

Air Quality in Ireland

Report 2023



Key Messages

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Air Quality Monitoring

Air Quality in Ireland 2023

Problem Pollutants

What can I do? What's needed?

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Air pollution can be a major environmental risk to people's health, with approximately 1,600 premature deaths annually in Ireland due to poor air quality.

Ireland's latest monitoring shows we are in compliance with current EU standards.

Ireland is not on track to achieve its ambition, set out in the National Clean Air Strategy, to meet the health-based WHO air quality guideline limits in 2026. Achieving future targets will be very challenging.

Main pollutants of concern are fine particulate matter (PM_{2.5}) from solid fuel combustion and nitrogen dioxide (NO₂) from vehicle emissions/traffic.



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 alternatives to solid fuel combustion



Public and active transport



Better insulated homes



Electric vehicles

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What and how we monitor air quality in Ireland

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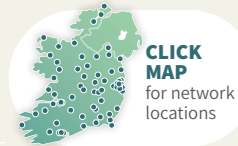
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The monitoring network

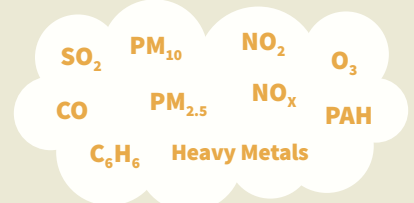
The national ambient air quality monitoring network has almost quadrupled in size since 2017 from 29 stations to the representative 115 station network.



The monitoring network provides real-time air quality results and generates public health advice. The results and advice can be viewed on the Air Quality Index for Health (AQIH) at www.airquality.ie, where you can see what air quality is like in your locality.



What did we monitor in Ireland's air in 2023?



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.



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SETTING UP A STATION

1

Site Selection 6 - 10 weeks

Engagement with third party operator e.g. local authority, third level institution, HSE, OPW etc.

Site options, assessment and review

Health and safety, security

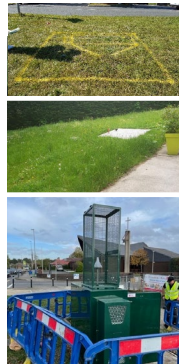
Suitability

Site type (single or multi pollutant)

2

Site Preparation 3 - 12 months

Planning and approval
Civil works (concrete base, electrics and communications)



3

Instrument Installation 2 - 6 weeks

Enclosure mounting
Instrument engineers
Testing of equipment
Network integration, communications, modem checks
Calibration of equipment



4

Data available to the public Real-time

Data online
Website - station information
Monthly bulletin
AQIH
Annual report
Reporting to Europe



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Cleaner Air For Europe Directive (CAFE Directive)¹

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The CAFE Directive¹

Ireland met all of its EU CAFE legal requirements in 2023 but failed to meet [WHO guidelines](#) values for health in 2023 and is not on track to meet the [Clean Air Strategy](#) Targets for 2026 which is equivalent to WHO IT3.

The [CAFE Directive](#) establishes objectives on how to assess ambient air quality in order to reduce, prevent, and avoid harmful effects on our health and on the environment. See how Ireland met the CAFE legal limit values for selected pollutants measured in 2023 (see opposite table).



Selected pollutants measured in 2023 and their adherence to EU legal limit values (CAFE Directive)

Pollutant	Number of stations where parameter monitored in 2023	EU legal limit values
PM ₁₀	106	No exceedances
PM _{2.5}	101	No exceedances
NO ₂	36	No exceedances
Ozone (O ₃)	23	No exceedances
Sulphur dioxide (SO ₂)	15	No exceedances
PAHs	5	No exceedances
Heavy metals	5	No exceedances
Dioxins	22	No exceedances

Air Monitoring Trends

Air Quality in Ireland is moving in a positive direction although Ireland has not yet met the Clean Air strategy and WHO values.

EACH PARAMETER
 long-term trends - next page

PM_{2.5}

NO₂

SO₂

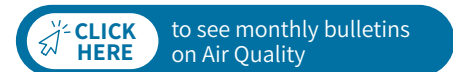
VIEW
 WHO AQGs & Interim targets on page 7

VIEW
 Comparison with CAFE Directive on page 8

VIEW
 The challenge facing Ireland on page 7

Monthly Bulletins

Each month Air Quality Bulletins are published on www.epa.ie and www.airquality.ie to give a snapshot of air quality across Ireland.



