



Department  
for Environment  
Food & Rural Affairs

# UK Report on measures for 2017 exceedance of the Target Value for Nickel

December 2019



Llywodraeth Cymru  
Welsh Government



© Crown copyright 2019

You may re-use this information (excluding logos) free of charge in any format or medium, under the terms of the Open Government Licence v.3. To view this licence visit [www.nationalarchives.gov.uk/doc/open-government-licence/version/3/](http://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/) or email [PSI@nationalarchives.gov.uk](mailto:PSI@nationalarchives.gov.uk)

This publication is available at [www.gov.uk/government/publications](http://www.gov.uk/government/publications)

Any enquiries regarding this publication should be sent to us at

Air Quality  
Department for Environment, Food and Rural Affairs  
Ground Floor, Seacole Building  
2 Marsham Street  
London, SW1P 4DF

Email: [air.quality@defra.gov.uk](mailto:air.quality@defra.gov.uk)

With technical input from Ricardo Energy & Environment

[www.gov.uk/defra](http://www.gov.uk/defra)

## Contents

1. Introduction .....	4
1.1 This document.....	4
1.2 Background and context.....	5
About nickel .....	5
UK assessment.....	7
Reporting requirements for the exceedance of a target value .....	7
2. Overview of affected zones.....	8
2.1 General information on zones .....	8
2.2 Assessment details .....	10
Monitoring.....	10
Modelling .....	10
3. Measures .....	11
3.1 Overview of measures.....	11
Industrial measures .....	11
4. Next steps.....	12
Annex A: Zones .....	<b>Error! Bookmark not defined.</b>
Annex B: Acronyms .....	13

# 1. Introduction

The Government recognises the impact that poor air quality can have on human health and the environment. Tackling air pollution is a priority. A cleaner, healthier environment benefits both people, the economy, crops and wildlife. Clean air is vital for people's health and the environment, essential for making sure our cities, towns and villages are welcoming places for people to live and work now and in the future, and for our prosperity.

That is why we produced a new Clean Air Strategy in 2019, setting out how we will work towards our international targets to significantly reduce damaging emissions.

Through improving air quality, we can reduce both the short-term and long-term effects on people's health. It will have benefits to those who may find their conditions are made worse through exposure to air pollution, for example people with heart or lung conditions or breathing problems as well as reducing longer term impacts on everyone.

## 1.1 This document

This report provides an overview of the measures being taken to address the exceedances of the pollutant nickel (Ni) in the United Kingdom (UK) for the compliance year 2017, including updates on the measures for exceedances in the compliance years 2014, 2015 and 2016<sup>1</sup>, as reported to the European Commission in September 2015, 2016 and 2017 respectively. Defra also publishes an annual report entitled *Air Pollution in the UK*, alongside the compliance-assessment submission, which can be found here: <http://uk-air.defra.gov.uk/library/annualreport/index>. For each compliance year, more detailed information on any exceedances and measures being taken to address them can be found in the individual zonal reports. However, in 2017 there were no reported exceedances so no zonal reports were prepared.

Copies of previous annual air quality submissions can be found on the Commission website: <http://cdr.eionet.europa.eu/gb/eu/annualair> and <http://cdr.eionet.europa.eu/gb/eu/aqd/>.

---

<sup>1</sup> <https://uk-air.defra.gov.uk/library/bap-nickel-measures>

## 1.2 Background and Context

The EU Directive<sup>2</sup> 2004/107/EC aims to improve and maintain air quality by setting target values for the concentration in ambient air of metals cadmium, arsenic, nickel and benzo[a]pyrene. The target value for nickel is an annual mean concentration of 20 nanograms (one billionth of a gram ( $10^{-9}$ )) per cubic metre ( $m^{-3}$ ) in ambient air or lower.

### About Nickel

Nickel is a toxic metallic element found in ambient air as a result of releases from oil and coal combustion, metal processes, manufacturing and other sources. The main source of emissions to air of nickel in the UK is the combustion of heavy fuel oil and solid fuels derived from petroleum.

