Modelling in the context of the Revised Directive (EU) 2024/2881

26th EMEP Task Force on Measurements and Modelling Meeting
Potsdam, 5-7 May 2025

Clean Air & Urban Policy Unit

European Commission

Outline

- Introduction of the Revised Ambient Air Quality Directive
- Introduction of modelling in the context of the AAQD
- Role of modelling in the Revised AAQD
- Towards harmonized modelling
- Concluding remarks

The Ambient Air Quality Directive recast

Directive 2008/50/EC

on ambient air quality and cleaner air for Europe

As amended by **Commission Directive (EU) 2015/1480**

Directive 2004/107/EC

relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air

As amended by **Commission Directive (EU) 2015/1480**

Official Journal of the European Union

EN
L series

2024/2881

20.11.2024

DIRECTIVE (EU) 2024/2881 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 23 October 2024

on ambient air quality and cleaner air for Europe

(recast)

Directive (EU) 2024/2881

on ambient air quality and cleaner air for Europe (recast)

Member States need to transpose this by **11 Dec 2026**

Directive (EU) 2024/2881 in a nutshell

Chapter	Articles	Content
I	1-6	**General Provisions** including objectives, subject matter, regular review, definitions, responsibilities, and establishment of zones and average exposure territorial unit
II	7-11	**Assessment of Ambient Air Quality and Deposition Rates** including assessment regime, assessment criteria, sampling points, monitoring supersites, and provisions on reference measurement methods, modelling applications, and data quality objectives
III	12-18	**Ambient Air Quality Management** including limit values, target values and average exposure reduction obligations, exceedances of alert or information thresholds, contributions from NS and WSS, and postponement of attainment deadline and exemption from certain limit values
IV	19-21	**Plans** including air quality plans and air quality roadmaps, short-term action plans, and transboundary air pollution
V	22-23	**Information and reporting** including public information and provisions related to the transmission of information and reporting
VI	24-26	**Delegated and Implementing Acts** including provisions for amendments to Annexes, exercise of the delegation, and the Committee procedure
VII	27-29	Enforcement through **Access to Justice, Compensation and Penalties** including specific provisions related to access to justice, compensation for damage to human health, and penalties
VIII	30-33	**Transitional and Final Provisions** including Transposition, Repeal, Entry into force and application, and Addressees
Annexes I-X		

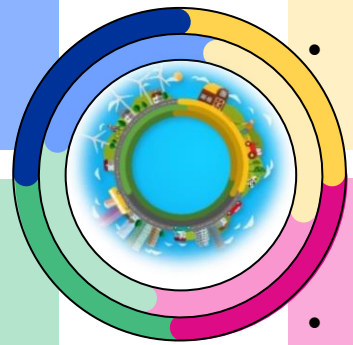
What's new in the revised AAQD

Environment & health

- **Zero pollution objective** at the latest by 2050
- Intermediate **2030 EU air quality standards**
- **Postponement** of deadlines possible (climate and orographic, domestic heating, projections)
- New metrics & **average exposure obligations**

Monitoring & assessment

- Refined approach to **air quality monitoring,** increased use of **air quality modelling**
- Additional information on representativeness of **sampling points**, better inform air quality action
- Monitoring **pollutants of emerging concern** (e.g. ultrafine particles, black carbon, ammonia)



Governance & enforcement

- **Regular review mechanism**
- Air quality plans to be **more effective in ending and preventing exceedances of EU standards**
- **Improved enforceability**: new provisions on access to justice, compensation and penalties
- More **transboundary cooperation** on air quality

Information & communication

- More **up-to-date air quality information**
- Requirements for **air quality indices** to provide hourly reporting of available air quality data
- **Informing the public** about possible health impacts and provide recommendations

Modelling in the revised AAQD - Highlights

There are **79 references** to modelling / modelling applications in the revised AAQD (in the current AAQDs there were 21 and 12 references, respectively).

- ✓ **Article 2(24)** defines that **'Modelling application'** means application of a modelling system, understood as a chain of models and submodels, including all necessary input data, and any post-processing.

- ✓ **Article 5(d)** sets a clear requirement for Member States to **designate competent authorities** and bodies responsible for promoting the accuracy of modelling applications.