¹The CAFE Directive was transposed into Irish legislation by the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011). 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).

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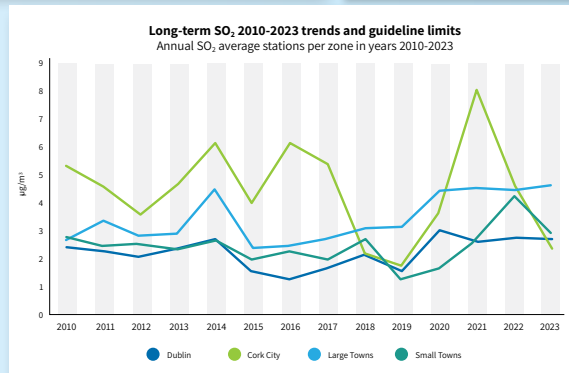
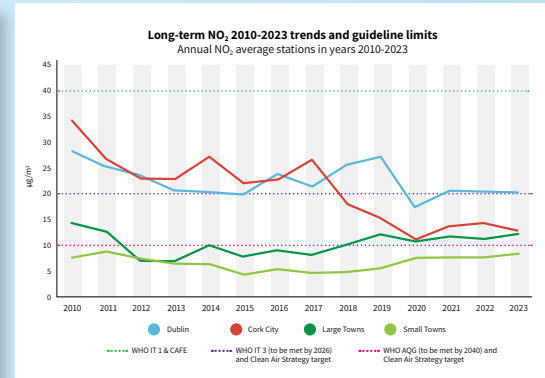
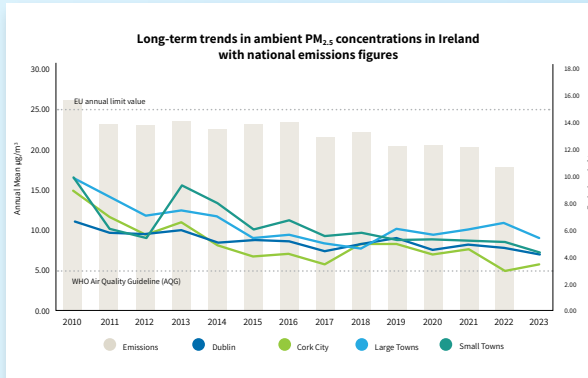
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Each Parameter - long-term trends



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WHO AQGs & Interim targets

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
	24 hour ¹	75	50	37.5	25	15
PM ₁₀ µg/m ³	Annual	70	50	30	20	15
	24 hour ¹	150	100	75	50	45
O ₃ µg/m ³	Peak Season ²	100	70	—	—	60
	8 hour ¹	160	120	—	—	100
NO ₂ µg/m ³	Annual	40	30	20	—	10
	24 hour ¹	120	50	—	—	25
SO ₂ µg/m ³	24 hour ¹	125	50	—	—	40
CO mg/m ³	24 hour ¹	7	—	—	—	4

¹99th percentile (i.e. 3-4 exceedance days per year).

²Average of daily maximum 8 hour mean O₃ concentration in the six consecutive months with the highest six-month running-average O₃ concentration.

The challenge facing Ireland

Selected pollutants measured in 2023 failing the WHO IT3, IT4 and AQG levels

Pollutant	Averaging Time	Number of stations, parameter monitored 2023	Recast CAFE aim for Europe		
			Number of stations over IT 3 WHO limit (to be met by 2026)	Number of stations over IT 4 WHO limit (to be met by 2030)	Number of stations over AQG WHO limit (to be met by 2040)
PM ₁₀	Annual	106	0	0	5
	24 hour ¹		1	4	10
PM _{2.5}	Annual	101	0	3	79
	24 hour ¹		9	26	80
NO ₂	Annual	36	8	8	24
	24 hour ¹		7	7	29
Ozone (O ₃)	Peak Season ²	23	1	1	6
	8 hours daily ¹		7	7	18
Sulphur dioxide (SO ₂)	24 hour ¹	15	1	1	1

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

²Peak season: April to end of August.

