# Air Quality

## *- revision of EU Rules -*

27 April 2022

*European Commission*
*Clean Air Unit*

# So, how can FAIRMODE help?

Over the past five years, the use and reporting of **air quality modelling** has increased:
from 4 (in 2013) to 10 (in 2017) to 16 (in 2019) Member States … (only 11 to go) …

*But: reported air quality modelling data still varies in resolution and quality, not harmonized.*

The ongoing revision of EU Rules will *inter alia* aim to **strengthen the provisions**
for air quality modelling … to make it more robust and more comparable …

*But: we need to hear from you what exactly needs rules and what needs more guidance.*

Air pollution has **consequences** for air quality, as well as for environment & health, economic and social consequences …

*And: we need to further develop modelling to address all this (better)! But how?*

# Air quality – revision of EU rules

Address five shortcomings and twelve consequences

Air policy revision: focus on three policy areas

Focus on air quality modelling

Other activities to strengthen monitoring, modelling and plans

… our timelines for all of this

European Commission

*"The Commission will draw on the lessons learnt from the evaluation of the current air quality legislation.*

*It will also propose to strengthen provisions on monitoring, modelling and air quality plans to help local authorities achieve cleaner air.*

*The Commission will notably propose to revise air quality standards to align them more closely with the World Health Organization recommendations."*

Communication on the European Green Deal
(COM/2019/640 final)

#EUGreenDeal

European Commission

# EU Clean Air Policy – what needs to improve?

**Implementation:** Need continued push towards full implementation of existing clean air policy.

See also COM (2018) 330 ‘Clean Air for All’ for an overview.

**(Use) Funding:** Specific allocations for air quality of some EUR 2 billion (2014-2020), plus substantial indirect contributions (> 28 bn).

See: https://cohesiondata.ec.europa.eu/stories/s/Tracking-cohesion-policy-air-quality-investments/7ddu-4fki/

**Enforcement:** As of April 2022, still 30 infringement cases addressing 18 Member States (+ 1 vs UK) related to bad application.

**Information:** Eurobarometer polls (No 497, 2019) indicate a majority (54%) do not feel well informed about air quality problems.

See: https://airindex.eea.europa.eu/Map/AQI/Viewer/ - this shows up-to-date, near real time air quality data, also for Bulgaria

# 5 shortcomings … and 10 related drivers

| | | | |
|---|---|---|---|
| **Health outcome shortcomings**<br>EU Standards are not fully aligned with scientific advice … | ⇔ | Exceedances above WHO Air Quality Guidelines and health impacts persist | Lack of flexibility to adapt to evolving science and new recommendations |
| **Enforcement shortcomings**<br>Exceedances are not always addressed sufficiently and/or on time … | ⇔ | Air quality plans and measures have often proven ineffective | Insufficient penalties and damages linked to exceedances |
| **Governance shortcomings**<br>Air quality plans do not always address all sources effectively ... | ⇔ | Local air quality is impacted by emissions outside local control | Some measures may be ineffective, or seem disproportionate |
| **Information shortcomings**<br>Public feels under-informed about poor air quality and its impacts … | ⇔ | Concerns about health impacts have increased | Public information is not always clear, and not harmonised |
| **Assessment (Monitoring) shortcomings**<br>Flexibilities may sometimes impact the comparability of data … | ⇔ | Monitoring rules offering flexibility are sometimes ‘stretched’ | Modelling ability has improved, allows for much more detail |

# The consequences of these shortcomings

Environment & Health

- **Elevated concentration levels of air pollutants,** both general exposure of population and at pollution hotspots
- **Health impacts**, more than 400.000 premature deaths each year across the EU, plus morbidity health impacts
- **Ecosystem impacts**, eutrophication limits are being exceeded in 62% of ecosystem areas across the EU territory
- **Links with climate change**, as higher temperature are associated with elevated ozone levels
- **Synergies with other EU policies**, and in particular with the goals of the EU Zero Pollution Action Plan
- **Administrative burden** of air quality management, in particular as relates to air quality assessment regimes

Economic

- **Cost to society**, EUR 20 bn direct cost to health-care, lost work-days, crop losses, plus EUR 330-940 bn indirect costs
- **Measures needed to meet EU air quality standards,** with costs for industry, transport, energy, and agriculture sector
- **Impacts on the EU's international competitiveness,** with innovation potential, especially for clean air technologies

Social

- **Sensitive population groups** (children, pregnant women, elderly citizens) are more susceptible to air pollution
- **Inequalities and social sustainability**, as groups of lower economic status tend to be more negatively affected
- Measures to address air pollution may have effects on **employment**