Nickel compounds are human carcinogens; people are exposed to these compounds through inhalation. Nickel compounds can cause irritation to the nose and sinuses, trigger allergic responses, and can lead to the loss of the sense of smell. Long-term exposure may lead to respiratory diseases and cancers<sup>3</sup>. Nickel can also pollute soil and water, thus having environmental impacts as well as impacts on human health.

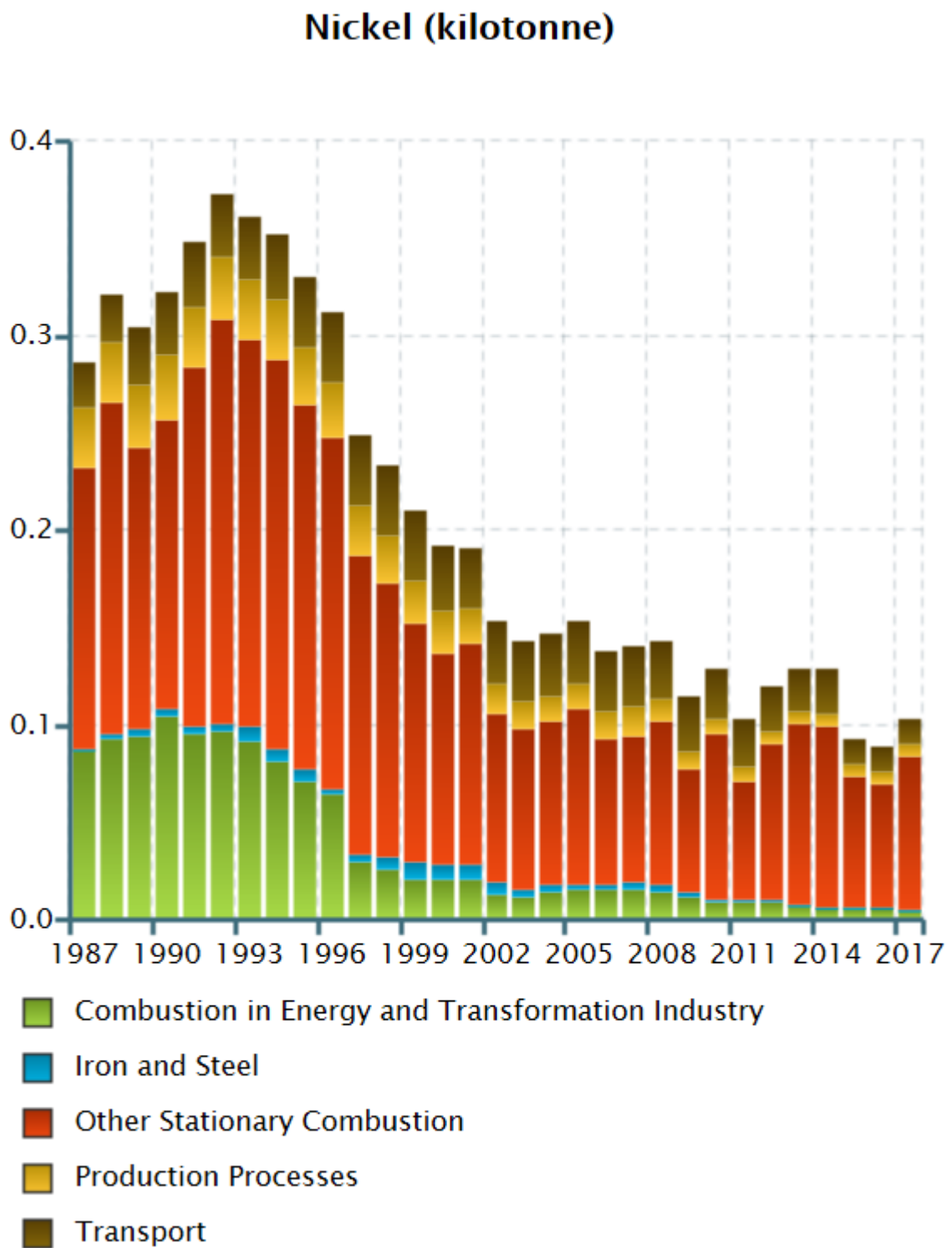
Figure 1 shows the levels of nickel emissions in the UK and the main contributory sources. This shows that nickel emissions have reduced significantly since 1990.