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Comparison with CAFE Directive

Selected pollutants measured in 2023 failing the WHO AQG levels

Pollutant	Number of stations where parameter monitored 2023	WHO Air Quality Guideline (AQG) level or EEA reference level ¹
PM ₁₀	106	Above annual WHO AQG value at 5 stations. Above daily WHO AQG value at 10 stations
PM _{2.5}	101	Above annual WHO AQG value at 79 stations. Above daily WHO AQG value at 80 stations
NO ₂	36	Above annual WHO AQG value at 24 stations. Above daily WHO AQG value at 29 stations.
Ozone (O ₃)	23	Above Peak Season WHO AQG level at 6 stations. Above 8hr daily WHO AQG value at 18 stations
Sulphur dioxide (SO ₂)	15	Above WHO 24 hour AQG level at 1 station

¹Stations with at least 50% data capture

Selected pollutants measured in 2023 and their adherence to EU legal limit values (CAFE Directive)

Pollutant	Number of stations where parameter monitored 2023	EU legal limit values
PM ₁₀	106	No exceedances
PM _{2.5}	101	No exceedances
NO ₂	36	No exceedances
Ozone (O ₃)	23	No exceedances
Sulphur dioxide (SO ₂)	15	No exceedances
PAHs	5	No exceedances
Heavy metals	5	No exceedances
Dioxins	22	No exceedances
All other pollutants	-	No exceedances



Problem Pollutants

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

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Particulate matter (PM)

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

Particulate matter (PM) are tiny particles of solid or liquid suspended in the air. 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 fuels, such as coal, peat, and wood to heat our homes.

How will it impact my health?

PM_{2.5} is the more important pollutant as it causes most health issues. These tiny particles are inhaled deep into the lungs and cause damage. Chronic exposure can also contribute to stroke and heart disease.

When is it at its worst?

PM levels, in our towns and villages, are at their highest during winter because of human activity, with increased burning of solid fuels using fires and stoves for heating.

Nitrogen dioxide (NO₂)

What is Nitrogen dioxide?

Nitrogen dioxide is a significant air pollutant (NO₂).

Where does it come from?

The main source of NO₂ in our towns and cities is from traffic (petrol and diesel engines).

How will it impact my health?

NO₂ can affect our lungs and breathing.

When is it at its worst?

High concentration of NO₂ occurs in our cities, where traffic is heaviest.



WATCH
 How we monitor PM



WATCH
 How we monitor NO_x



WATCH Clean air is important for good health

SEE The effects of PM_{2.5} on next page



Problem Pollutants

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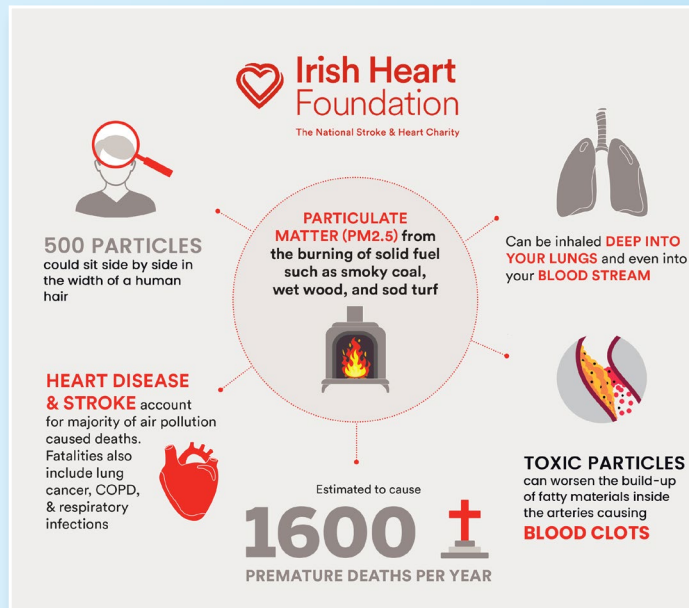
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The effects of PM_{2.5}



