

Air Quality in Ireland Report 2022



Key Messages

Air Quality
Monitoring

Air Quality in
Ireland 2022

Problem
Pollutants

What can I do?
What's needed?

Air Quality
Modelling

LIFE EMERALD

Citizen Science CAT

Learn more

Acknowledgements
and Disclaimer



Key Messages

Air quality in Ireland is generally good, however there are concerning localised issues.

Fine particulate matter (PM_{2.5}) from solid fuel combustion and nitrogen dioxide (NO₂) from vehicle emissions are the main pollutants.

People's health and the health of our environment is impacted by these pollutants.

Ireland's ambition in the **Clean Air Strategy** is to move towards the **World Health Organisation (WHO) Air Quality** guidelines, this will be challenging but will have a significantly positive impact on health.



What can we do?

We can all help improve the quality of the air we breathe by:

Using less solid fuel and cleaner fuels to heat our homes.

Reducing our use of cars to go to school, work and play.

There are supports to encourage us to move to:



Better
insulated
homes



Better
alternatives
to solid fuel
combustion



Public
and active
transport



Electric
vehicles

Air Quality Monitoring

What and how we monitor air quality in Ireland

Key Messages

Air Quality Monitoring

Air Quality in Ireland 2022

Problem Pollutants

What can I do? What's needed?

Air Quality Modelling

LIFE EMERALD

Citizen Science CAT

Learn more

Acknowledgements and Disclaimer



The EPA in partnership with Local Authorities, public/semi state bodies and universities has established a world class air monitoring network. The network will be completed in 2023 with 116 stations (107 operational at the end of 2022).

107
Stations
END 2022

▶

116
Stations
END 2023

See how the Ambient Air Monitoring Programme has expanded over the years



CLICK ON THE MAP

The monitoring network

Provides real-time air quality results and generates public health advice for the area around your local station.

Air quality results and advice can be viewed at airquality.ie



FIND OUT
what air quality is like near you


Level	1	Enjoy your usual outdoor activities.	Enjoy your usual outdoor activities.
2	3	4	5
6	7	8	9
10	11	12	13

FIND OUT HERE

How air quality looks across Europe and how does Ireland compare?

What did we monitor in Ireland's air in 2022?

SO₂	PM₁₀ PM_{2.5}	NO₂ NO_x	O₃
CO	C₆H₆	Heavy Metals	PAH



A description of each parameter is available here

Dioxins

The main source of dioxin is combustion particularly residential and backyard burning of waste. Dioxin concentrations, as in recent years, were well below European limit values. Find out more on our [FAQs](#)





WATCH THE VIDEO





SEE HOW WE MONITOR AIR QUALITY

Air Quality in Ireland 2022

Cleaner Air For Europe Directive (CAFE Directive)¹

Key Messages

Air Quality Monitoring

Air Quality in Ireland 2022

Problem Pollutants

What can I do? What's needed?

Air Quality Modelling

LIFE EMERALD

Citizen Science CAT

Learn more

Acknowledgements and Disclaimer



The CAFE Directive¹

Ireland met all of its EU CAFE Directive legal requirements in 2022.

The [CAFE Directive](#) sets out standards for a wide variety of pollutants in order to protect human health, vegetation and ecosystems. See how Ireland met the EU legal limit values for selected pollutants measured in 2022 (see table opposite).

More detail is available in the 2022 supplementary data tables for Ireland's air quality.

[READ HERE](#)



Selected pollutants measured in 2022 and their adherence to EU legal limit values (CAFE Directive)

Pollutant	Number of stations, parameter monitored in 2022	EU legal limit values
PM ₁₀	85	No exceedances
PM _{2.5}	79	No exceedances
NO ₂	31	No exceedances
Ozone (O ₃)	22	No exceedances
Sulphur dioxide (SO ₂)	15	No exceedances
PAHs	5	No exceedances
Heavy metals	5	No exceedances
All other pollutants	-	No exceedances

WHO Guidelines

The WHO published new air quality guidelines (AQGs) for health, including interim targets (IT) in 2021 based on the impact of pollutants on human health. The WHO AQGs will be challenging for Ireland to meet. In 2022 Ireland failed to meet the [WHO AQGs](#).

