Natural Environment Research Council

IMPACT

Cleaning up our air, cutting down the costs of pollution

Lives saved, better health, lower costs, a cleaner environment – NERC science that equips government, business and wider society to tackle air pollution results in benefits worth £1.2 billion/year[1].

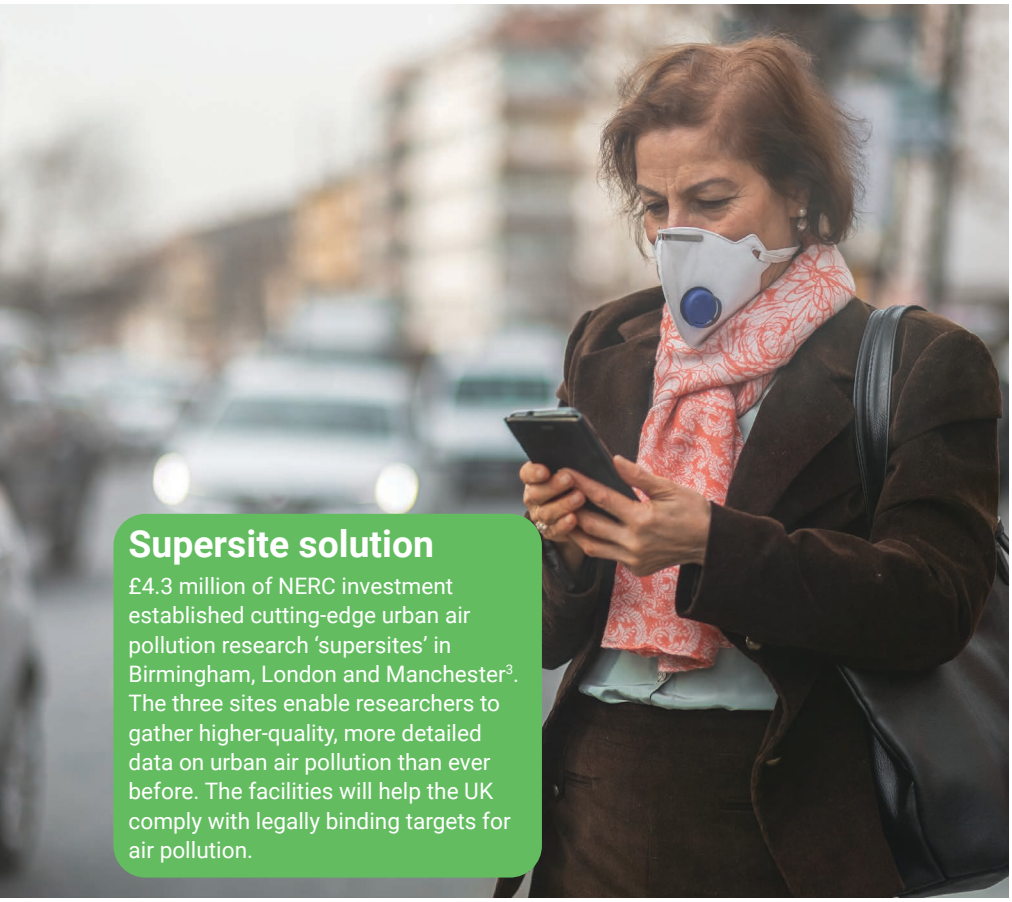
Why it matters

Clean air underpins everything we need and value: our physical health, our mental wellbeing, our quality of life and the environment we depend on. Poor air quality, then, presents serious risks. In the UK it is the fourth-biggest danger to public health and carries an estimated annual cost of £20 billion to health services and businesses.
It causes tens of thousands of premature deaths in the UK each year, and has recently been shown to increase the risk of death from covid-19[2]. It also has wider implications, including links to dementia, heart disease and some types of cancer; damaged buildings, lower crop yields, harm to ecosystems, even climate change. In the face of the threats it brings, the importance of cutting air pollution simply cannot be overstated.

What we did:

Four decades of NERC investment have played a critical role in understanding and tackling air pollution. With a clear focus on generating practical solutions, our multidimensional approach includes support for:

- **Leading-edge research:** A combination of discovery science and targeted, interdisciplinary research designed in partnership with research users
- **World-class infrastructure:** Outstanding facilities and equipment for measuring air pollution (see 'Supersite solution')
- **Long-term monitoring:** Accurate data on pollutant types and trends
- **Targeted training:** Reinforcing and extending the UK's world-leading knowledge base on air quality
- **Collaboration:** Maximising benefits by working positively and proactively with government and businesses.



Supersite solution

£4.3 million of NERC investment established cutting-edge urban air pollution research 'supersites' in Birmingham, London and Manchester[3]. The three sites enable researchers to gather higher-quality, more detailed data on urban air pollution than ever before. The facilities will help the UK comply with legally binding targets for air pollution.

