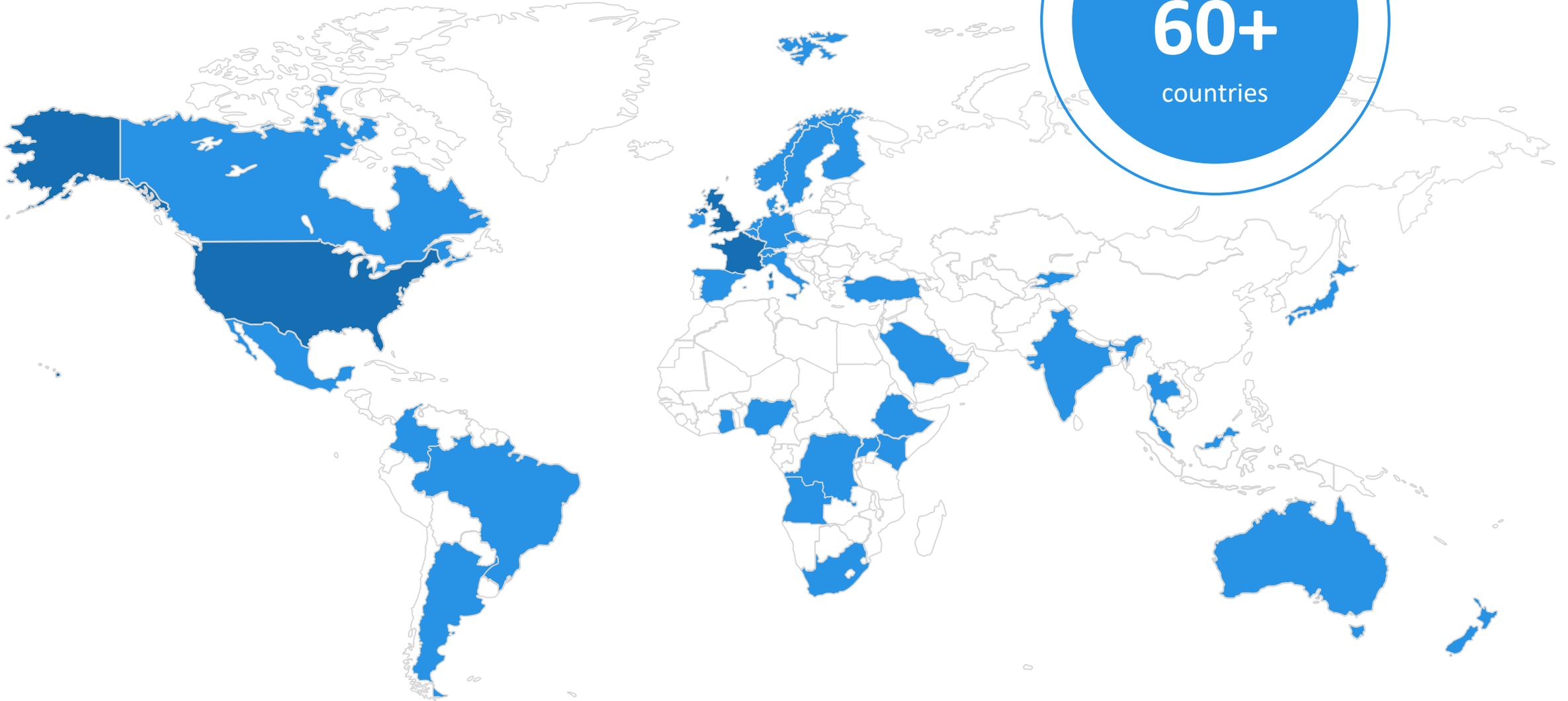


A globally-adopted air quality measurement solution

Deployed in

60+

countries



