

UK Air Quality Monitoring Networks



History of air quality monitoring

Legislative drivers

The monitoring networks

Data quality considerations

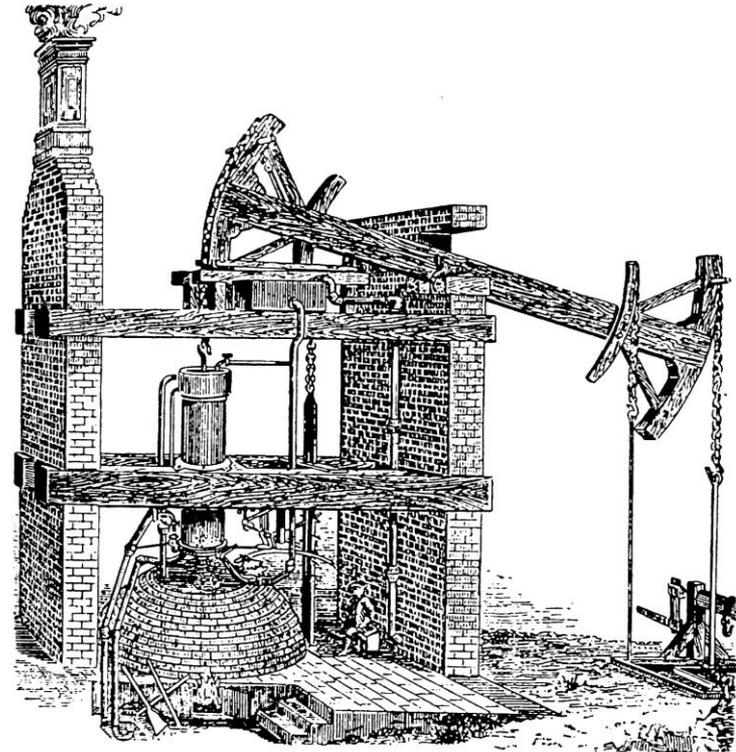
Access to data

Concern about air pollution goes back a long way

In 1285, King Edward I set up a commission to deal with the foul air in London



The Steam Engine Act of 1821 forced users not to 'prejudice public health'..





- widespread use of coal
- cleaner fuels available but not used
- unfavourable winter meteorology (fogs)
- lack of effective source control/regulation
- air pollution not seen as priority by public or government

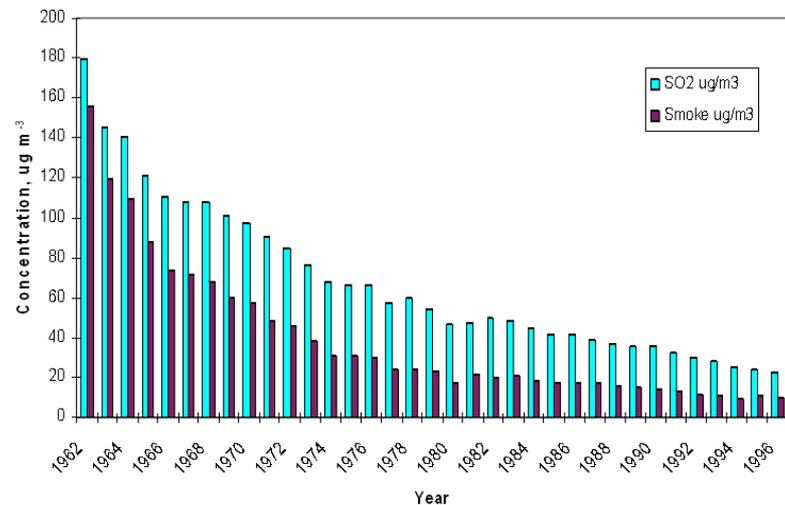
The Great Smog of 1952



- 4 days of stable, foggy weather
- peak smoke levels up to 1.5 mg/m^3
- peak SO_2 up to 0.75 mg/m^3
- death rate tripled, up to 4000 excess deaths
- widespread public concern and pressure for action...