VIEW

WHO AQGs & Interim targets

VIEW

Comparison with CAFE Directive

VIEW

The challenge facing Ireland

[CLICK HERE](#) to see the long-term trends in ambient PM_{2.5} concentrations across Ireland from selected stations for the purpose of monitoring air quality.



READ ABOUT
 Clean Air Strategy (CAS) 2023

READ ABOUT
 Solid Fuel Regulations 2022

¹The CAFE Directive (2008/50/EC) was transposed into Irish legislation by the Ambient Air Quality Standards Regulations 2022 (S.I. No 739 of 2022). The 4th Daughter Directive was transposed by the Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air Regulations 2009 (S.I. No. 58 of 2009).

Air Quality in Ireland 2022

Cleaner Air For Europe Directive (CAFE Directive)¹

Key Messages

Air Quality Monitoring

Air Quality in Ireland 2022

Problem Pollutants

What can I do?
What's needed?

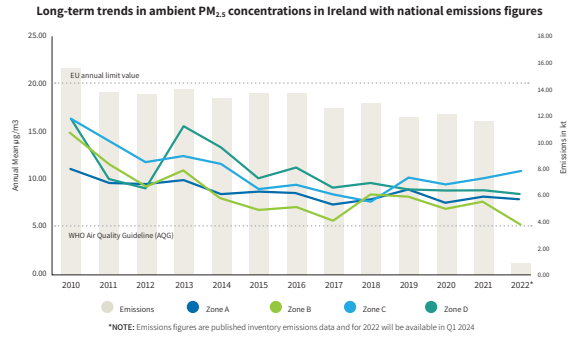
Air Quality Modelling

LIFE EMERALD

Citizen Science CAT

Learn more

Acknowledgements and Disclaimer



Selected pollutants measured in 2022 failing the WHO IT3, IT4 and AQG levels

Pollutant	Averaging Time	Number of stations, parameter monitored 2022	CAFE Recast Proposal		
			Number of stations over IT 3 WHO limit (to be met by 2026) ²	Number of stations over IT 4 WHO limit (to be met by 2030) ²	Number of stations over AQG WHO limit (to be met by 2040) ²
PM ₁₀	Annual	85	0	2	15
	24 hour ²		3	21	26
PM _{2.5}	Annual	79	2	10	76
	24 hour ²		20	52	75
NO ₂	Annual	31	6	6	23
	24 hour ²		10	10	28
Ozone (O ₃)	Peak Season ³	22	0	0	5
	8 hours daily ²		12	12	19
Sulphur dioxide (SO ₂)	24 hour ²	15	1	1	1

¹99th percentile (Number of stations over daily WHO limit - equal or more than 3 days per year).

²Clean Air Strategy. Peak season: April to end of August.

³Peak season: April to end of August.

Selected pollutants measured in 2022 failing the WHO AQG levels

Pollutant	Number of stations, parameter monitored 2022	WHO Air Quality Guideline (AQG) level or EEA reference level
PM ₁₀	85	Above annual WHO AQG value at 15 stations. Above daily WHO AQG value at 26 stations
PM _{2.5}	79	Above annual WHO AQG value at 76 stations. Above daily WHO AQG value at 75 stations
NO ₂	31	Above annual WHO AQG value at 23 stations. Above daily WHO AQG value at 28 stations.
Ozone (O ₃)	22	Above Peak Season WHO AQG level at 1 station. Above 8hr daily WHO AQG value at 19 stations
Sulphur dioxide (SO ₂)	15	Above WHO 24 hour AQG level at 1 station

Selected pollutants measured in 2022 and their adherence to EU legal limit values (CAFE Directive)