NERC's impact in numbers:

£1.2 billion:
The estimated annual benefits from actions on air pollution enabled by our science

15 million:
The number of hay fever sufferers in the UK helped by daily pollen forecasts

24 people:
Lives saved for every 10 days of heatwave thanks to more accurate smog forecasts

Contributing to the UN Sustainable Development Goals

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Impacts and benefits

NERC science has enabled governments, businesses and communities to take evidence-based action to tackle air pollution, yielding benefits worth an estimated £1.2bn/year.

- **Policy underpinned: Providing a sound basis for effective government action**
  By 2018, UK sulphur dioxide emissions had fallen 98% compared with 1970[4]. Key to this achievement was the 1979 international Convention on Long-range Transboundary Air Pollution (CLRTAP), which built on NERC-funded work demonstrating the link between acid rain and burning fossil fuels.

  NERC research was a key platform for the UK's Clean Air Strategy 2019. For instance, our work triggered a new policy approach to cutting emissions of volatile organic compounds (VOCs), which prompted vehicle manufacturers to take action as well as providing the foundation for London's Ultra Low Emission Zone (ULEZ). Since ULEZ was introduced, nitrogen dioxide emissions in the city have fallen 44%[5].

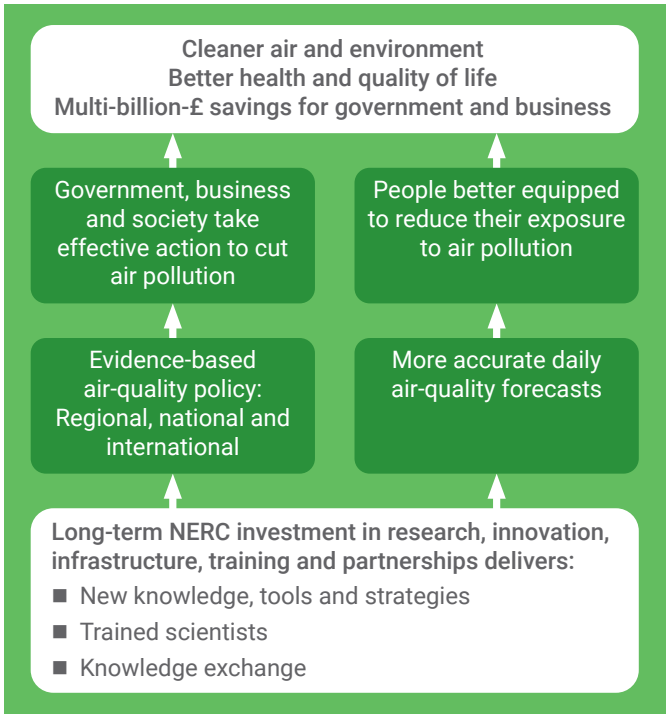
  Developed with NERC and Defra funding, two computer models showing how air pollutants react to produce ozone in the atmosphere are widely used in the UK and overseas to improve air quality policy[6].

- **People protected: Better daily forecasts enable people to reduce their exposure to air pollution**
  The NERC-funded Clean Air for London (Clearflo) project underpins daily air-quality forecasts relied on by individuals and local government[7]. These are especially valuable for people whose health suffers when pollution levels are high.

  NERC-funded research led to improved Met Office forecasts on the formation of ozone and other pollutants associated with heatwaves, saving an estimated 24 lives for every 10 days of heatwave[8].

  NERC-supported researchers developed the national pollen forecasting system. This provides daily forecasts for the Met Office, business and the media, helping the UK's estimated 15 million hay fever sufferers and reducing associated health-related and productivity losses (estimated at £970 million/year)[9].

From NERC support to cleaner air



Investing for the future

NERC is committed to funding research to better understand air pollution and find new ways of addressing it. Current initiatives include:

- Clean Air: Analysis & Solutions: UKRI-funded and led by NERC and the Met Office, this £42.5 million programme will protect health and support clean growth by developing solutions to today's air-quality issues and equipping the UK to tackle future challenges proactively[10].
- Improving air quality in the West Midlands: A £4 million programme will boost understanding of sources and levels of pollution in the region and develop new capability to predict how policy measures would affect air quality, health and the economy there[11].
- Urgency grants: Enabling researchers to examine Covid-19's impact on air quality and the resulting health implications. The results are already informing government actions.

1. Deloitte (2015). http://tiny.cc/22e6tz
2. European Society of Cardiology (2020). http://tiny.cc/h2e6tz
3. NERC (2018). http://tiny.cc/5zo6tz
4. National Statistics (2020). http://tiny.cc/k2e6tz
5 Greater London Authority (2020). http://tiny.cc/b2e6tz
6. REF (2014). https://bit.ly/3gvfXuZ
7. London Air website: https://bit.ly/3nggofr
8 Met Office (2007). http://tiny.cc/b6g6tz
9. REF (2014). https://bit.ly/37285hv
10. Clean Air Programme website: https://bit.ly/3m5b7G7
11. WM-Air website: http://tiny.cc/qg16tz