- ✓ **Article 11 & Annex VI** define that MS shall apply **air quality modelling applications** subject to the conditions set out in Annex VI.

- ✓ **Article 8(7)** stipulates that by 11 June 2026, the Commission shall provide, by means of implementing acts, further technical details for: (a) **modelling applications**, […]; (b) determining the spatial representativeness of sampling points.

Role of modelling in the revised AAQD

Air Quality Assessment

Modelling applications provide data on **air quality** and information on the **spatial distribution** of air pollutants (e.g. Articles 8 and 9, and Annex V)

Spatial Representativeness

Modelling applications inform **spatial representativeness of sampling points and network design** (e.g. Articles 8 and 9, and Annex IV)

Modelling applications offer **short-term projections** of air quality and on pollution peaks (e.g. Articles 15 and 20, and Annexes I and X)

Forecasting

Modelling applications assess **links between emission sources and air quality** (e.g. Article 19 and Annex VIII. Applicable to Articles 16-18 & 20-21)

Source Apportionment

Modelling applications quantify the **expected impact of measures** (e.g. Annex VIII and Articles 18 to 20)

Air Quality Planning

Role of modelling and Article 8 of the AAQD

Air Quality Assessment

Modelling applications provide data on **air quality** and information on the **spatial distribution** of air pollutants

Spatial Representativeness

Modelling applications inform **spatial representativeness of sampling points** and network design

OJ L, 20.11.2024 EN

7. By 11 June 2026, the Commission shall provide, by means of implementing acts, further technical details for:

(a) modelling applications, including how results from modelling applications and indicative measurements shall be taken into account when assessing air quality and how potential exceedances that are identified by those assessment methods can be verified;

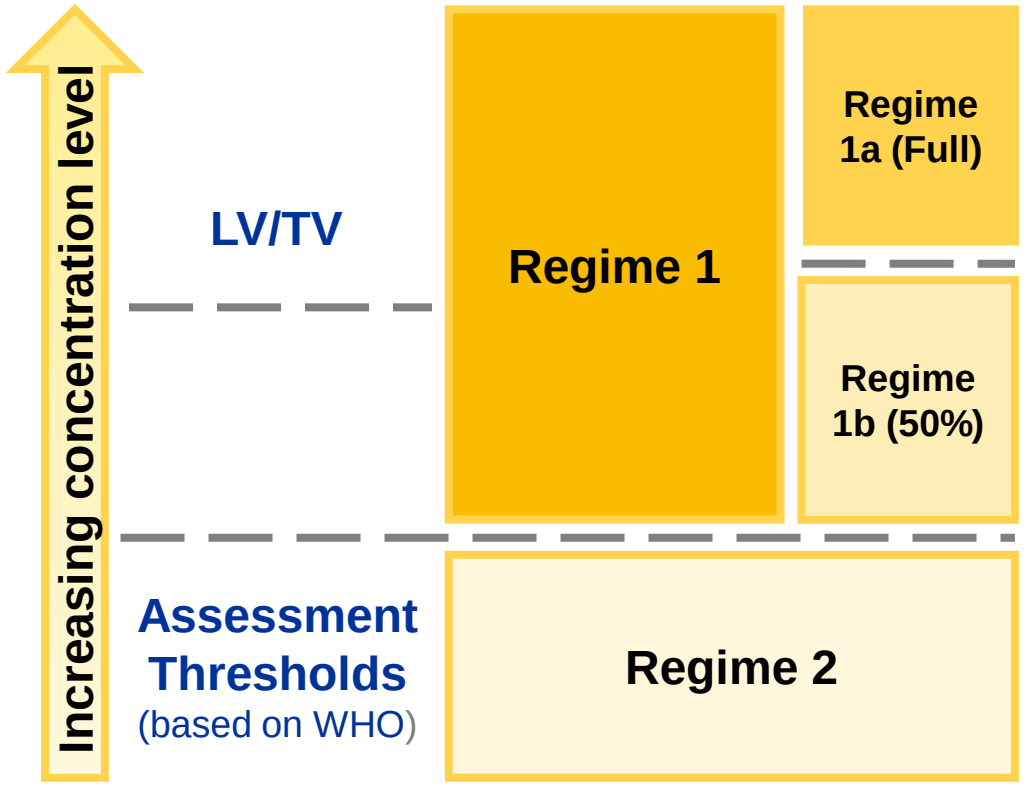
(b) determining the spatial representativeness of sampling points.