European Commission

# Modelling the consequences of air policy?

## Environment & Health

- **Elevated concentration levels of air pollutants,** both general exposure of population and at pollution hotspots — 89%
- **Health impacts**, more than 400.000 premature deaths each year across the EU, plus morbidity health impacts — 56%
- **Ecosystem impacts**, eutrophication limits are being exceeded in 62% of ecosystem areas across the EU — 42%
- **Links with climate change**, as higher temperature are associated with elevated ozone levels — 38%
- **Synergies with other EU policies**, and in particular with the goals of the EU Zero Pollution Action Plan — 15%
- **Administrative burden** of air quality management, in particular as relates to air quality assessment regimes — 6%

## Economic

- **Cost to society**, EUR 20 bn direct cost to health-care, lost work-days, crop losses, plus EUR 330-940 bn indirect costs — 35%
- **Measures needed to meet EU air quality standards,** costs for industry, transport, energy, and agriculture sector — 44%
- **Impacts on the EU's international competitiveness,** with innovation potential, especially for clean air technologies — 0%

## Social

- **Sensitive population groups** (children, pregnant women, elderly citizens) are more susceptible to air pollution — 39%
- **Inequalities and social sustainability**, as groups of lower economic status tend to be more negatively affected — 12%
- Measures to address air pollution may have effects on **employment** — 3%

→ *Size of the ★★★★★ indicates what 'FAIRMODE models' focus on (66 replies)*

# Air policy revision: focus on three policy areas

**Augment the current Ambient Air Quality Directives for three policy areas**

- **Policy area 1:** closer alignment of the **EU air quality standards** with scientific knowledge including the latest recommendations of the World Health Organization (WHO).
- **Policy area 2**: improving the **air quality legislative framework**, including provisions on penalties and public information, in order to enhance effectiveness, efficiency and coherence.
- **Policy area 3**: strengthening of **air quality monitoring, modelling and plans**.

→ *to be further developed into more detailed options/scenarios for each policy area, to address five shortcomings and their consequences*

