

RICARDO  
EMAQ+

# Air quality and climate change co-benefits

## EMAQ Webinar

September 2022

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RICARDO  
EMAQ+

Chartered  
Institute of  
Environmental  
Health

IAQM

Institute of  
Air Quality  
Management

The Scottish  
Government

ENVIROCONSULT  
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LQM  
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Defensible decisions

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AECOM

SBS  
SOUND BARRIER SOLUTIONS

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## Air Quality Monitoring

At Ricardo we have a dedicated team of AQ specialists and look forward to helping you with any of your air quality challenges:

- ISO 17025 UKAS accredited **QA/QC audits** – required by LAQM TG (16)
- **Data management**, data collection, checking, validation, ratification etc
- **Local site operations**, calibrations/call outs
- **Web reporting**  
*<http://www.airqualityengland.co.uk/>*
- **Routine data reporting** – weekly, monthly, quarterly, annual – for example  
*[http://www.airqualityengland.co.uk/assets/reports/291/KensingtonChelsea\\_month\\_2019\\_01.html](http://www.airqualityengland.co.uk/assets/reports/291/KensingtonChelsea_month_2019_01.html)*
- **Short term monitoring surveys** (site installation/decommissioning through to reporting)
- Long term station hire
- Free advice on station installation and best practice
- Procurement of analysers and installation to LAQM TG (16) or AURN standards
- **Low cost sensor measurements**, network management
- **Real world vehicle emissions monitoring** aiding Action Planning
- **Mobile Monitoring** for point source and concentration contour mapping
- **Diffusion tube surveys**
- **Air quality forecasting** and public dissemination (via sms text, email, web, social media etc.)
- Air quality reporting
- LAQM TG (16) Annual Status Reporting (ASR), Detailed Assessment
- CAZ/LEZ consultancy
- Expert witness and Expert Advice
- Air Quality Modelling

For further information please get in touch with David Madle



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## IAQM – Institute of Air Quality Management



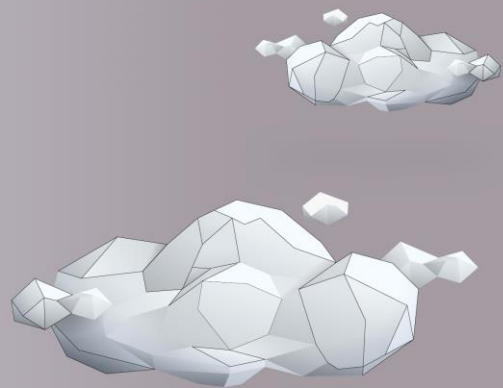
Institute of  
Air Quality  
Management

The mission of the IAQM is to be the authoritative voice for air quality by maintaining, enhancing and promoting the highest standards of working practices in the field and for the professional development of those who undertake this work.


IAQM would like to invite all EMAQ+ delegates working in Air Quality to join them, for more information and details of their membership.




Please visit the IAQM website - <https://iaqm.co.uk>



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## Agenda

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Part 1 - What is the link between Air Quality and Climate Change?


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Part 2 - What are the benefits of integrating Air Quality and Climate Change policy?

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Part 3 - How to integrate Air Quality and Climate Change policy

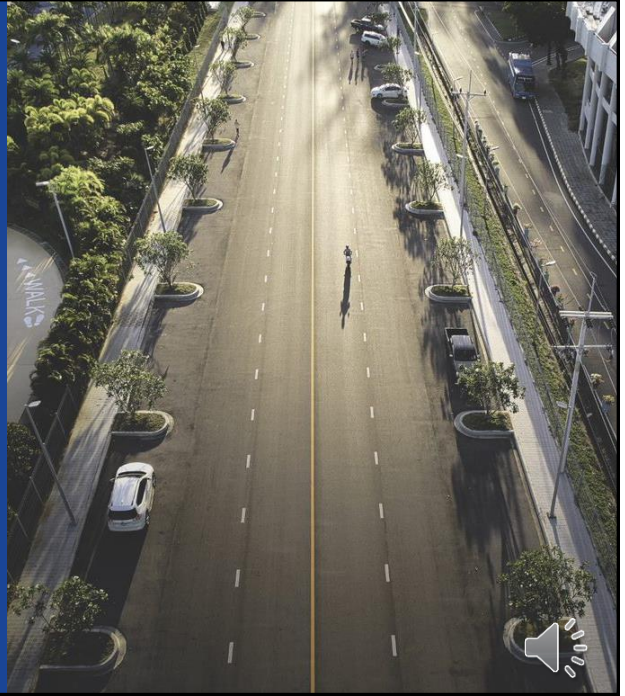
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## Part one