The air quality management response

- 1956 and 1968 Clean Air Acts
- effective control of domestic emissions
- introduction of Smokeless Control Zones
- use of cleaner fuels required by law
- accelerated existing trend to clean fuels
- public and fuel users willing to co-operate
- national monitoring programme established



UK's air pollution climate has changed dramatically in 30 years

**Domestic/industrial coal burning
(Smoke and SO₂)**



**Traffic in our cities
(CO, PM_x, NO₂, O₃, VOCs)**



- Assessment of population/ecosystem exposure
- Providing a basis for local planning & action
- UK Government Policy Development
- Monitoring compliance with UK, EU standards
- Public information/awareness

The UK National Air Quality Strategy, 1996



- Initiated under part IV, 1995 Environment Act
- Prescribed health-based standards for major air pollutants
- With objectives to be achieved by end 2005 and
- LA duty to “Review and Assess” local air quality...

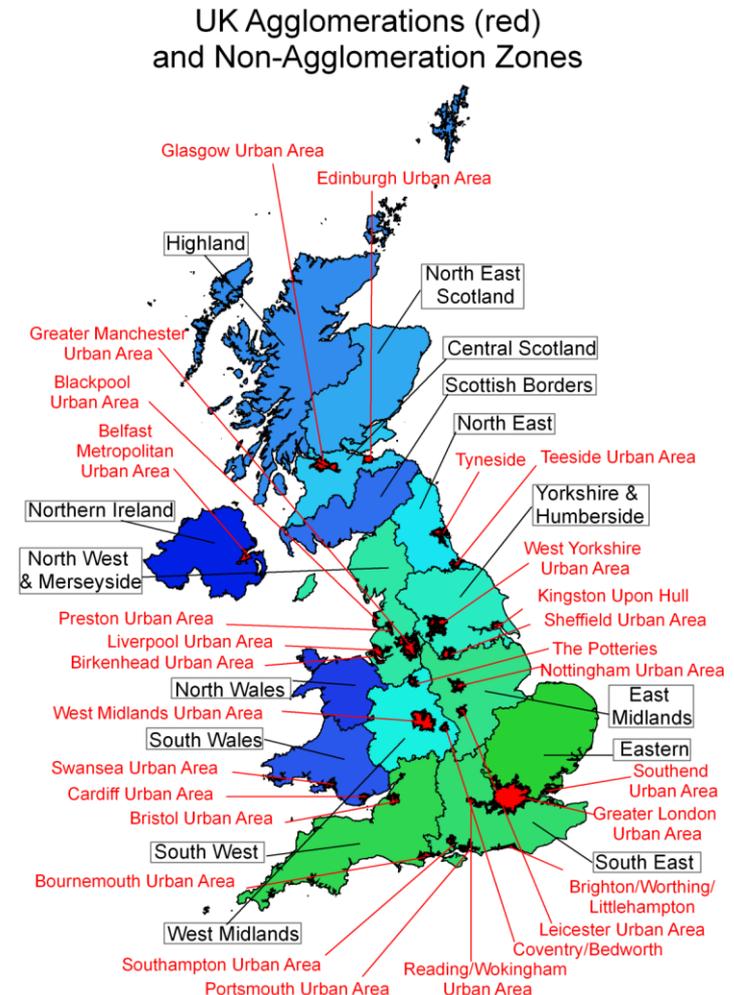
Objectives and targets for a range of substances

- Carbon monoxide
- Nitrogen dioxide
- Ozone
- Sulphur dioxide
- Particulate matter (PM₁₀ & PM_{2.5})
- Benzene
- Metals (As, Cd, Hg, Ni, Pb)
- PAHs

Other substances (reporting only)

- Ozone precursor VOCs
- Speciated PM_{2.5}

- Agglomerations
- Continuous urban areas of >250,000 population
- 28 in UK (2 in Scotland)
- Zones
- Remaining territory divided following government regions
- 15 for UK (4 in Scotland)