Addressing a wide range of use cases



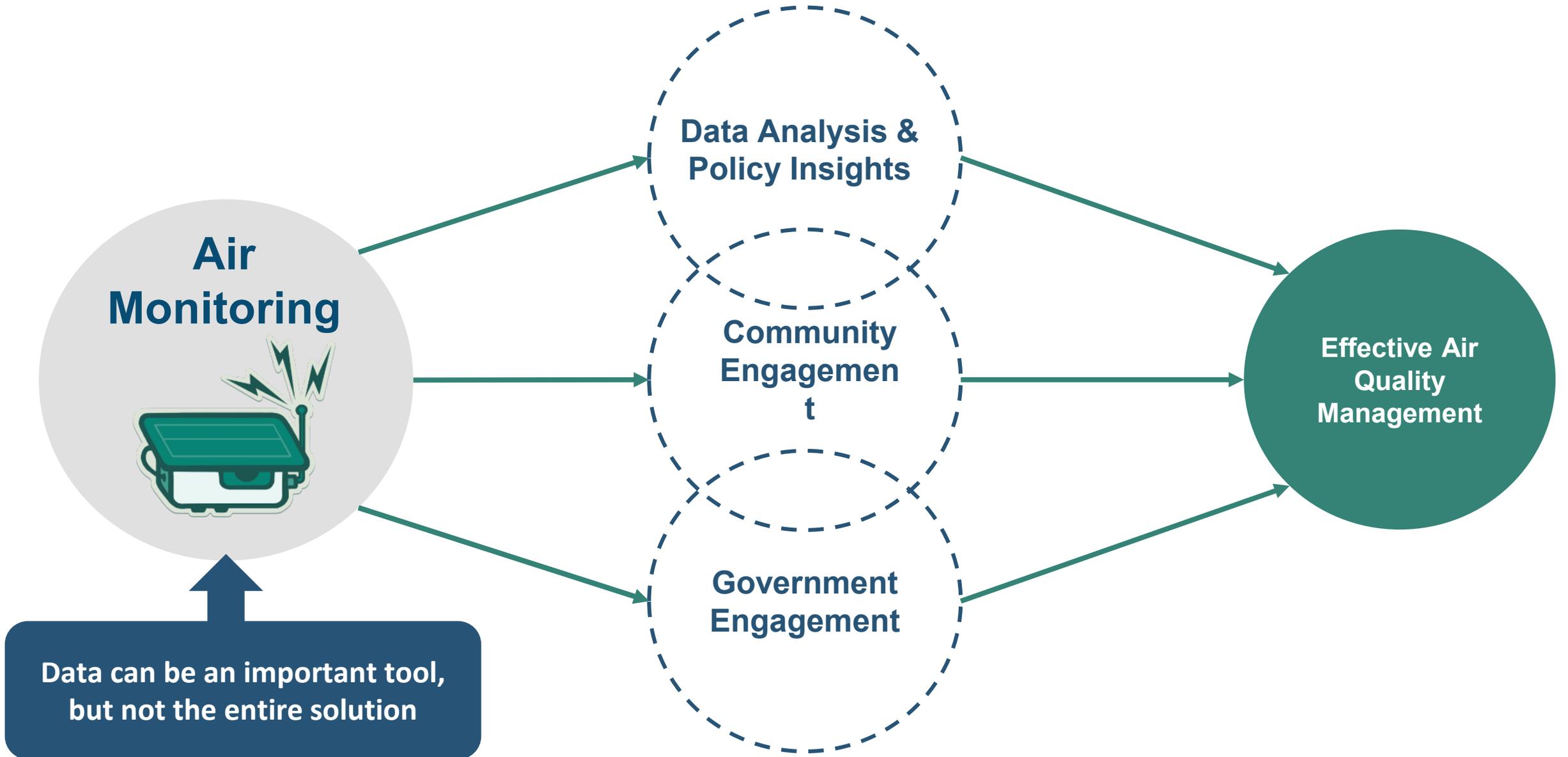
What makes city-scale air sensor networks successful?

