Department for Environment, Food and Rural Affairs
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AIR QUALITY STATISTICS IN THE UK, 1987 TO 2012
PRE-RELEASE ANNOUNCEMENT: (05-02-2013)
METHODOLOGICAL CHANGES

Background

Each year, Defra publishes a National Statistics Release on Air Quality Statistics in the UK. This Statistical Release covers years from 1987 onwards, and presents key statistics as measured by the United Kingdom's national air quality monitoring network.

The Statistical Release covers annual average concentrations in the UK of particulate matter and ozone, the two pollutants thought to have the greatest impacts on human health. To date, the Statistical Release has also presented the average number of days per monitoring site, when air pollution was 'moderate or higher' for any one of a suite of five pollutants:

- nitrogen dioxide (NO_2)
- ozone (O_3)
- sulphur dioxide (SO_2)
- particulate matter as PM_{10}
- carbon monoxide (CO)

The definition of "moderate or higher" for each of the above pollutants is according to the air pollution bandings used in the Daily Air Quality Index ("low", "moderate", "high" and "very high") for the purpose of air quality forecasting.

On 1st January 2012, these air pollution bandings, and the suite of air pollutants used, were changed. The Statistical Release for 2012 will be based on the new suite of pollutants, and the new bandings. This Pre-Release Announcement explains what has changed, why the changes were made, and the effects that the changes will have.

What has changed?

1. The suite of pollutants has changed, with carbon monoxide being replaced by the $PM_{2.5}$ fraction of particulate matter. Ambient concentrations of carbon monoxide in outdoor air are now very low and of little health concern at most locations across the UK. Conversely the health impacts of particulate matter as $PM_{2.5}$ are of increasing concern and monitoring of this pollutant is now mandatory across Europe. The five pollutants used as of 1st Jan 2012 are as follows:
    - nitrogen dioxide (NO_2)
    - ozone (O_3)
    - sulphur dioxide (SO_2)
    - particulate matter as PM_{10}
    - particulate matter as $PM_{2.5}$

2. The thresholds in the air pollution bandings have changed. In most cases they have been made more stringent. For nitrogen dioxide, sulphur dioxide and PM_{10} the lower threshold of the "moderate" band has been reduced, with the new threshold now consistent with the limit values set by the European Union Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe.

3. For some pollutants (PM_{10} and ozone), the statistic on which the air quality banding is based has also changed. The air quality bandings for PM_{10} (and $PM_{2.5}$) now refer to the daily mean, while those for ozone now refer to the maximum daily eight-hour running mean.

Further details of the new air pollution bandings can be found on the UK-AIR website at http://uk-air.defra.gov.uk/air-pollution/daqi .

Why have these changes been made?

The old air pollution bandings had been in use since 1992. Since that time, there have been changes to both European and UK legislation on air quality, as well as advances in scientific understanding of the impact of air pollution on human health.

Therefore, the UK Committee on the Medical Effects of Air Pollutants (COMEAP) was asked to review the existing air quality index and make recommendations on how it might be updated. (COMEAP is an independent committee of experts which provides advice to UK Government Departments and Agencies on the potential health effects of air pollutants.)

COMEAP published its report in June 2011. Among its recommendations were the following:

- A recommendation to keep the existing four bands ("low" to "very high"), but to make some of the bands more stringent to more accurately reflect the latest scientific understanding of the health effects of air pollution.
- The removal of carbon monoxide from the air quality index, as outdoor levels of this gas have fallen dramatically since the index was last revised in 1998.
- The addition of particulate matter of less than 2.5 micrometres in diameter ($PM_{2.5}$) to the index, as EU Directives now require its regulation in the UK.

The COMEAP report can be found online at http://www.comeap.org.uk/membership/130-review-of-the-uk-air-quality-index.html.

The majority of the changes recommended by COMEAP were implemented by Defra and the Devolved Administrations of Wales, Scotland and Northern Ireland. However, COMEAP's proposal to lower the bottom of the "moderate" band to 80 μgm^3 for ozone was not adopted.

What affect will these changes have on the Air Quality Indicator statistics?

The annual mean Air Quality Indicator statistics for ozone and PM_{10} will not be affected.

Most of the indicator statistics which are based on air pollution bandings will be significantly affected, reflecting the more stringent thresholds for the lower limit of the "moderate" band.

- The average number of days per site with "moderate" or higher NO_2 is likely to increase because of the more stringent banding.
- The average number of days per site with "moderate" or higher PM_{10} is also likely to increase because of the more stringent banding.
- The introduction of bandings for $PM_{2.5}$ in place of CO is likely to lead to additional days "moderate" or above.
- The average number of days per site with "moderate" or higher SO_2 is low, and unlikely to change substantially because there has been minimal change to the lower threshold of the "moderate" banding.
- The average number of days per site with "moderate" or higher O_3 is likely to decrease: the bandings are now based on only the maximum daily 8-hour running mean, rather than the highest of the maximum daily 1-hour mean and 8-hour running mean as previously.
- The average number of days per **urban** site with "moderate" or higher pollution (any pollutant) is expected to increase, reflecting the lowering of the "low" to "moderate" threshold for NO_2 and PM_{10}, and the introduction of bandings for $PM_{2.5}$ in place of CO.
- The average number of days per **rural** site with "moderate" or higher pollution (any pollutant) is not expected to increase, and could even go down. This is because the majority of "moderate" or higher pollution days at rural sites result from ozone, for which the calculation of the bandings has been simplified as described above, and for which the lower threshold of the "moderate" banding has not been tightened.

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