# What is the link between Air Quality and Climate Change?



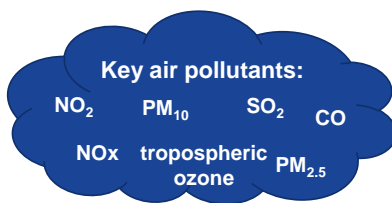
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## Air pollutants vs greenhouse gases



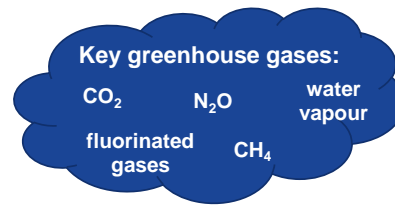
### Air pollutants:

- Short-lived in the atmosphere.
- Impacts we are concerned about occur close to the Earth's surface.
- Air pollution causes an increased risk of human health impacts, such as respiratory infections, heart disease, and lung cancer. Children and elderly people are more susceptible to the increased risk.



### Greenhouse gases (GHGs):

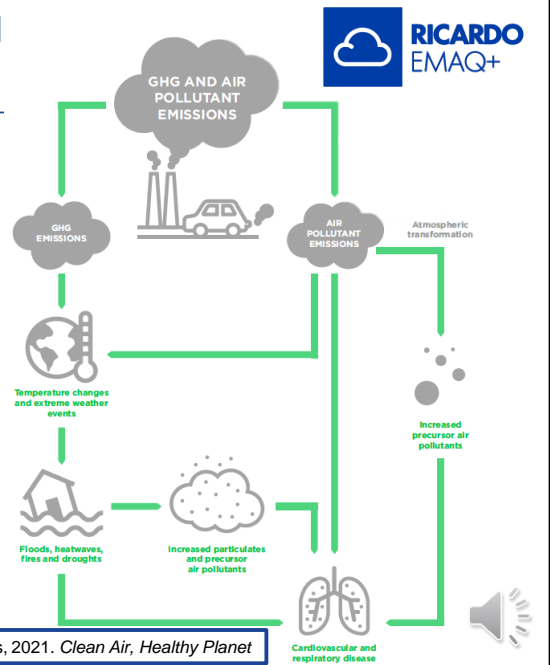
- Remain in the atmosphere for a long time.
- Absorb some frequencies of IR emitted from the Earth's surface, trapping heat in the atmosphere that would otherwise be re-radiated into space.
- Impacts of a warming climate include: increased drought, lost crops, drinking water shortages, sea level rise, increase in disease e.g. malaria.



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## Common sources of air pollutants and greenhouse gases

- Common emission sources:
  - Energy production
  - Transport
  - Agriculture
  - Manufacturing



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## The impact of air quality on climate change

- Climate change and **rising global temperatures** are caused by the release of greenhouse gas emissions to the atmosphere.
- The impact of air quality on climate change is **complex** because the range of pollutants have different properties.
- Some air pollutants are considered as short-term 'climate forcers':
  - Some have a **warming effect** on the climate:
    - Ozone
    - Black carbon
  - Whilst others have a **cooling effect** on the climate:
    - Sulphate
    - Sea salt