Second half of 2022

# Different levels of ambition (example: for $PM_{2.5}$)

**AMBITION LEVEL**

-

**EU standards today / baseline**

**Low ambition**

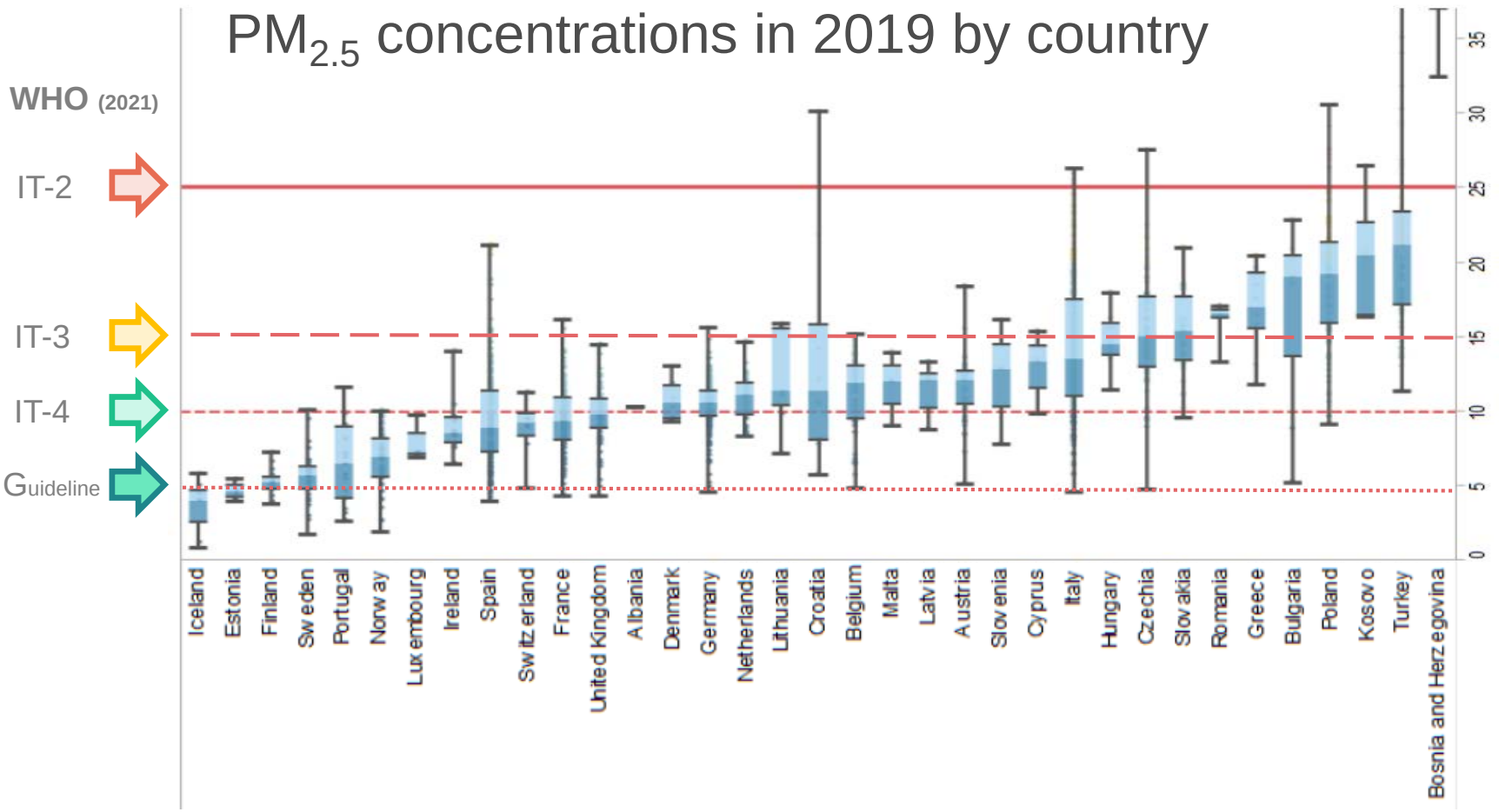
**Mid ambition**

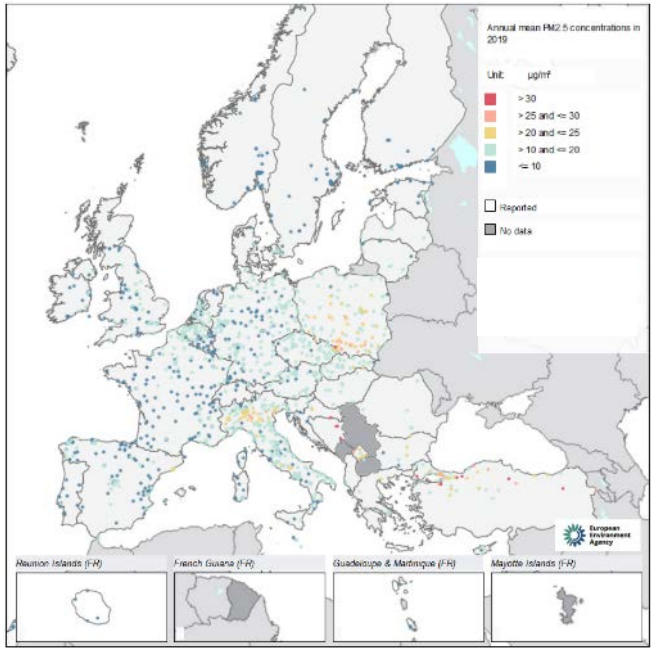
**High ambition**

**WHO – Air Quality guidelines and interim targets for PM (annual mean)**

| Annual mean level | $PM_{2.5}$ (µg/m3) | Mortality |
|---|---|---|
| Interim target 1 | 35 | + 24 % above guideline level |
| Interim target 2 | 25 | + 16 % above guideline level |
| Interim target 3 | 15 | + 8 % above guideline level |
| Interim target 4 | 10 | + 4 % above guideline level |
| AQ guideline level | 5 | mortality at guideline level |