Monitoring networks

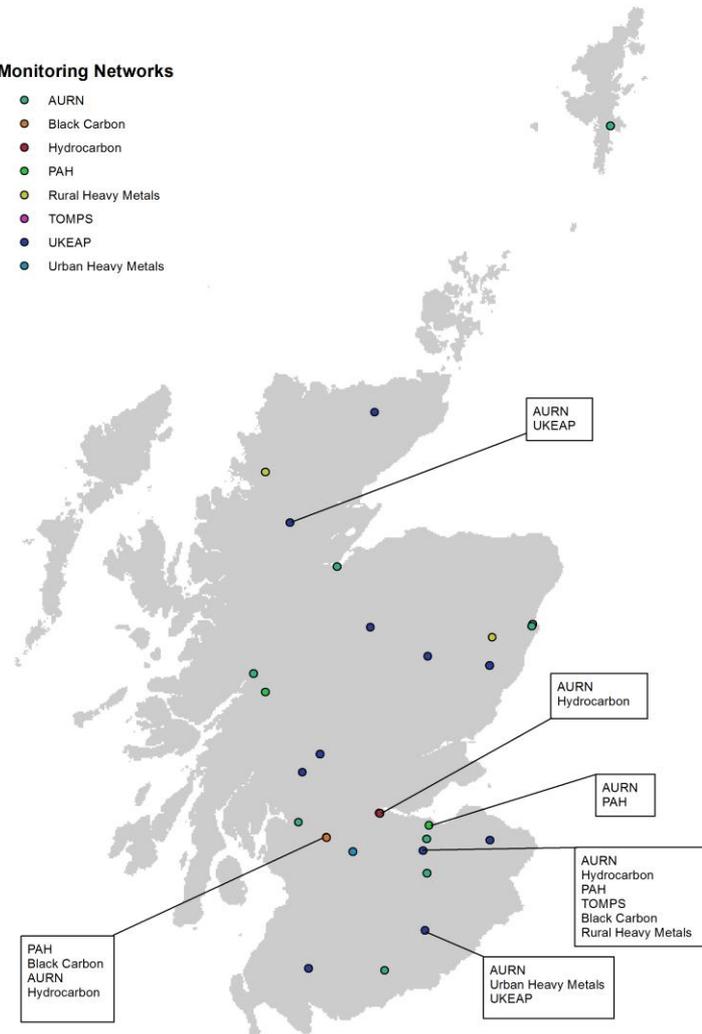
| Monitoring network | Statutory | Research |
|--------------------|-----------|----------|
| AURN | ✓ | |
| Hydrocarbons | ✓ | |
| PAH | ✓ | |
| TOMPS | | ✓ |
| Black carbon | | ✓ |
| UKEAP | | ✓ |
| Urban heavy metals | ✓ | |
| Rural heavy metals | | ✓ |

“National” AQ monitoring in Scotland

| Monitoring network | Number of monitoring points |
|--------------------|-----------------------------|
| AURN | 16 |
| Hydrocarbons | 3 |
| PAH | 4 |
| TOMPS | 1 |
| Black carbon | 2 |
| UKEAP | 12 |
| Urban heavy metals | 2 |
| Rural heavy metals | 3 |

Monitoring Networks

- AURN
- Black Carbon
- Hydrocarbon
- PAH
- Rural Heavy Metals
- TOMPS
- UKEAP
- Urban Heavy Metals



Other monitoring initiatives

European Monitoring & Evaluation Programme (EMEP)

“acidification, eutrophication, ground level ozone, heavy metals, persistent organic compounds and atmospheric particles”