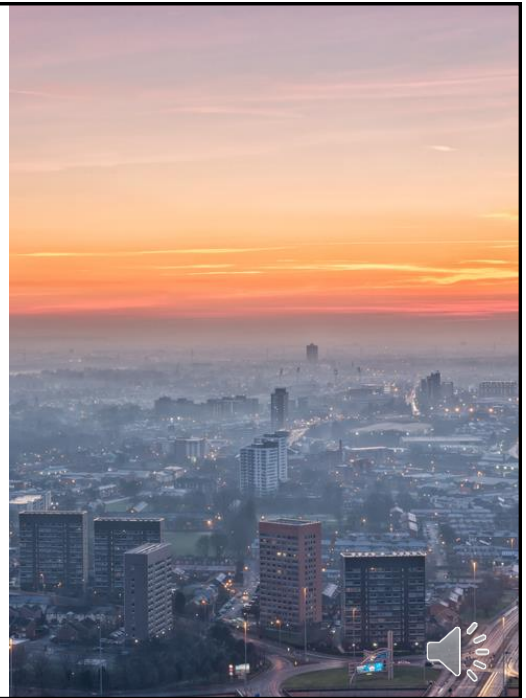
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## The impact of climate change on air quality

- Air pollution is the **leading environmental risk factor for premature death globally**, overtaking smoking and obesity.
- The **emissions, dispersion, and formation of air pollutants** will be influenced by warmer temperatures.

### UK summertime example:

- More frequent and intense heat waves.
- More episodes of ozone and particulate matter.
- Greater build-up of local emissions under stagnant meteorological conditions.
- Increases in precursor emissions from vegetation and soils, more moorland fires, and inflow of pollutants from mainland Europe.



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## Overlapping mitigation actions

- Estimating and understanding the air quality and health implications of a local authority's GHG mitigation actions provides an opportunity for the local authority to **efficiently tackle both issues simultaneously** and focus on those sectors that will have the greatest benefits.
- The key is finding the **balance** between the impacts of policies.



Source: C40 Cities, 2021. Clean Air, Healthy Planet

### AIR QUALITY AND HEALTH BENEFITS

- **Vehicles:** ultra-low sulphur fuel and catalytic converters
- **Household energy:** switching from solid fuels (coal, wood, charcoal) to cleaner-burning LPG or natural gas
- **Vehicles:** stringent vehicle emissions and efficiency standards
- **Vehicles:** switching to electric vehicles (if grid is fully decarbonized) and public transport
- **Electricity mix:** replacing fossil fuel-based electricity generation with renewables (wind, solar)
- **Household energy:** switching from solid fuels (coal, wood, charcoal) to solar water heaters and heat pumps

### CLIMATE BENEFITS

- **Vehicles:** continued fossil-fuel (diesel, oil) use with weak or non-existent air pollutant controls
- **Household energy:** encouraging 'improved' biomass cookstoves\*
- **Electricity mix:** continued or increasing fossil-fuel electricity generation with weak or non-existent air pollutant controls
- **Vehicles:** switching from fossil fuel (diesel, oil) to biofuels\*\*
- **Waste:** incineration technologies for e-waste – conversion of waste to energy
- **Household energy:** switching from fossil fuels to biomass (wood, charcoal) for residential cooking, space heating or water heating

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## Part two

# What are the benefits of integrating Air Quality and Climate Change policy?



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## The benefits of integrated policy measures



### Cost effective

- The design of only one set of holistic policy measures to benefit both areas.
- Lower costs for local authorities, businesses, and the community.
- Reduces the risk of future costs to mitigate climate change or the economic costs of air pollution on human health.



### Longer timescale of benefits

- Linking local priorities to global challenges.
- Air quality benefits occur in the short term (improved public and environmental health).
- Climate change benefits are recognised in the longer term (reduced global warming and associated environmental impacts).



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## The benefits of integrated policy measures



### Avoiding accidental trade-offs

- Avoiding unintentional increases in emissions of air pollutants or GHGs when one area is mitigated without consideration for the other.
- Reduces the risk of remedial measures to mitigate the impacts in the future.