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

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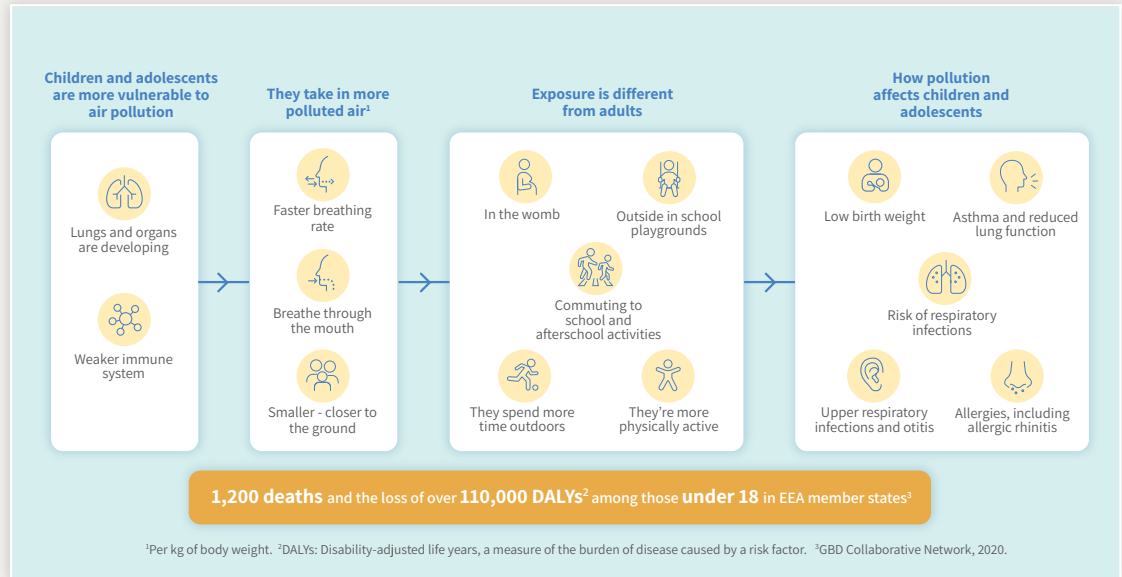
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Children and adolescents are more vulnerable to air pollution



What can I do? What's needed?

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

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Reduce Home Heating Pollution (PM)



Avoid using solid fuels

if you have an alternative cleaner heating system



Change how you heat your home

by using cleaner fuel choices

Cleaner ways to heat our homes - see Page 13



Make your home more energy efficient and more comfortable

Home energy upgrade one stop shop

See the effects of solid fuel burning on the air monitoring network

WATCH THE VIDEO

Reduce Car Pollution (NO₂)



Leave the car at home

if you can for 1 day a week



Carpool

and reduce the amount of cars on the road



Take public transport

or walk, or cycle



Work from home

for part of your working week



Go electric



Reduce idling

What's needed? Help is needed to facilitate people to make cleaner and healthier air quality choices.