Those implementing acts shall be adopted in accordance with the examination procedure referred to in Article 26(2).

Air Quality Assessment

Assessment regimes & criteria

Refined **monitoring and assessment regimes**, with stronger role for modelling and additional requirements to assure monitoring continuity and spatial representativeness.



Regime 1a - *fixed sampling points shall be used; may be supplemented by indicative measurements/modelling to assess air quality. From 2 yrs after adoption of IA modelling: indicative or modelling shall be used. Modelling at least every 5 yrs.*

Regime 1b - *fixed sampling points shall be used; but can be reduced by up to 50% under conditions (i.e. if there is sufficient modelling and/or indicative measurements, same number of indicative as fixed replaced).*

Regime 2 - *modelling applications, indicative measurements, objective-estimation techniques or a combination shall be sufficient for assessment of AQ.*

Spatial Representativeness

Spatial Representativeness – SR

- ✓ Article 8(2) defines that in zones classified as above the assessment thresholds […], fixed measurements shall be used to assess the AQ. Those may be supplemented by modelling […] to provide adequate information on the spatial distribution of air pollutants and on the SR of fixed measurements.
- ✓ Article 8(3) stipulates that from 2 years following the adoption of the IA, modelling applications […] should be used to assess the ambient air quality […]. Where modelling applications are used, they shall also provide information on the SR of fixed measurements […].
- ✓ Article 9(7) discusses relocation requirements […]. Among others, it defines that "Relocation of such sampling points shall be supported by modelling applications or indicative measurements and shall, wherever possible, ensure continuity of measurements and be done within their area of SR".
- ✓ Annex IV lists the criteria related to SR of sampling points. These include – among others – (a) that the geographical area may include non-contiguous domains […]; (b) if assessed via modelling applications, a fit-for-purpose modelling system shall be used […].

Towards harmonized air quality modelling

To promote and support the **harmonized use of scientifically sound air quality modelling,** the appropriate competent authorities and bodies shall ensure the following:

a) that the designated reference institutions participate in the **European network of air quality modelling** set up by the Commission's Joint Research Centre;

b) that **best practices in air quality modelling** identified by the network through scientific consensus are adopted in relevant applications […], without prejudice to model adaptations necessitated by singular circumstances;

c) that the quality of relevant applications of air quality modelling is periodically checked and improved through **intercomparison exercises** organized by the Joint Research Centre;

d) that the European network of air quality modelling be responsible for the **periodic review**, at least every 5 years, **of the maximum ratio of modelling uncertainties listed in Annex V and subsequent proposal of necessary changes.**

Technical support documents

AQ Monitoring for air quality policy

Technical support document on the use of reference and non-reference methods, and on the quality assurance process to meet relevant data quality objectives for regulated air pollutants

AQ Modelling for air quality policy

Technical support document on the use of modelling for various application domains under the new Ambient Air Quality Directive

Natural Sources

Technical support document revising the guidelines on the demonstration and subtraction of exceedances attributable to **natural sources** under the Ambient Air Quality Directive (SEC-2011-208)

Winter sanding and salting

Technical support document revising the guidelines on the determination of contributions from the re-suspension of particulates following **winter sanding or salting** of roads (SEC-2011-207)

Concluding remarks

- **EU Clean Air Policy works!** We have seen major improvements in air quality since the 1990s.

- Air quality monitoring (4.000 monitoring stations) and air quality modelling provide us with a **robust, comparable, and harmonized information basis** across the EU.

- **Air quality modelling** is afforded a much bigger role in the revised AAQD: for assessment, spatial representativeness, source apportionment, forecasting, and planning.

- Modelling applications will need to be **fit-for-purpose** – what this means will depend on the purpose. The choice of model(s) to use lies with MS, but there are requirements.

- Need to further advance air quality modelling to **support implementation** of the AAQD – relevant ongoing activities and technical support documents will serve as reference … and communicate clearly **what modelling applications can / cannot do!**

Thank you

ENV_AIR@ec.europa.eu