### Justifies measures

- Some people may need convincing of the need for emissions reduction policy measures.
- Air quality helps to justify measures taken to reduce GHG emissions.
- Greater political feasibility.
- Simpler regulatory approval.



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## Modelling the benefits of integrated policy measures



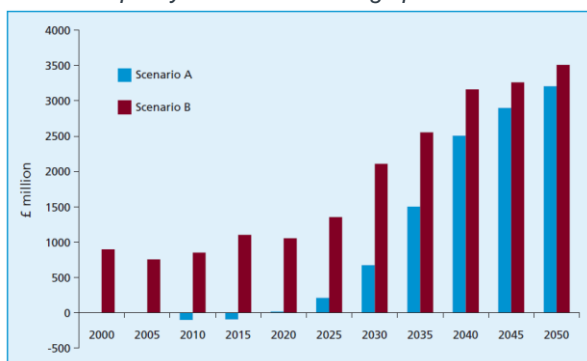
### Scenarios

- **Scenario A)** The optimal technology mix based on the Climate Change Act reduction targets for 2020 and 2050.
- **Scenario B)** As Scenario A, except that the *air quality impacts are also taken into account* when selecting the optimal technology mix.

### Results

- **Scenario A)** Mitigating climate change leads to reduction in air pollutant emissions, delivering a value of £15 billion by 2050.
- **Scenario B)** When mitigating climate change and accounting for air quality, additional benefits worth £24 billion can be achieved.

MARKAL modelling of the benefits of integrating air quality and climate change policies



Source: Defra, 2010. *Air Pollution: Action in a Changing Climate*

[Study](#): Optimising delivery of Carbon reduction targets: integrating air quality benefits using the UK MARKAL model. 2008.



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## Modelling the benefits of integrated policy measures

### Scenario B reduction in air pollutants

#### NO<sub>x</sub>

- Transition from diesel to hydrogen-powered vehicles.
- Reducing coal use in carbon capture and storage (CCS) and replacing it with CCS gas or nuclear power to produce electricity.



#### SO<sub>2</sub>

- Quicker phase-out of solid fuels (e.g. coal, charcoal, firewood).
- Increases reliance on flue gas desulphurisation (FGD) plants in electricity generation.
- Transition from coal to gas in industry.



#### PM<sub>10</sub>

- Transition from diesel to petrol in the transport sector.
- Reduction in biomass for residential heating.



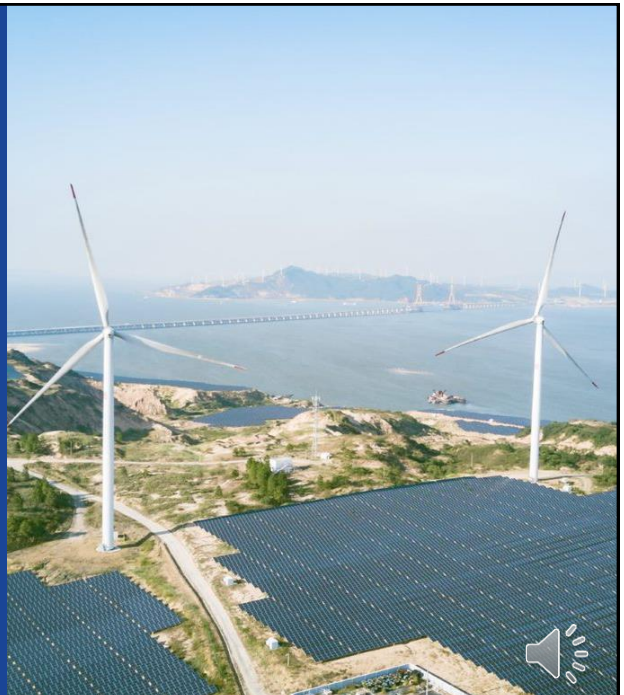
[Study](#): Optimising delivery of Carbon reduction targets: integrating air quality benefits using the UK MARKAL model. 2008.