# Ambition level versus air quality today

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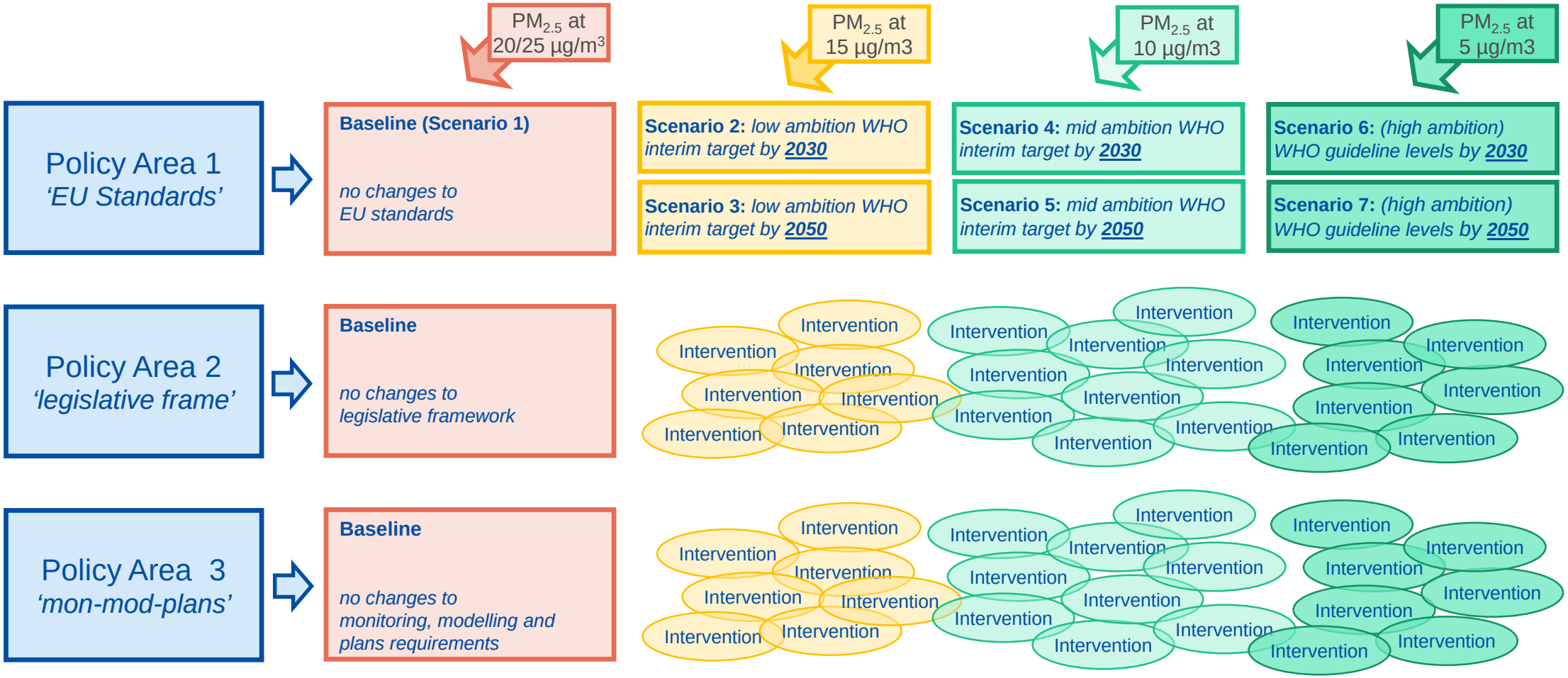
Source(s): EEA Europe's air quality status 2021

# Assessment of policy options per policy area




→ *based on assessment of consequences, combine different* ***policy options*** *to* ***policy packages***

| Problems | Drivers | Interventions |
|---|---|---|
| **Health outcome shortcomings**<br>EU Standards are not fully aligned with scientific advice … | Exceedances above health guidelines and negative health impacts persist<br>Lack of flexibility to adapt to evolving science' and new recommendations | Policy Area 1<br>*'EU Standards* |
| **AQ Implementation shortcomings**<br>Exceedances are not always addressed sufficiently and/or timely … | Insufficient penalties and compensation linked to exceedances<br>Air quality plans and measures have often proven ineffective | Policy Area 2<br>*'legislative frame'* |
| **AQ Governance shortcomings**<br>Air quality plans do not always address all sources effectively ... | Local air quality is impacted by emission outside control<br>Some measures may seem disproportionate, ineffective | |
| **AQ Information shortcomings**<br>Public feels under-informed about poor air quality and its impacts … | Concerns about health impacts have increased, not addressed<br>Public information is not always available, and not harmonised | Policy Area 3<br>*'monitoring, modelling and plans'* |
| **AQ Monitoring shortcomings**<br>Flexibilities may sometimes impact the comparability of data … | Monitoring rules offering flexibility are 'stretched' in instances<br>Modelling ability has improved, allows for much more details | |

## Key Objectives

**Policy Area 1 - Closer alignment of the EU air quality standards with scientific knowledge including the latest recommendations of the World Health Organization:**

- *to improve ambient air quality to the greatest extent possible taking into account the latest scientific advice, feasibility, costs, benefits.*

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# Potential interventions – policy area 1

| **O – PM2.5** *Particulate matter* | **P – PM10** *Particulate matter* | **Q – NO2** *Nitrogen dioxide* | **R – O3** *Ozone* | **S – SO2** *Sulphur dioxide* | **T – CO** *Carbon monoxide* | **U – C6H6** *Benzene* |
|---|---|---|---|---|---|---|
| O1: annual mean standard | P1: annual mean standard | Q1: annual mean standard | R1: new long-term standard | S1: annual mean standard | T1: short-term mean standard | U1: annual mean standard |
| O2: new short-term standard(s) | P2: short-term standard(s) | Q2: short-term standard(s) | R2: short-term standard(s) | S2: short-term standard(s) | | |
| O3: revise avg. exposure oblig. | P3: new avg. exposure oblig. | Q3: new avg. exposure oblig. | R3: new avg. exposure oblig. | | | |

| **V – BaP** *Benzo(a)pyrene* | **W – Pb** *Lead* | **X – As** *Arsenic* | **Y– Cd** *Cadmium* | **Z – Ni** *Nickel* | **Ø – Other** |
|---|---|---|---|---|---|
| V1: annual mean standard | W1: annual mean standard | X1: annual mean standard | Y1: annual mean standard | Z1: annual mean standard | Ø1: new standards |