Pollutant	Number of stations, parameter monitored 2022	EU legal limit values
PM ₁₀	85	No exceedances
PM _{2.5}	79	No exceedances
NO ₂	31	No exceedances
Ozone (O ₃)	22	No exceedances
Sulphur dioxide (SO ₂)	15	No exceedances
Heavy metals	5	No exceedances
All other pollutants	-	No exceedances

Summary of recommended AQG levels and interim targets

Pollutant	Averaging Time	IT1	IT2	IT3	IT4	AQG Level
PM _{2.5} µg/m ³	Annual	35	25	15	10	5
PM _{2.5} µg/m ³	24 hour ²	75	50	37.5	25	15
PM ₁₀ µg/m ³	Annual	70	50	30	20	15
PM ₁₀ µg/m ³	24 hour ²	150	100	75	50	45
O ₃ µg/m ³	Peak Season ³	100	70	—	—	60
O ₃ µg/m ³	8 hour ²	160	120	—	—	100
NO ₂ µg/m ³	Annual	40	30	20	—	10
NO ₂ µg/m ³	24 hour ²	120	50	—	—	25
SO ₂ µg/m ³	24 hour ²	125	50	—	—	40
CO mg/m ³	24 hour ²	7	—	—	—	4

Problem Pollutants

The two most significant pollutants in Ireland are Particulate matter and Nitrogen dioxide.

Key Messages

Air Quality Monitoring

Air Quality in Ireland 2022

Problem Pollutants

What can I do? What's needed?

Air Quality Modelling

LIFE EMERALD

Citizen Science CAT

Learn more

Acknowledgements and Disclaimer



Particulate matter (PM)

What is Particulate matter (PM): PM₁₀ and PM_{2.5}?

These are very small particles which can be solid or liquid. The EPA monitors PM₁₀ and PM_{2.5}.

Where does it come from?

Fine particulate matter (PM_{2.5}) in Ireland mainly comes from the burning of solid fuel, such as coal, peat, and wood to heat our homes.

How will it impact my health?

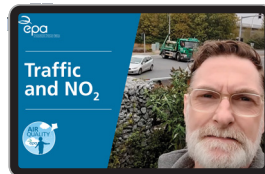
PM_{2.5} is the more important from a health perspective as it causes more health issues. These small particles can penetrate the lungs and cause damage.

When is it at its worst?

PM levels are at their worst during the winter i.e. when we light our fires and stoves.



WATCH
How we monitor PM



WATCH
Traffic and NO₂

Nitrogen dioxide (NO₂)

What is Nitrogen dioxide?

Nitrogen dioxide (NO₂) is an air pollutant gas.

Where does it come from?

The main source of NO₂ in our towns and cities is from petrol and diesel vehicles.

How will it impact my health?

NO₂ can affect our lungs and breathing.

When is it at its worst?

High concentration of NO₂ are seen on our busiest streets.



Irish Heart Foundation

SEE

The effects of PM_{2.5}



WATCH Clean air is important for good health

Problem Pollutants

The two most significant pollutants in Ireland are Particulate matter and Nitrogen dioxide.

Key Messages

Air Quality Monitoring

Air Quality in Ireland 2022

Problem Pollutants

What can I do? What's needed?