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## Part three

# How can Local Authorities integrate Air Quality and Climate Change policy?



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# What is the current guidance for local authorities?

Department for Environment Food & Rural Affairs

Part IV of the Environment Act 1995  
Environment (Northern Ireland) Order 2002 Part III

## Local Air Quality Management Technical Guidance (TG16)

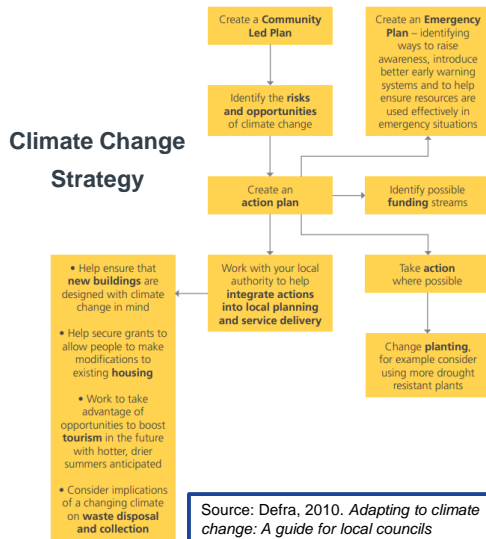
April 2021



Source: Defra, 2021. <https://laqm.defra.gov.uk/documents/LAQM-TG16-April-21-v1.pdf>



# What is the current guidance for local authorities?



Source: Defra, 2010. *Adapting to climate change: A guide for local councils*

## Air Quality Action Plan



Source: C40 Cities, 2021. *Clean Air, Healthy Planet*



## Key recommendations for developing an integrated approach to air quality and climate change (EPUK)



- **Ensure agreement between staff working on AQ & CC issues**

- Collaboration amongst staff in different departments.
- Understanding the importance and drivers of each other's work.

- **Gain support from elected leaders**

- More than one line of argument.
- To drive the progression of the integrated policy.

- **Influence LA policies & practices**

- Consider common measures (see later).
- Early engagement in the development of suitable plans and policies.
- To drive the progression of the integrated policy.



environmental protection uk

**Air Quality and Climate Change:**  
Integrating Policy  
Within Local Authorities

- **Recognise the differences between AQ & CC policy**

- LAQM = process driven.
- CC activities = driven by LA's own internal processes / ambition.
- Integration does not have to mean strategies need to be merged!

- **Integrate with other environmental areas**

- Consider related areas (see later).

Source: EPUK, 2011. *Air Quality and Climate Change: Integrating Policy Within Local Authorities*



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## Integrating with other environmental areas



Waste & Recycling



Environmental Noise



Sustainable Land Management



Biodiversity & Green Spaces



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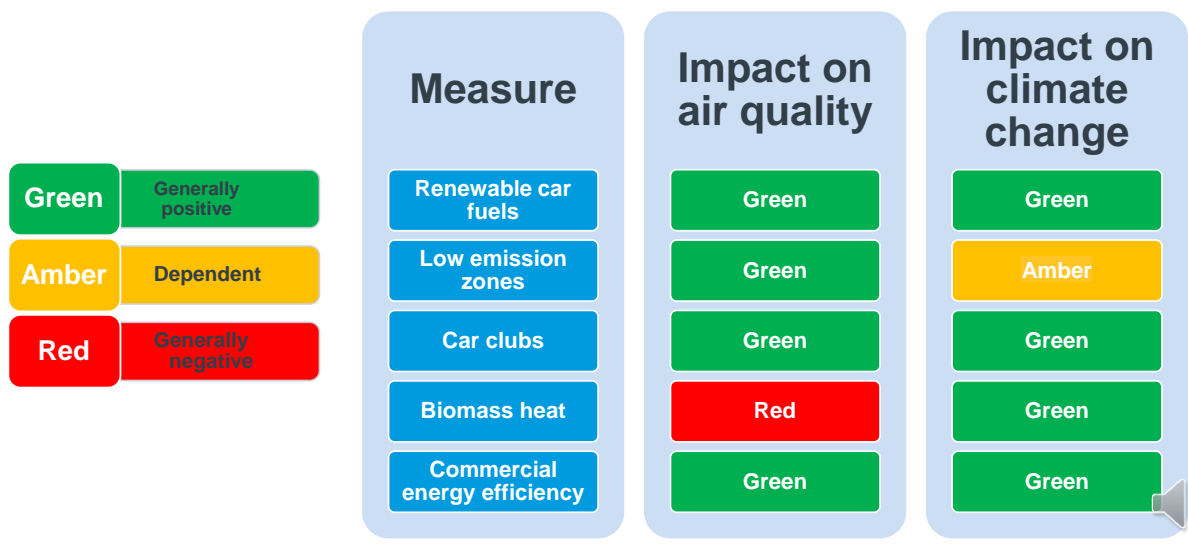
### How might air quality and climate change policy influence each other in practice? (EPUK)