13 intervention areas >> 22 interventions

Key focus: **Health Outcome** (and environmental impacts) shortcomings

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| | Modelling ability has improved, allows for much more details | |

## Key Objectives

**Policy Area 2 - Improving the air quality legislative framework, including provisions on penalties and public information**

- *To improve the quality and timely implement-ation of air quality plans to achieve air quality objectives, and strengthen public participation in the development of air quality plans.*
- *To include clearer provisions on access to justice, penalties and compensation linked to clean air in EU legislation.*

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# Potential interventions – policy area 2

| A – Timely adjustments | B – Type of standards | C – Action w/ exceedance | D – AQ Plan Involvement | M – Coop Transboundary | E – Access to justice (A2J) | F – Inform the public |
|---|---|---|---|---|---|---|
| A1: science triggers update? | B1: short-term std also for $PM_{2.5}$ | C1: what action mandated when | D1: define who to involve | M1: use agreed methodology, | E1: minimum penalties levels | F1: more up to date reporting |
| A2: tech feasibl. triggers update? | B2: alert levels for all pollutants | C2: what is 'as short as possible' | D2: harmonise AQ plans / zones | M2: joint action plans mandatory | E2: right for compensation | F2: make health data mandatory |
| A3: stricter local standards | B3: more targets for avg. exposure | C3: coordinate short-/long term | | | E3: set up a fund for damages | F3: specific comm. channels |
| A4: priority substance list | B4: better define standards&action | C4: short-term action for all | | | E4: explicit clause on A2J | F4: harmonise air quality indices |
| | B5: more limit values | C5: AQ plan regular update | | | | |

7 intervention areas >> 26 interventions

Key focus: **Implementation** shortcomings, **Governance** shortcomings and **Information** shortcomings

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| Problems | Drivers | Interventions |
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| **AQ Monitoring shortcomings**<br>Flexibilities may sometimes impact the comparability of data … | Monitoring rules offering flexibility are 'stretched' in instances | |
| | Modelling ability has improved, allows for much more details | |

## Key Objectives

**Policy Area 3 - Strengthening of air quality monitoring and modelling, and air quality plans**

- *To further improve the reliability and comprehensiveness of air quality assessments undertaken by national, regional and local authorities.*
- *To ensure that the public in all Member States receive the same high quality and timely information about their air quality.*

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# Potential interventions – policy area 3

| G – Assessment regimes | H – Number of sampling points | I – Continuity of sampling points | J – Siting of sampling points | K – Data quality | L – Additional pollutants | N – Information in AQ plans |
|---|---|---|---|---|---|---|
| G1: indicative monitoring | H1: change minimum number | I1: minimum number of years | J1: macro-scale siting criteria | K1: clearer data quality needs | L1: mandatory super sites | N1: refine min. information |
| **G2: mandatory modelling** | H2: PM10 and PM2.5 separate | I2: require long-term assessment | J2: micro-scale siting criteria | K2: measure up to date data | L2: emerging pollutants | |
| **G3: criteria for regular review** | H3: simpler typology | I3: protocol for relocation | **J3: est. spatial representative** | **K3: modelling quality criteria** | L3: expand list of VOCs sampled | |
| | | | | K4: absolute or relative uncert.? | | |

7 intervention areas
>> 20 interventions

Key focus: **Assessment (monitoring)** shortcomings and **Information** shortcomings

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# Focus on air quality monitoring and modelling

**Support Study**

- Expert consultation, interviews, focus group
- Draft & Building Blocks for additional guidance
- Assessment of impact of possible solutions
- Recommendations for Technical Guidance

**Impact Assessment**

- Stakeholder consultations (Q1 2022)
- 2 stakeholder workshops
- Definition of legislative interventions
- Assessing impacts of policy options

**EU Expert Group**

- Workshops on Assessment & Assessment Regimes
- Possibly set-up working groups for additional guidance appointed by the Expert Group

**AQUILA**

- Regular exchange on improvement needs
- Working groups on specific issues
- Position papers on improvement needs
- …

**FAIRMODE**

- Regular exchange on improvement needs
- Working groups on *Cross-cutting Themes*
- Recommendations on use of modelling
- …

**Others**

- Exchange with networks at national level
- Exchange with IPR Technical Group
- ... plus experience from CEN working groups
- Ad-hoc contributions

