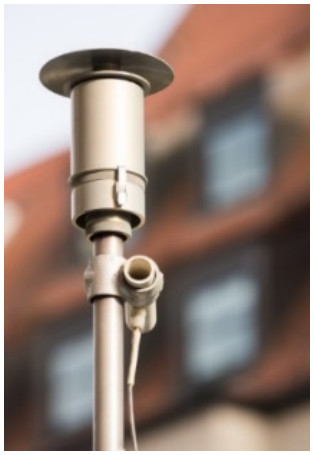
European Parliament

Study in focus: Sampling points for air quality



Air quality monitoring at fixed sites is a major instrument provided for in the **Ambient Air Quality Directive** (AAQD)[1] to check compliance with limit or target values for certain air pollutants, which have been set for the **protection of human health**.

This study by Nagl et al 2019[2] analyses the criteria for the **location of monitoring sites** in five Member States to **identify ambiguous provisions** that might lead to different assessments of **air pollution exposure**. Furthermore, the study investigates differences in exposure and exposure trends in the selected Member States and provides an overview of measures implemented to improve air quality and of information provided to the public. A representative selection of monitoring stations in zones in Austria, Germany, France, Italy, and Poland was examined to that end.

Background

There are two main types of monitoring site locations, those measuring the **highest concentration** with risk of general population exposure during a certain period, and locations measuring a more **general exposure**. To ensure **comparability** across Europe, the AAQD defines criteria for the location and number of monitoring sites. In addition, these criteria should ensure a certain **representativity** of sites, as their number is limited, also due to financial restrictions.

Key findings

- **Air pollution** is the main environmental risk factor for **human health**. Air quality **monitoring stations** at **fixed** locations are the **main tool to measure** the concentration of air pollutants.
- In most of the analysed Member States, the AAQD was **directly transposed into national law**, without amendments regarding the number and criteria for monitoring stations. However, due to **unprecise wording** or **ambiguous language** in both the AAQD and in the guidance documents for network operators, **Member States interpret various provisions in different ways.** The following **main ambiguities** in the provisions were identified:

  - According to the AAQD, microscale criteria apply only "*in so far as practicable*", and the macroscale criteria only "*where feasible*". This leaves **room for interpretation** and requires the network operator to only document cases related to deviations from the microscale criteria;
  - There is **no definition for the general population exposure;**
  - There is a number of **unspecific provisions**, such as those regarding the distance to buildings, the air flow to the inlet sampling and the vicinity of sources;
  - There are some ambiguities concerning the **distribution of monitoring stations** between an "*urban background*" and "*traffic*".
- **Long-term citizens exposure**: Of all analysed zones at urban background sites, which are the most relevant station type regarding general exposure, the highest **NO_2** levels occur in Italy. **PM_{10}** and **$PM_{2.5}$** levels are highest in the Po Valley (Lombardy) and Poland, while **ozone** levels are highest in the Po Valley. In general, air pollutant levels have declined in recent years. An exception is ozone, which shows a more stagnant tendency.
- In case of **exceedances** of an air quality limit or target value, the AAQD requires the Member States to develop and implement an **air quality plan**. The plan has to ensure compliance with the limit value in the shortest time possible. Such a plan has been implemented in all analysed zones and agglomerations. Most of these plans include a number of traffic-related measures and general traffic strategies, e.g. to improve public transport and reduce private car use.

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Conclusions

Most of the requirements of the AAQD are fulfilled in the air quality zones analysed in this study. However the information available does not allow an analysis of whether the pollution hotspots have been identified in all zones and Member States.

There are a number of **ambiguities** in the provisions of the AAQD that can lead to different interpretations. These should be addressed during its review. This refers in particular to the methods for the **identification of the highest concentration** and the **general population exposure**, to a number of imprecise or ambiguous provisions in the **siting criteria**, and to certain definitions in the current **guidance document**. These ambiguities could lead to **differing assessments** of maximum concentrations and general population exposures, thereby potentially compromising the protection of human health against the negative impact of air pollution. In addition, **documentation of site selection** which would allow to fully assess if a monitoring site fulfils the criteria and whether the highest concentrations are covered by the monitoring network is not readily available for most zones.

Recommendations for the AAQD review

The following main recommendations are based on the findings of this study and could be addressed during the review process of the AAQD:

- Introduce clear provisions for the **identification of highest concentrations**, including regular updates, modelling and / or passive sampling campaigns;
- Clarify the **ambiguities** in the provisions regarding the microscale and macroscale siting criteria, as well as the number and distribution of monitoring stations (Any changes to the siting criteria should be substantiated by modelling and / or monitoring exercises);
- Clarify the **ambiguous** criteria in the **guidance documents**, e.g. concerning the classification of monitoring sites;
- Introduce provisions for the delivery of **documentation** (and regular update) of monitoring site selection, comprising requirements for a complete, thorough assessment, including modelling;
- Develop definitions for imprecise but crucial concepts, such as the "general population exposure" and provisions for the **representativeness** of monitoring sites;
- **NO_2 assessment** should be performed obligatory by a combination of fixed monitoring and modelling (with suitable spatial resolution), optionally accompanied by passive sampling, because the high variability of NO_2 levels is difficult to grasp with fixed monitoring sites;
- **Increase** the required minimum **number of $PM_{2.5}$ sites** since it is considerably lower compared to PM_{10}, which does not reflect $PM_{2.5}$'s potential impact on human health;
- Regarding **air quality plans**, it is recommended to tighten requirements for diesel vehicles in some zones, as well as aiming for a general reduction of the overall amount of traffic.

[1] Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe.

[2] Nagl, C., Spangl, W., Buxbaum, I., *Sampling points for air quality - Representativeness and comparability of measurement in accordance with Directive 2008/50/EC on ambient air quality and cleaner air for Europe*, Study for the Committee on Environment, Public Health and Food Safety, Policy Department for Economic, Scientific and Quality of Life Policies, European Parliament, Luxembourg, 2019.

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