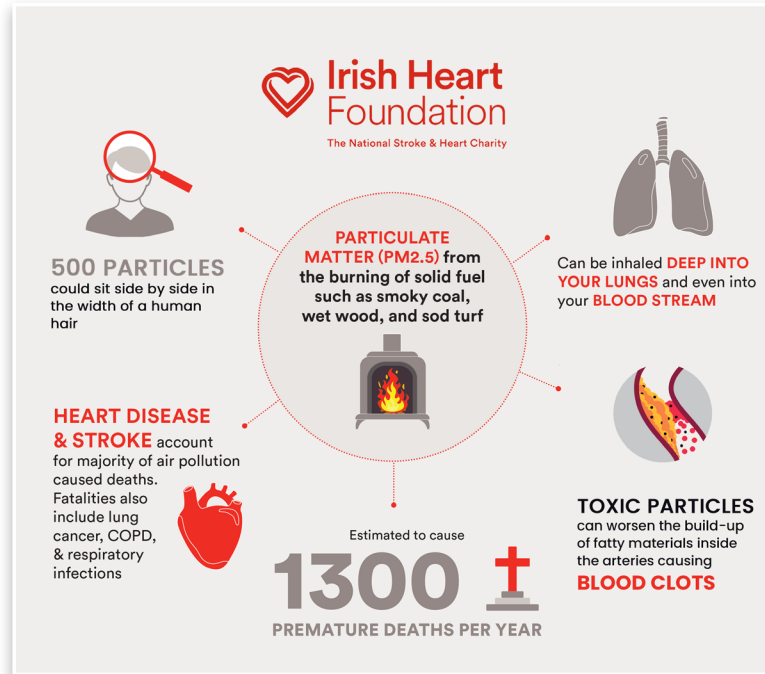
Air Quality Modelling

LIFE EMERALD

Citizen Science CAT

Learn more

Acknowledgements and Disclaimer



What can I do? What's needed?

We can all help improve the quality of the air we breathe

Key Messages

Air Quality
Monitoring

Air Quality in
Ireland 2022

Problem
Pollutants

**What can I do?
What's needed?**

Air Quality
Modelling

LIFE EMERALD

Citizen Science CAT

Learn more

Acknowledgements
and Disclaimer



What can I do?

We can all help improve the quality of the air we breathe:

Reduce particulate matter (PM) pollution from home heating

- > Avoid using solid fuels if you have an alternative cleaner heating system.
- > Change how you heat your home by moving away from smoky fuels and instead use cleaner heat sources. For more guidance [CLICK HERE](#)
- > Make our homes more comfortable by increasing / improving insulation, supports are available through [The national retrofitting scheme](#)

Reduce nitrogen dioxide (NO₂) pollution from transport

- > Leave the car at home if you can for one day a week.
- > Walk, cycle or take public transport.
- > Carpool.
- > Work from home for part of your working week.
- > Go Electric on your next car.

What's needed?

Help is needed to facilitate people to make cleaner and healthier air quality choices:

- > Local authorities must prioritise the appropriate allocation of resources to advance air enforcement activities and implement the new solid fuel regulations.
- > Dublin Local Authorities must fully implement the Dublin Air Quality Plan [SEE THE PLAN HERE](#).
- > Maintain and increase investment in clean public transport infrastructure across the country.
- > Create more safe footpaths and cycle lanes.



What can I do? What's needed?