| Air Quality Action Plan   | Climate Change Strategy  |
|---|--|
| Refer to climate change strategies when discussing cross-cutting measures     | Refer to AQAPs when discussing cross-cutting measures  |
| Assess and quantify climate benefits / dis-benefits of AQAP measures          | Assess and quantify AQ benefits / dis-benefits of climate strategy measures                    |
| Prioritise measures that are win/win for air quality and climate change       | Prioritise measures that are win/win for air quality and climate change                        |
| Avoid / de-prioritise measures with strong carbon dis-benefits where possible | Avoid / de-prioritise measures with a negative impact on AQ                                    |
|   | Geographically target climate measures that show strong AQ benefits towards areas with poor AQ |



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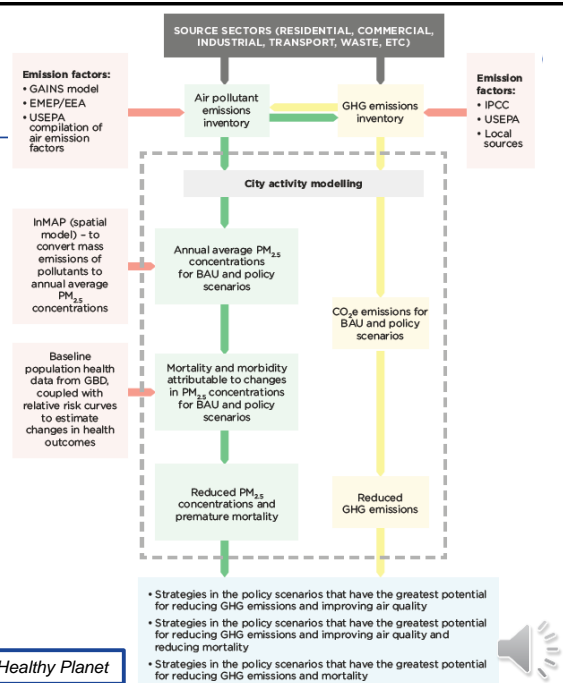
### Common measures and their impacts on air quality and climate change (EPUK)



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## Clean Air, Healthy Planet (C40)