**Air
Monitoring**

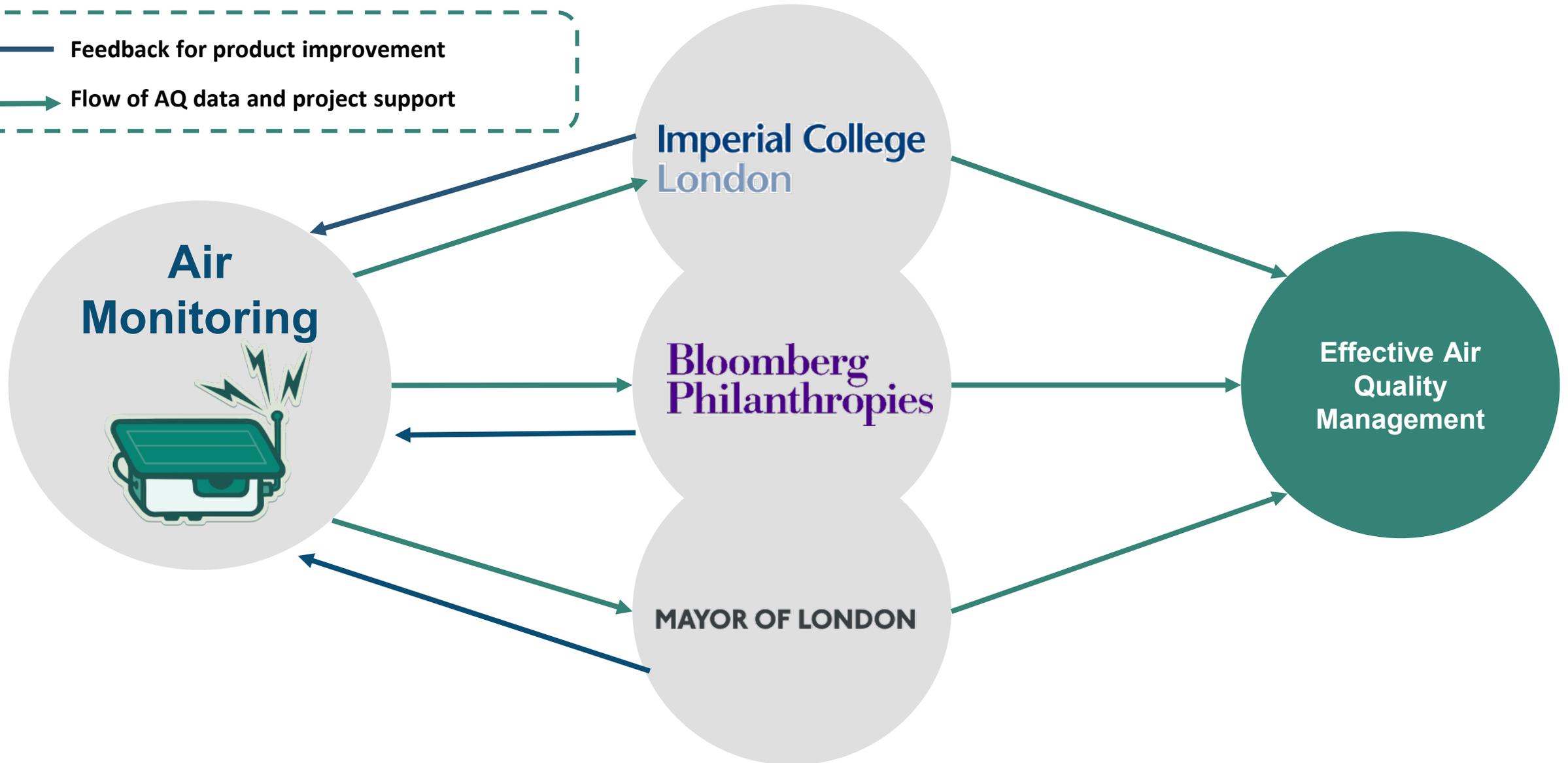


alone is not enough...

What makes city-scale air sensor networks successful?