We can all help improve the quality of the air we breathe

Key Messages

Air Quality Monitoring

Air Quality in Ireland 2022

Problem Pollutants

**What can I do?
 What's needed?**

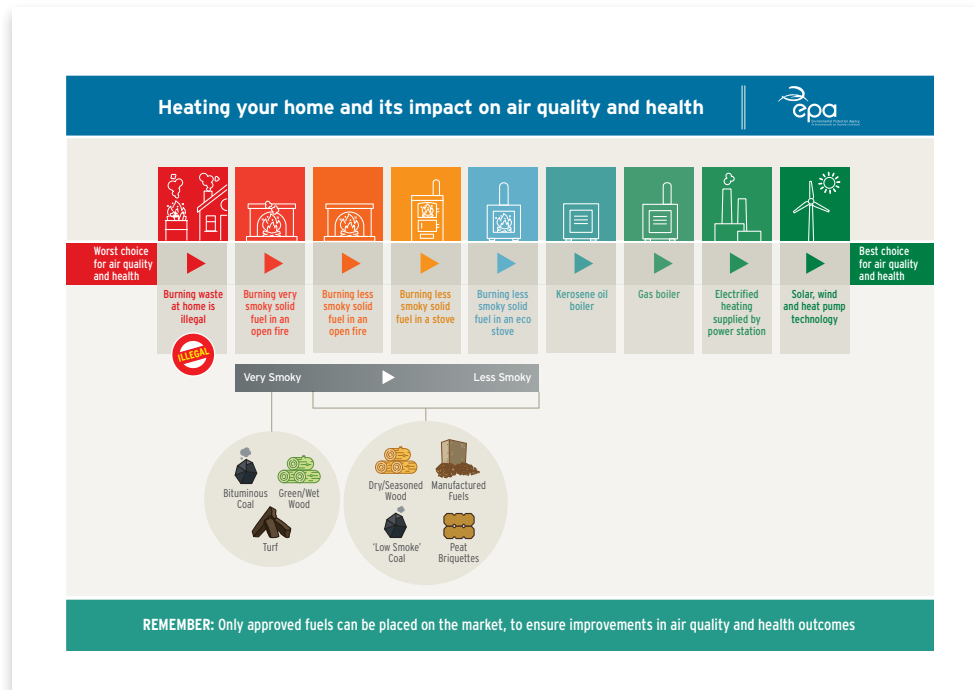
Air Quality Modelling

LIFE EMERALD

Citizen Science CAT

Learn more

Acknowledgements and Disclaimer



Air Quality Modelling

Key Messages

Air Quality Monitoring

Air Quality in Ireland 2022

Problem Pollutants

What can I do? What's needed?

Air Quality Modelling

LIFE EMERALD

Citizen Science CAT

Learn more

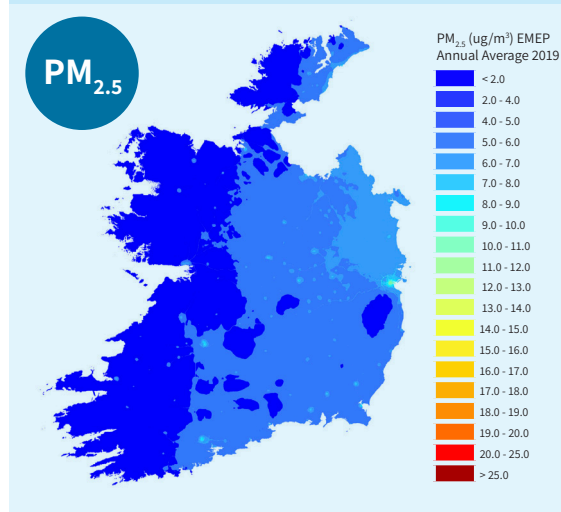
Acknowledgements and Disclaimer



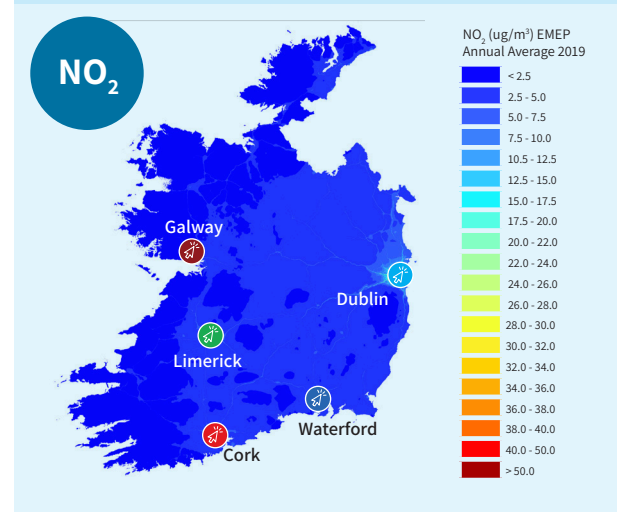
Air quality maps for 2018 and 2019 were generated by modelling. The maps allow a comparison against the World Health Organisation (WHO) guidelines for health. The full modelling report, including additional maps, is available [HERE](#). Key findings for 2019, as shown in the maps below, were:

- > Most of Ireland did not meet the WHO guideline for fine particulate matter (PM_{2.5}) of 5 µg/m³.
- > While most of Ireland can meet the WHO guideline for nitrogen dioxide (NO₂) of 10 µg/m³, the model highlights elevated concentrations along the major urban road network in our larger cities – click on the city links below.