Local authorities

Prioritise allocation of resources to advance enforcement



Solid Fuel regulations

Full implementation

See regulations



Air Quality plans

Full implementation of Air Quality Plans

Dublin Region Air Quality Plan



Clean public transport

maintain and increase investment



Active travel

create more and safer footpaths and cycle lanes

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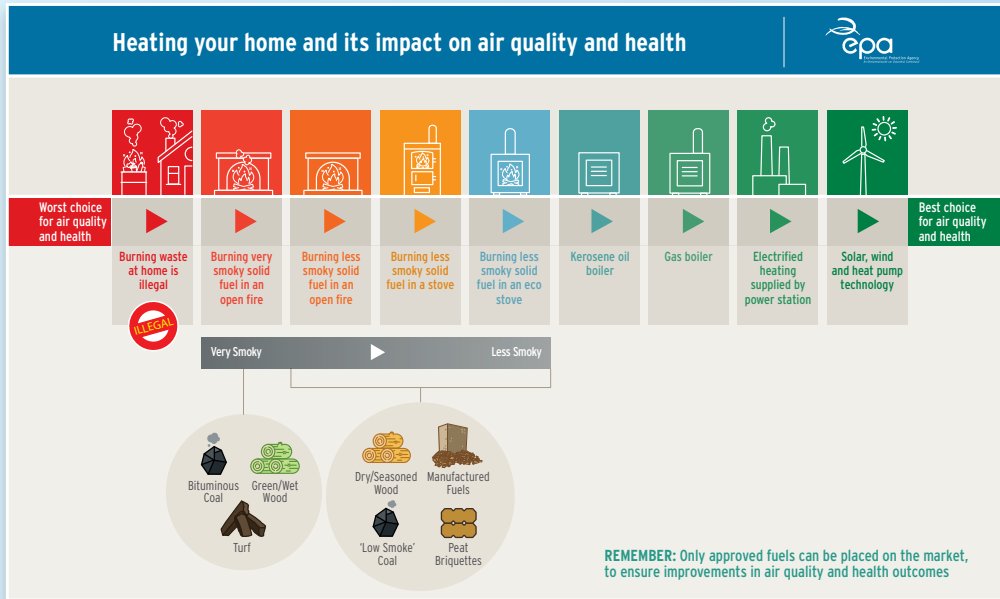
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Change how you heat your home



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Air Quality Modelling

Air quality modelling is an effective way to communicate air quality data in a format that is easy to understand. It fills in gaps between monitoring stations, providing air quality values across the entire country.

EPA's LIFE Emerald project has developed state of the art air quality models which will be used by the EPA for years to come. These models will provide daily forecast, hourly updated and annual high-resolution maps for air quality in Ireland.



WATCH OVERVIEW
 of airquality.ie

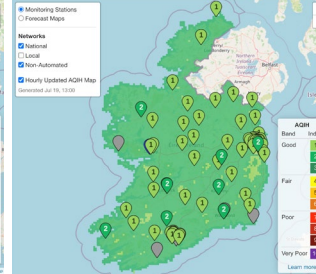
These maps are all readily available through epa.ie and on airquality.ie



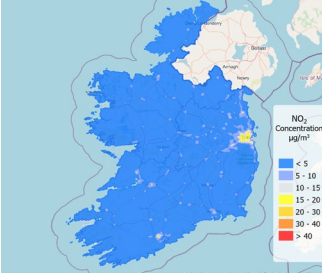
Daily Air Quality Forecasts



Hourly Updated Air Quality Index for Health



Annual High-Resolution Maps - see Page 16



High-resolution air quality maps have been produced for the entire country for 2019, 2021, 2022 and 2023. These maps will be produced annually and will not only provide greater detail across the country, but can also be used for:

Better identification of potential air quality limit exceedances

National health assessments

Spatial representiveness studies

More detail on following page

Improved Mapping of Emissions

LIFE Emerald studies carried out in Dungarvan and Edenderry improved our understanding of where air pollutants were coming from.



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Better identification of potential air quality limit exceedances

High resolution air quality maps for the entire country allow potential exceedances of European air quality limits to be more easily identified. An observation of a modelled exceedance would require follow up indicative air quality monitoring for confirmation before reporting to the European Commission.

National health assessments

High resolution air quality concentration maps can be used to identify populations most at risk from air pollution. These maps can be combined with population data to calculate the relative risk from air pollution to the general public.

Spatial representativeness studies

A spatial representativeness study is an assessment of how well an air quality monitoring network monitors the full range of concentrations of atmospheric pollutants. The use of high resolution air quality maps ensures air quality monitoring is representative of conditions across the country.