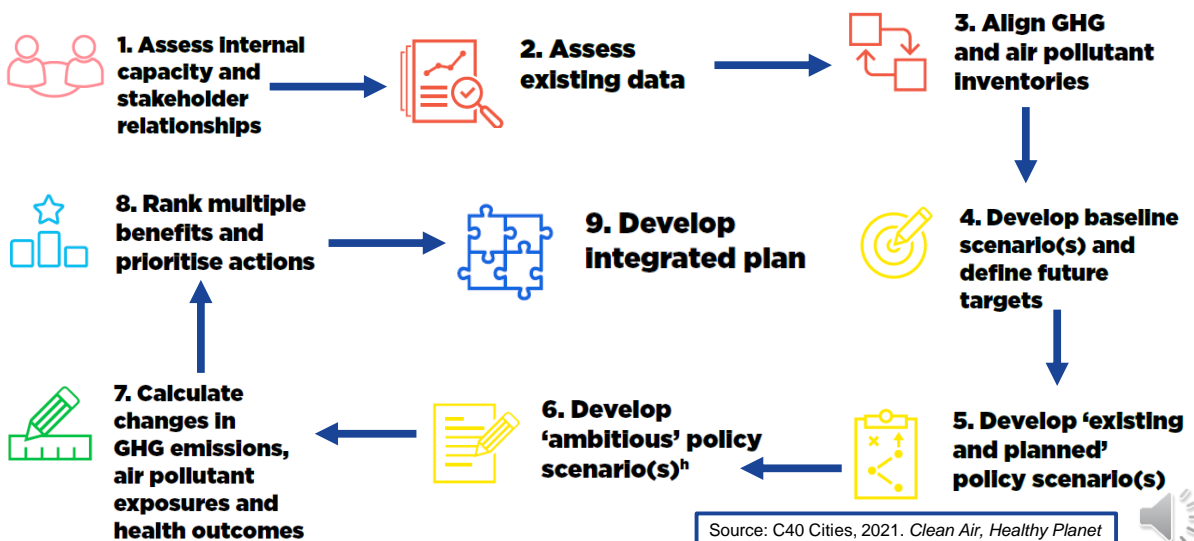
- A roadmap for cities to efficiently and effectively work towards climate change objectives while addressing air pollution concerns.
  - C40 is a climate focused organisation.
  - Enhance both the air quality action planning and climate action planning processes.
  - Air pollution benefits can motivate a city to implement climate actions.
- Includes useful diagrams to help policymakers map out their policy development.
  - See their integrated planning approach →
  - 9-step framework to successful policy integration (see later).



Source: C40 Cities, 2021. *Clean Air, Healthy Planet*

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## Process for integrating air quality and climate change policies (C40)



Source: C40 Cities, 2021. *Clean Air, Healthy Planet*

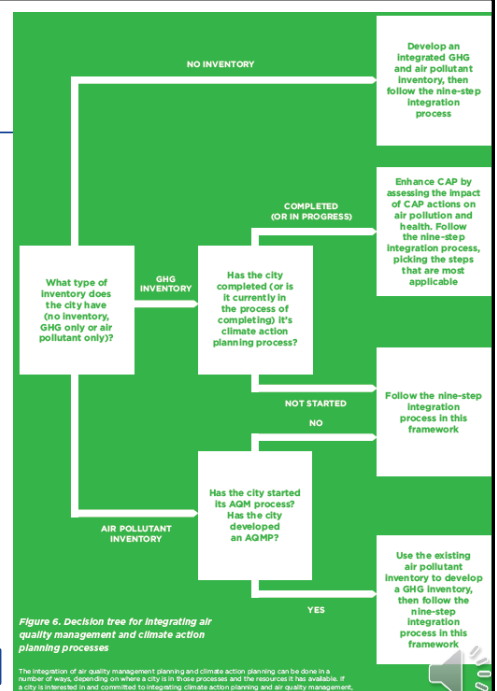
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## Decision tree for integrating AQ & CC policies (C40)

- **Policy integration can be done in many ways, depending on the city's circumstances.**
  - Where the city is in terms of air quality action planning and/or climate action planning.
  - Data available (e.g. GHG inventory, AQ monitoring/modelling data).
  - Resources available (e.g. finance, people).
- **Policy integration should make the policies more efficient, not more difficult!**
  - Starting point can be a completed CAP, AQAP, or neither.
  - Build on what you have, enhance it, and bring in what's missing.
  - Or, start from scratch with the 9-step process!