# Focus on air quality modelling

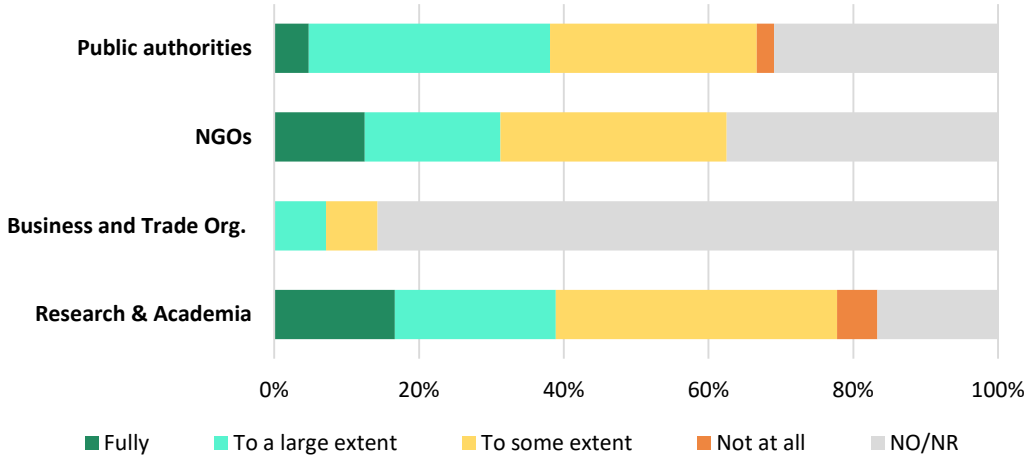
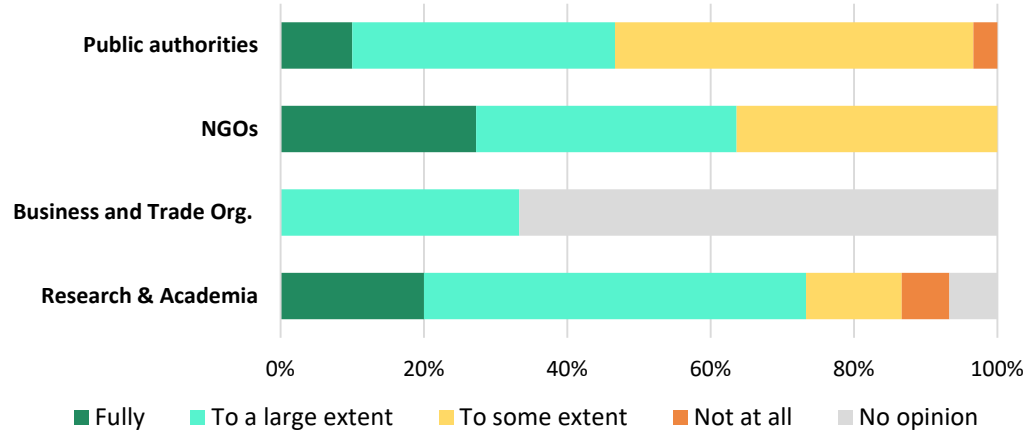
**G2 -** Make the use of **air quality modelling mandatory** as part of air quality assessment, in some circumstances – e.g. (1) forecasting, (2) compliance checking; (3) near real time mapping; (4) monitoring network design; (5) population exposure; (6) source apportionment estimations; (7) long-range air pollutant transport; (8) projections for air quality planning.

**G3 -** Require a regular **review of the assessment regime** following clear criteria defined in the Directive (including based on air quality modelling)

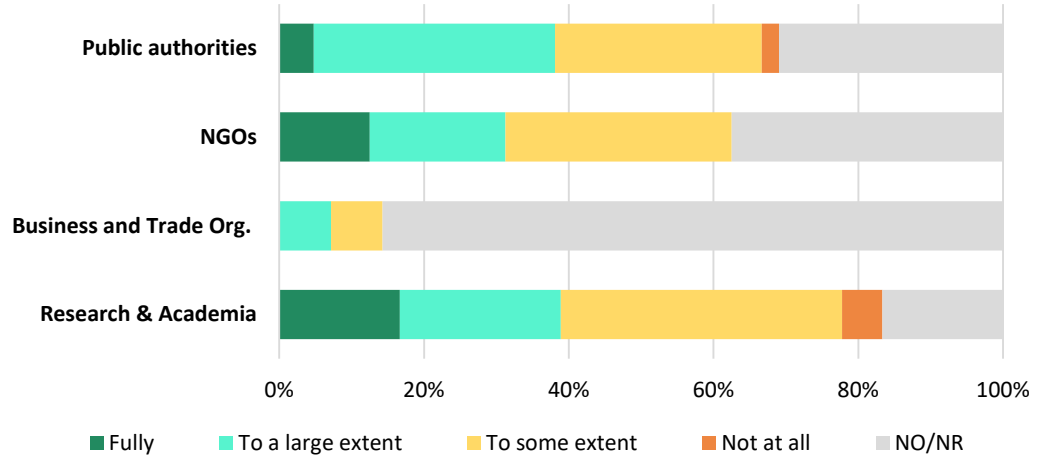
**J3 -** Introduce the concept of a **spatial representative area** which should be estimated (and reported) for each sampling point (irrespective of exceedances being measured or not)

**K3 -** Introduce a standardized **'modelling quality objective'** as a quality control mechanism to assess whether a modelling based assessment is fit-for-purpose.