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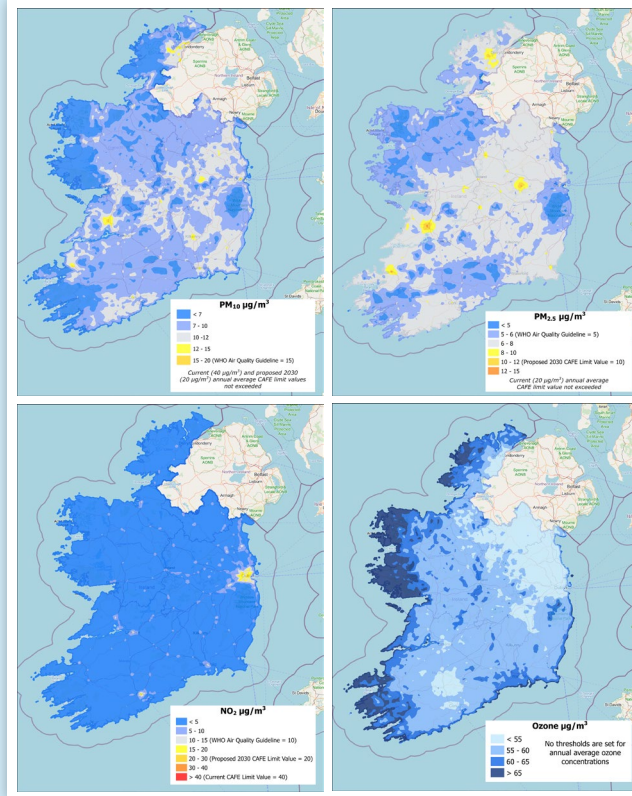
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Annual High-Resolution Maps



New EU Legislation

Proposed new Directive on air quality



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Legislation Updates

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The EU has proposed a new Cleaner Air for Europe Directive, key points include:

- Lower limit values for 2030 for key health impacting pollutants including fine particulate matter (PM_{2.5}) and nitrogen dioxide (NO₂), more closely aligned with WHO guidelines.
- New pollutants added to monitoring requirements including Ultrafine Particles (UFP), black carbon and ammonia.
- Further improvements to the EU legal framework for air quality including better public information on air quality, strengthened air quality plans, requirements for air quality modelling and air quality road-maps to improve air quality management.
- A review of air quality limit values must be carried out by 2030 to look at options for alignment with WHO guidelines and the latest scientific evidence.



EU Zero Pollution Fact Sheet



READ HERE



Questions and Answers on New Air Quality Rules



READ HERE



Provisional agreement for cleaner air in the EU



READ HERE



Proposed new CAFE Directive



READ HERE

EU CleanAir Forum



EEA ask an expert
 Air pollution and health



WATCH VIDEO

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Following successful campaigns in Dublin in 2021 and Cork city in 2022, the EPA's citizen science project Clean Air Together moved to Galway city in 2023 and will roll out in Limerick city in late 2024. The project involves citizen scientists measuring levels of the nitrogen dioxide (NO₂) in their local area in October.



Clean Air Together moved to Galway in 2023 with full details @Cleanairtogether.ie

- > Results from all three Clean Air Together (CAT) campaigns to date clearly show that higher NO₂ levels are linked to higher volumes of vehicular traffic.
- > Results for CAT-Galway City show that 71% of locations sampled were 0-10 µg/m³ and 24.5% (10 - 20 µg/m³) for NO₂.
- > CAT-Limerick City was launched on Wednesday August 21st, 2024 to carry out NO₂ measurements during the month of October. Results are expected to be published in early 2025.
- > CAT results are being used by the EPA to support air quality modelling and by local authorities to support air quality management.



Learn more

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If you want more information

Go to the EPA Air Quality Frequently Asked Questions








USEFUL LINKS

-  [Supplementary information for the 2023 Air Quality Report in Ireland](#)
-  [EPA's Air Quality Index for Health \(AQIH\)](#)
-  [Real Time Air quality data for Ireland](#)
-  [The National Investment Framework for Transport in Ireland](#)
-  [Ireland's Climate Action Plan](#)
-  [Clean Air Strategy](#)
-  [Clean Air Day Cork](#)
-  [The National Retrofitting Scheme](#)

AIR QUALITY RESEARCH

-  [EPA funded research in Air Quality](#)

EU & WHO

-  [The Cleaner Air For Europe Directive \(CAFE Directive\) \(2008/50/EC\)](#)
-  [EEA Report: Europe's air quality status 2023](#)
-  [WHO Air Quality Guidelines](#)
-  [WHO: Breathe Life - How air pollution impacts your body](#)
-  [EU Air Quality Index for Health](#)

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.



Acknowledgements and Disclaimer

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