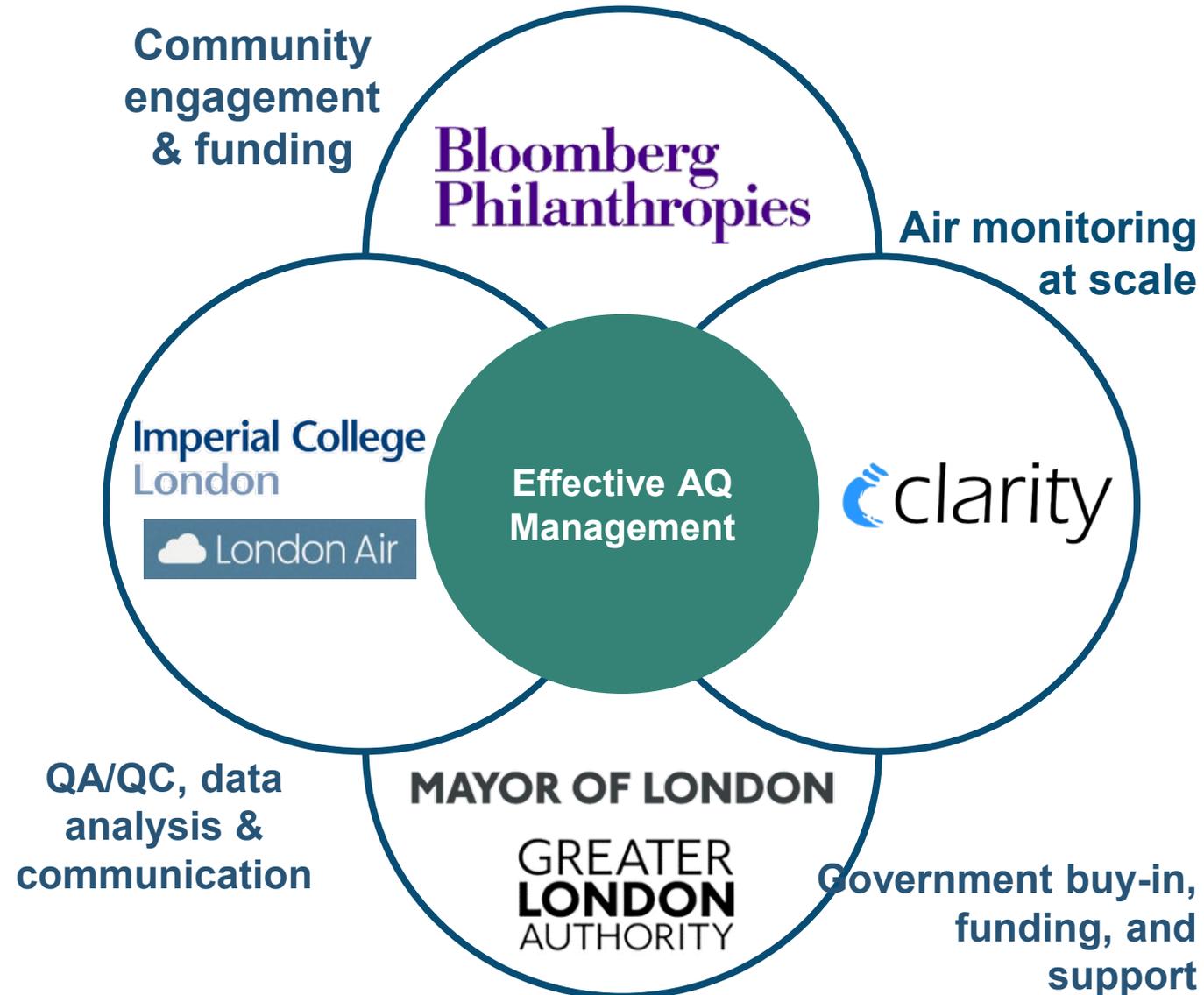
What makes city-scale air sensor networks successful?



Successful city-scale air sensor networks require much more than just technology

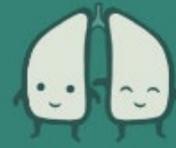
Success factors

1. Right project team (skillsets and “org chart”) in place
2. Supported by local authorities
3. Funding for program support (not just tech)
4. Technology built to perform at the city scale
5. Open data, communicated effectively to stakeholders
6. Mechanism for communities to get involved & take ownership



Additional questions?

Q&A or visit Breathe London website



Breathe London

the community sensing network

We're here to answer any questions!

Use Zoom Q&A box !

Learn more on the Breathe London website

breathelondon.org

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