UK Supersite – Auchencorth Moss



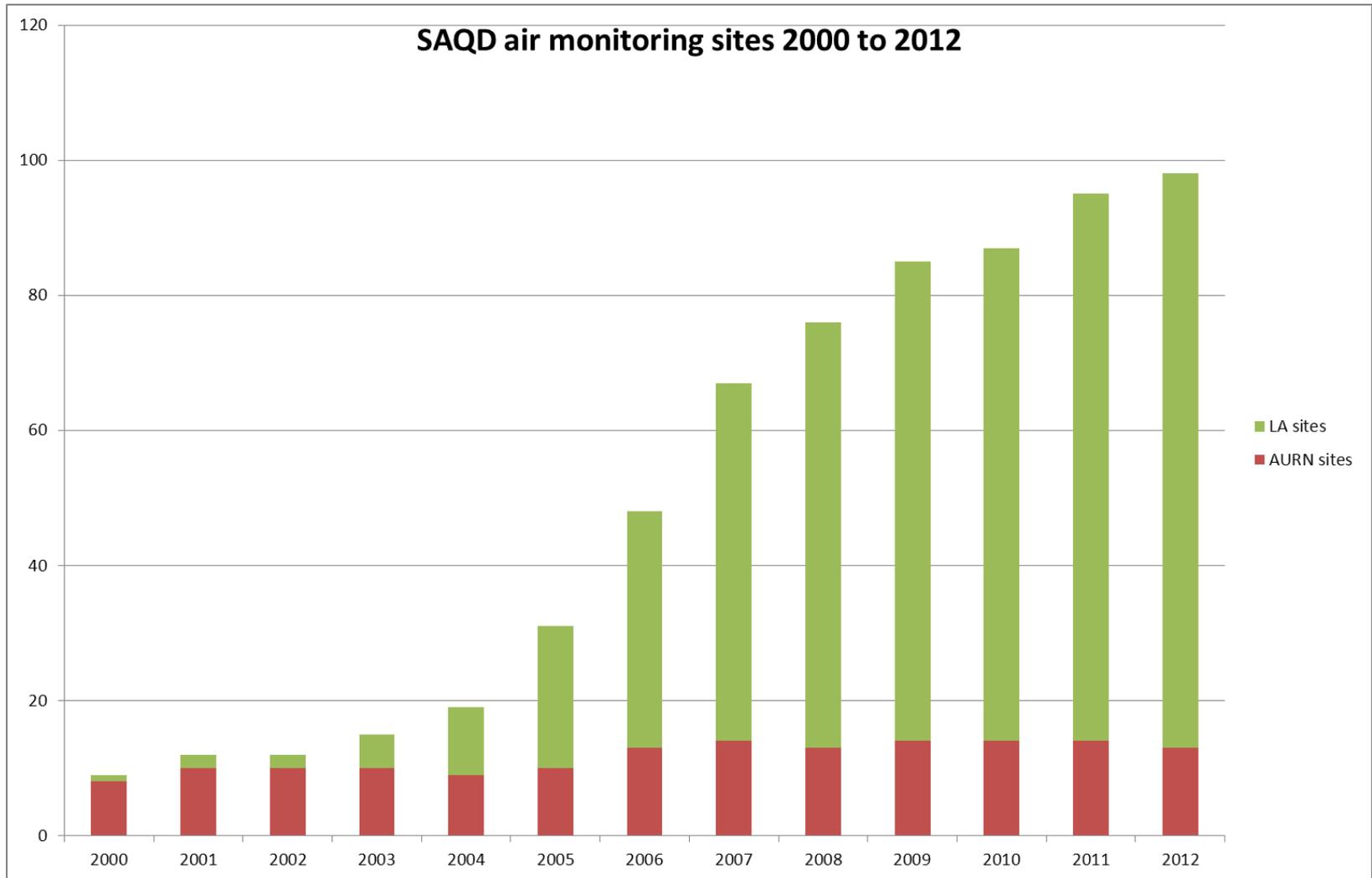
Holds data from air quality monitoring stations in Scotland

Co-ordinated network

- Consistent procedures
- Data quality
- Accessible



Network growth



- Representative of ambient conditions
- Results comparable and traceable
- Measurements consistent over time
- High data capture, evenly distributed
- Measurements of known uncertainty

Quality Assurance

(Pre-measurement)

- Definition of monitoring objectives
- Network design, management, training systems
- Site selection and establishment
- Equipment evaluation and selection
- Operator training and manuals

Quality Control

(Post-measurement)

- Routine site operations
- Establishment of calibration/traceability chain
- System maintenance and support
- Data review and management
- System review and development

Measurements

- Data collection
- Front end screening
- Data scaling
- Provisional data

Quality Control

- On-site calibrations
- Equipment maintenance
- Independent audits
- Data ratification

Data Usage

- Near realtime dissemination
- Formal reporting
- Research and policy development

Access to air quality data



Nationally (Defra)
www.uk-air.defra.gov.uk

The screenshot shows the UK-AIR website interface. At the top, there is a navigation bar with links for Home, About Air Pollution, Data Archive, Monitoring Networks, Library, and Science & Research. A search bar is located in the top right. The main content area is divided into several sections: 'UK-AIR: Air Information Resource' with a 'Latest UK pollution summary' and 'Forecast for next 24 hours'; 'You may also be interested in...' with links to Defra, NAEI, and local air quality management; 'Latest air quality news' and 'Quick Links'; and 'Devolved administrations' with logos for the Scottish Government and the Welsh Government. A 'Welcome to UK-AIR' section provides introductory text and contact information (0800 55 66 77).