# Focus on air quality modelling (93 replies)

| INTERVENTION | STAKEHOLDER FEEDBACK | COMMENTS |
|---|---|---|
| G2<br>Make the use of AQ modelling mandatory as part of AQ assessment (in some circumstances) |  | ▪ Models should be (strongly) recommended as best practice<br>▪ But strong support that these should only be mandatory in a few specific cases (e.g. to support air quality management and planning, forecasting, etc)<br>▪ Require some capacity building but modelling more cost effective than monitoring |
| G3<br>Require a regular review of the assessment regime following clear criteria defined in the Directive |  | ▪ General consensus that a review should be every 5 years<br>▪ Majority support for a review to be based on fixed monitoring and modelling data |

# Focus on air quality modelling (93 replies)

| INTERVENTION | STAKEHOLDER FEEDBACK | COMMENTS |
|---|---|---|
| G2<br><br>Make the use of AQ modelling mandatory as part of AQ assessment (in some circumstances) |  | ▪ Models should be (strongly) recommended as best practice<br>▪ But strong support that these should only be mandatory in a few specific cases (e.g. to support air quality management and planning, forecasting, etc)<br>▪ Require some capacity building but modelling more cost effective than monitoring |



| | 54. Intervention G2: Make the use of air quality modelling mandatory as part of air quality assessment (in some circumstances) a. i To which extent would this intervention address the above identified shortcomings? | a. ii Under which circumstances should air quality modelling be mandatory?: 1) For short term air quality forecasting (up to a few days ahead)? Forecasting | a. ii Under which circumstances should air quality modelling be mandatory?: 2) For assessment of air quality for compliance checking purposes? Compliance | a. ii Under which circumstances should air quality modelling be mandatory?: 3) For air quality mapping? Real-tme | a. ii Under which circumstances should air quality modelling be mandatory?: 4) For evaluation of monitoring network design? Network | a. ii Under which circumstances should air quality modelling be mandatory?: 5) For estimation of population exposure? Exposure | a. ii Under which circumstances should air quality modelling be mandatory?: 6) For source apportionment estimations? Sources | a. ii Under which circumstances should air quality modelling be mandatory?: 7) For assessment of long-range air pollutant transport? Long-range | a. ii Under which circumstances should air quality modelling be mandatory?: 8) For future projections in support of air quality management and planning? Planning |
|---|---|---|---|---|---|---|---|---|---|
| Fully | 7 | 21 | 8 | 21 | 14 | 21 | 16 | 27 | 32 |
| To a large extent | 22 | 13 | 21 | 27 | 29 | 27 | 27 | 17 | 16 |
| To some extent | 27 | 15 | 22 | 11 | 15 | 8 | 12 | 9 | 11 |
| Not at all | 2 | 6 | 9 | 3 | 3 | 3 | 3 | 5 | 2 |
| No opinion | 4 | 6 | 1 | 0 | 1 | 3 | 4 | 4 | 1 |
| | 32 | 33 | 33 | 32 | 32 | 32 | 32 | 32 | 32 |
| | **94** | **94** | **94** | **94** | **94** | **94** | **94** | **94** | **94** |