Modelled national map for PM_{2.5} 2019



Modelled national map for NO₂ 2019



 **CLICK ON EACH CITY FOR MORE DETAIL**

Air Quality Modelling

Key Messages

Air Quality
Monitoring

Air Quality in
Ireland 2022

Problem
Pollutants

What can I do?
What's needed?

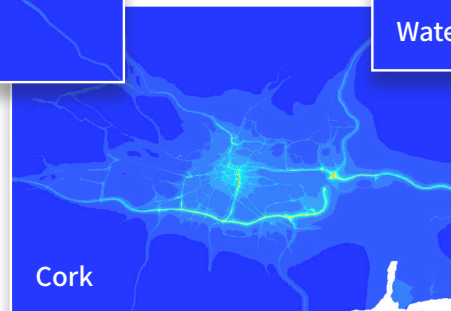
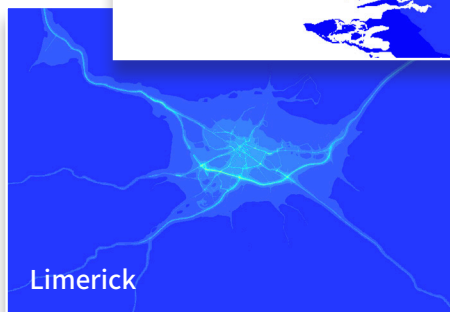
Air Quality
Modelling

LIFE EMERALD

Citizen Science CAT

Learn more

Acknowledgements
and Disclaimer



LIFE EMERALD

Key Messages

Air Quality Monitoring

Air Quality in Ireland 2022

Problem Pollutants

What can I do? What's needed?

Air Quality Modelling

LIFE EMERALD

Citizen Science CAT

Learn more

Acknowledgements and Disclaimer



LIFE Emerald is a four-year EU-Irish Government funded forecasting and modelling project. The three outputs will be an air quality forecast, nowcast and historical maps.

Air Quality Forecast

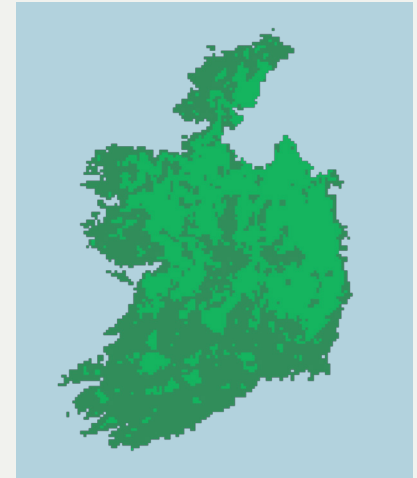
From November 2023 3 day forecast maps will be available for the Air Quality Index for Health (AQIH) and 4 pollutants (PM_{10} , $PM_{2.5}$, NO_2 and O_3). From the maps, users will be able to see predicted air quality values for their local area.

Nowcast Maps

Hourly modelled maps (Nowcast maps) will show the current modelled air quality data for the AQIH and the 4 air pollutants across Ireland from Q2 2024.

Historical Maps

From June 2024 national maps showing historical annual average AQIH values and the concentrations of the 4 air pollutants will be available.



The Forecast maps will be available on airquality.ie in November 2023



 **WATCH**
Dungarvan Sensor

 **VISIT**
The LIFE Emerald website

Citizen Science - CAT

CAT is moving to Galway in 2023



Key Messages

Air Quality Monitoring

Air Quality in Ireland 2022

Problem Pollutants

What can I do? What's needed?