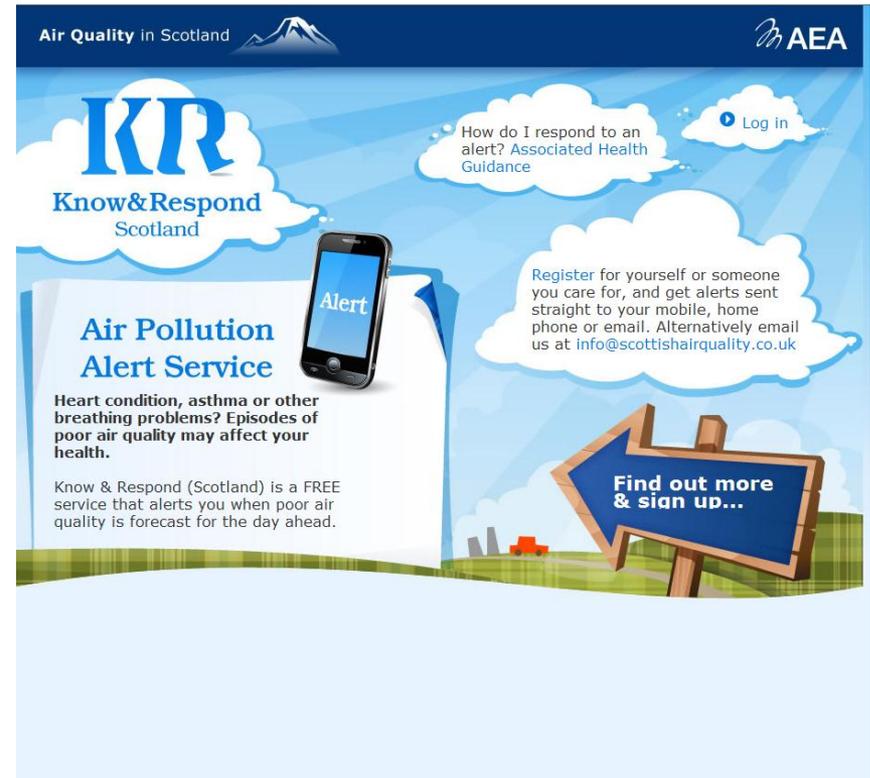
In Scotland (SAQD)
www.scottishairquality.co.uk

The screenshot shows the Scottish Air Quality Data (SAQD) website interface. It features a map of Scotland with numerous monitoring sites marked by colored dots. A 'Pollution Summary' panel on the right shows a pie chart and a table of data for 90 sites. The website includes a search bar, navigation tabs, and a 'Forecast Data' section. The footer contains the AEA logo and contact information.

Know & Respond Scotland

Scottish Government
initiative supported by
Health Protection
Scotland and NHS
National Service Scotland

Free text message alert
service when poor air
quality is forecast for the
day ahead



The image shows a screenshot of the Know & Respond Scotland website. The header includes "Air Quality in Scotland" and the AEA logo. The main content area features the "KR Know&Respond Scotland" logo, a "Log in" button, and a "How do I respond to an alert? Associated Health Guidance" link. A central graphic shows a smartphone displaying "Alert" next to a document titled "Air Pollution Alert Service". Below this, text explains that heart conditions, asthma, or other breathing problems may be affected by poor air quality. A "Find out more & sign up..." sign is also visible.

Air Quality in Scotland

AEA

KR
Know&Respond
Scotland

Log in

How do I respond to an alert? Associated Health Guidance

Alert

Air Pollution Alert Service

Heart condition, asthma or other breathing problems? Episodes of poor air quality may affect your health.

Know & Respond (Scotland) is a FREE service that alerts you when poor air quality is forecast for the day ahead.

Register for yourself or someone you care for, and get alerts sent straight to your mobile, home phone or email. Alternatively email us at info@scottishairquality.co.uk

Find out more & sign up...



AEA

Steve Telling
Principal Consultant

AEA
The Gemini Building
Fermi Avenue
Harwell Oxford
Didcot OX11 0QR

Tel: +44 (0)870 190 6583

Mob: +44 (0)7968 707557

E: steve_telling@uk.aeat.com

W: www.aeat.co.uk

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