# Focus on air quality modelling (93 replies)

| INTERVENTION | STAKEHOLDER FEEDBACK | COMMENTS |
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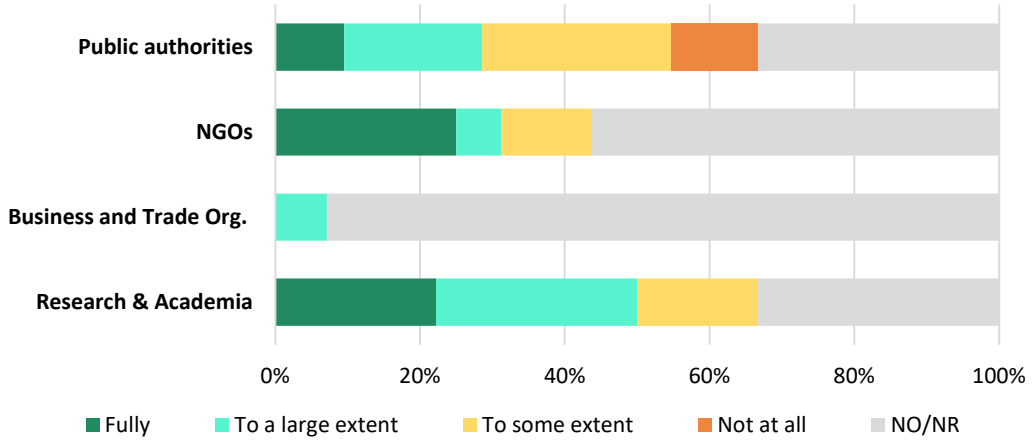
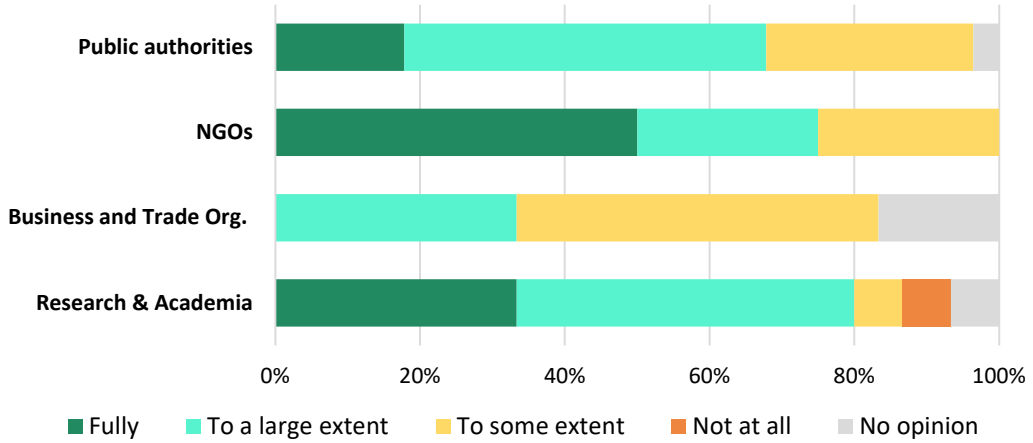
| J3<br>Introduce the concept of a spatial representative area which should be estimated (and reported) for each sampling point |  | ▪ Spatial representativeness generally useful but there is no clear guidance.<br>▪ FAIRMODE guidance a starting point to develop consensus to an estimation approach. |
| K3<br>Introduce a standardized 'MQO' as a quality control mechanism to assess whether a modelling-based assessment is fit-for-purpose |  | ▪ Uncertainty in models should be minimised<br>▪ General support for FAIRMODEs Modelling Quality Objective<br>▪ CEN standard Model Quality Objective working group considering though there is not yet consensus. |

# Air quality monitoring, modelling, plans

**In addition:** Support study on (a) scoping, mapping and analysis related to the before-mentioned issues, (b) assessing the technical suggestions to address issues identified

**Outcome:** Study suggests to develop new technical guidance (for non-legislative solutions):

- A. Guidance on air quality assessment in air quality zones
- B. Guidance on exceedance and exposure indicators.
- C. Guidance on reference methods and DQO for new pollutants.
- D. Guidance on use of indicative measurements/low cost sensors.
- E. Guidance on the Tiered approach of assessment methods.
- F. Guidance on the use of models.
- G. Guidance on preparing air quality plans.
- H. Guidance on AQ Management Best Practice (Governance and Communication)

TENTATIVE (!)

# EU Clean Air Policy Milestones 2020 to 2023

**Fitness Check**
(published in Nov 2019)

**Council Conclusions**

**NEC Implementation Report**
(Commission Communication)

**Expert consultation**
(on monitoring, modelling, plans)

**WHO Guidelines publication**
(postponed to II/2021)

**Zero Pollution Action Plan**

**EEA Air Quality Briefings 2022**

**Targeted consultation**
(air quality - revision of EU rules)

**Impact Assessment**
(air quality – revision of EU rules)

Council discussions of legislative proposal
(air quality - revision of EU rules)

Submission of Second National Air Pollution Control Programmes begins


**EEA Air Quality Report 2020**

**Inception Impact Assessment**
(revising the Air Quality Directive)

**Second Clean Air Outlook**
(Commission Report)

**EEA Air Quality Briefings 2021**

**WHO Guidelines publication**
(22 September 2021)

**Public consultation**
(air quality - revision of EU rules)

**3rd EU Clean Air Forum**
(18 & 19 November in Madrid)

**EEA Air Quality Briefings 2022**

**Adoption: legislative proposal**
(air quality - revision of EU rules)

**Review Gothenburg Protocol**
(Air Convention)

**Third Clean Air Outlook**
(Commission Report)

**EEA Air Quality Briefings 2023**

**4th EU Clean Air Forum**
(location to be determined)

European Commission

Contact us:

env-air@ec.europa.eu

Have your say:

https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12677-Revision-of-EU-Ambient-Air-Quality-legislation

# Thank you