Air Quality Modelling

LIFE EMERALD

Citizen Science CAT

Learn more

Acknowledgements and Disclaimer

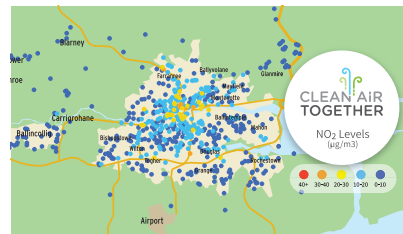


In 2021 and 2022, the Clean Air Together measurement campaigns in Dublin and Cork saw citizen scientists successfully measuring NO₂ near their homes, businesses and schools.



Clean Air Together moved to Cork in 2022 with full details @Cleanairtogether.ie

- CAT Dublin and Cork results clearly show that higher nitrogen dioxide levels are linked with higher traffic volumes.
- The results will be used by the EPA to support air quality modelling and by local authorities to support air quality management.
- None of the results indicated a breach of EU air quality limit (40 µg/m³).
- CAT will take place in Galway this October with up to 400 citizen scientists.

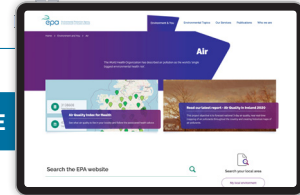


Learn more

If you want more information

Go to the EPA Air Quality Frequently Asked Questions

 **CLICK HERE**



USEFUL LINKS		EU & WHO	
	Supplementary information for the 2022 Air Quality Report in Ireland		The Cleaner Air For Europe Directive (CAFE Directive) (2008/50/EC)
	EPA's Air Quality Index for Health (AQIH)		EEA Report: air quality in Europe 2022
	Real Time Air quality data for Ireland		WHO Air Quality Guidelines Global
	ABC for Cleaner Air		WHO: Breathe Life - How air pollution impacts your body
	The National Investment Framework for Transport in Ireland	EPA funded research in Air Quality  CLICK for details	
	Ireland's Climate Action Plan		

Europe as part of the Green Deal and the EU's zero pollution visions for 2050 is revising its air quality standards to align them more closely with the lower WHO recommendations.



CLICK ON EACH BUTTON for more detail



Key Messages

Air Quality Monitoring

Air Quality in Ireland 2022

Problem Pollutants

What can I do? What's needed?

Air Quality Modelling

LIFE EMERALD

Citizen Science CAT

Learn more

Acknowledgements and Disclaimer

Acknowledgements and Disclaimer

Acknowledgments: The Principal authors, Lisa Sheils, Patrick Kenny and Ken Murphy, wish to acknowledge the contributions of their colleagues: Lin Delaney, Emilia Hanley, Sarah Boylan, Kevin Delaney, Patrick Malone, Dermot Burke, Cathal Ruane, Kevin Harte, Patrick Byrne and Director Micheál Lehane, in the National Ambient Air Quality Unit. EPA contractors, Hugh Baxter, Dylan Halpin, and Peter Mooney. Fiona O' Rourke EPA Evidence Programme, Emily Williamson and Eileen Butler, Communications Team and Leo McKittrick EPA Clean Air Together. Additional support in monitoring, analysis and input was provided by EPA staff in Dublin, Kilkenny, Wexford, Castlebar, Monaghan, Cork and Limerick with support in data collection and reporting from colleagues in the EPA Research, Emissions, Air Cross Office, Ecosystem Services, Enforcement, Catchments, IT and Geographic Information System teams. The authors also acknowledge the input of personnel from local authorities, DECC, the Health Service Executive, Met Éireann, UCC, MTU, TCD, MU, UoG amongst others who provided data for this report. The authors wish to also acknowledge all the site personnel who assisted in gaining access to our monitoring sites and enabling us to carry out our routine work, which in turn assisted us greatly in the development of this report.

FUSE Graphic Design.

Cover and back cover photographs courtesy of Lisa Sheils.

Disclaimer: Although we in the Environmental Protection Agency have tried our best to make sure this publication is accurate, we cannot guarantee complete accuracy. Neither we nor the authors are in any way responsible for any loss or damage caused by, or claimed to have been caused by, anyone doing anything or failing to do anything based on information in this publication. You may reproduce all or part of this publication without further permission, provided you acknowledge the source.