Source: C40 Cities, 2021. *Clean Air, Healthy Planet*

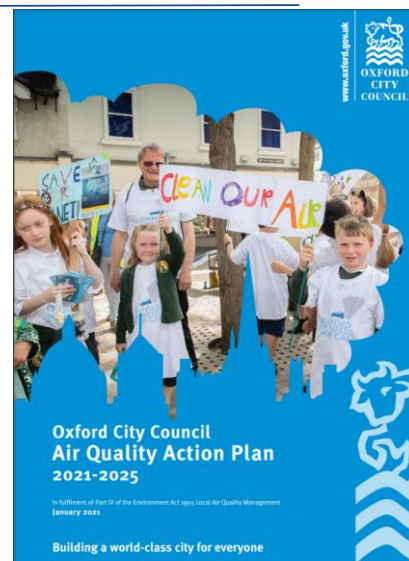


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## Case study – Oxford City Council AQAP 2021 – 2025



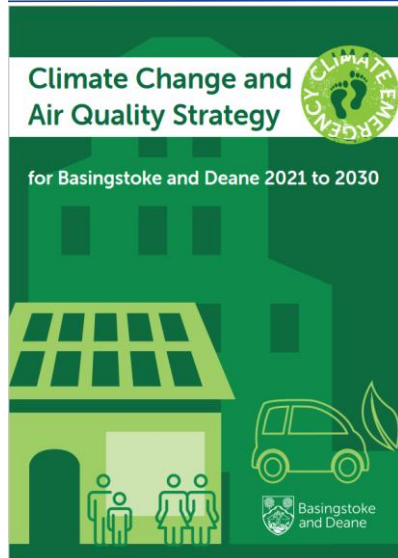
- **Ambitious AQAP working alongside climate actions**
  - Formally recognised a climate emergency in Jan 2019.
  - No Climate Action Plan as of yet, but was the first UK city to host a [Citizens' Assembly on Climate Change](#).
- **4 priority areas**
  1. Developing partnerships and public education.
  2. Support for uptake of low and zero emission vehicles.
  3. Reducing emissions from domestic heating, industry and services.
  4. Reducing the need to travel, and increasing modal shift and the uptake of sustainable transport.
- **AQAP measures outline benefits not only for AQ, but for other areas**
  - Climate impacts e.g. CO<sub>2</sub> reduction.
  - Noise, health, environment benefits.



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## Case study – Basingstoke and Deane



### Basingstoke and Deane Borough Council [Climate Change and Air Quality Strategy 2021 – 2030](#)

- **Strategy alongside Climate Emergency Action Plan**
  - Focus is on climate change but also includes air quality.
  - Declared a climate emergency in 2019.
  - [Climate Emergency Action Plan](#) succeeds the Climate Change Strategy 2014 – 2020; it was published in 2020 and [updated in 2021](#).
- **Council's aim is to develop synergistic policies for climate change and air quality**
  - There are no AQMAs in the LA so the AQ focus is on any areas of concern, high risk areas, etc.
  - Develop milestones for emissions reduction spanning transport, buildings, electricity, waste & more.
  - Council especially want to avoid trade-offs.



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## Summary



- Air quality and climate change are very interconnected. They have **similar emissions sources** and they have an impact on each other.
- Estimating and understanding the air quality and health implications of a local authority's GHG mitigation actions provides an opportunity for the local authority to **efficiently tackle both issues simultaneously** and focus on those sectors that will have the greatest benefits.
- **Benefits of integrating policy** include reducing costs, increasing the longevity and strengthening the impact of measures, and avoiding trade-offs.
- Integrating air quality and climate change policy begins with identifying their **similarities and differences**, and how they are likely to **influence each other**.
- **People** are the key to successfully integrating policies – both the **staff** working on them, and **political support**.
- There are opportunities to **integrate air quality and climate change policy with other environmental areas** like noise, waste, land management, and biodiversity.
- Integrating air quality and climate change policy **does not necessarily mean creating one joint policy!**



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# Thank you for listening

Please get in contact if you have any questions about this webinar.

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