---

<sup>2</sup> <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32004L0107&rid=1>

<sup>3</sup> WHO AQG 2000, PHE Compendium of Chemical Hazards

Figure 1. Nickel emissions by sector (1990-2017)



## UK Assessment

Assessment of levels of nickel in the UK with regards to the EU target value are made through a combination of fixed monitoring supplemented by modelling. There is a requirement to undertake monitoring at a fixed number of locations to assess key emissions sources, particularly near to large industrial emission sources. Undertaking modelling alongside monitoring enables the UK to calculate concentrations at locations where monitoring is not conducted providing a fuller picture of nickel concentrations across the UK. National assessment is carried out each year for the previous calendar year and results are reported to the Commission on an annual basis (submitted by 30<sup>th</sup> Sept for the previous calendar year). The 2017 compliance assessment reported that the UK did not exceed the target value for nickel.

## Reporting requirements for the exceedance of a target value

Where a target value is exceeded, Member States are required to specify the areas of exceedance and the sources contributing to it<sup>4</sup>. Following an exceedance, Member States must submit a report detailing the measures already taken or that will be taken, to reduce levels of this pollutant, particularly those directed at the main emission sources in order to attain the target value. In the case of industrial installations covered by the Industrial Emissions Directive EU Directive 2010/75/EU<sup>9</sup> (IED)<sup>5</sup> this means the application of the Best Available Techniques Conclusions (BATCs) Implementing Decisions. It is required that all reasonable measures should be taken that do not entail disproportionate cost. The report must be submitted no later than two years after the end of the year in which the exceedance triggering the measure was observed (i.e. the end of 2019 for 2017 compliance year – see Table 1).

This report on nickel is the fifth such report that the UK has produced and updates the Report on Measures produced for the exceedances reported for 2013, 2014, 2015 and 2016<sup>1</sup>.

**Table 1. Reporting timetable**

Compliance year	“Year” (e.g. 2017)
Compliance assessment reporting	Sept 30 <sup>th</sup> “Year”+1 (e.g. 2018)

<sup>4</sup> Further detail on the reporting requirements can be found in the Commission Implementing Decision 2011/850/EC

<sup>5</sup> <http://ec.europa.eu/environment/industry/stationary/ied/legislation.htm>

In the UK, the responsibility for meeting air quality target values is devolved to the national administrations in Scotland, Wales and Northern Ireland. The Secretary of State for Environment, Food and Rural Affairs (Defra) is responsible for meeting the target values in England. Defra has co-ordinated the production of this report in conjunction with the Welsh Government.

## 2. Overview of Affected Zones

### 2.1 General information on zones

For the purposes of EU compliance reporting against EU Directive 2004/107/EC, the UK is divided into 43 zones, termed agglomerations (large urban areas) and non-agglomeration zones (regional areas). There are 15 non-agglomeration zones (Non-AZ) and 28 agglomeration zones (AZ). The 15 non-agglomeration zones match:

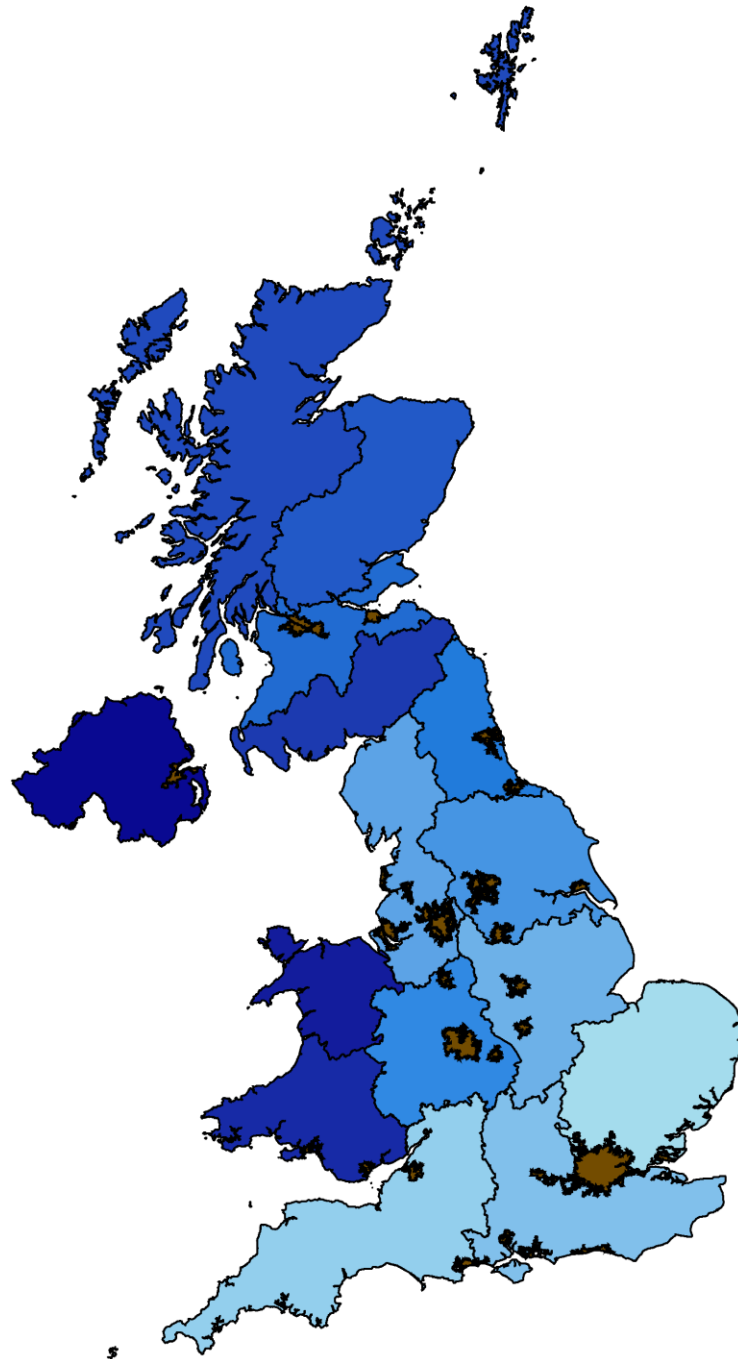
1. The boundaries of England's former Government Offices for the Regions; and
2. The boundaries agreed by the Scottish Executive, National Assembly for Wales, and Department for Agriculture, Environment and Rural Affairs in Northern Ireland.

An agglomeration is defined as any urban area with a population greater than 250,000.

In 2017, none of the 43 zones in the UK were reported to have exceeded the target value for nickel.



Figure 2. Map of the UK showing location of zones and agglomerations



## 2.2 Assessment details

The UK's annual assessment of compliance is based on a combination of information from the UK national monitoring network and the results of modelling assessments. The level of fixed monitoring is strictly defined by European Directives. The use of models, alongside monitoring, has the benefit of enabling air quality to be assessed at locations without monitoring sites. Modelling also provides additional information on source apportionment (understanding which sources are the main contributors to the concentrations observed) and projections (predicting future concentrations) required for the development and implementation of air quality plans as well as this report on measures.

### Monitoring

Monitoring situated near to large industrial sources is important for assessing the impact of industrial emissions on concentrations where there is relevant public exposure. In 2017 there were 23 monitoring sites measuring nickel concentrations in the UK. These monitors collect samples of particulate matter from the air (PM<sub>10</sub> – Particulate Matter of size fraction up to 10 microns). Samples are analysed to determine the concentrations. More information on the UK monitoring of metals covered by the Fourth Air Quality Daughter Directive (EU Directive 2004/107/EC) can be found on UK-Air<sup>6,7</sup>.

### Modelling

The UK's modelling for compliance assessment is undertaken using a national-scale model known as Pollution Climate Mapping (PCM)<sup>8</sup>. PCM has been designed to assess compliance with environmental objectives at locations defined within EU Air Quality Directives. Modelling is undertaken for 11 air pollutants each year, including nickel and completed each year in time for compliance assessment submission at the end of September. The model performs an annual calculation covering the whole of the UK and outputs concentrations on a 1km square grid. These grid squares are assigned to each of the 43 zones and agglomerations to assess the compliance status with respect to limit and target values in the Directives.

Modelling calculates concentrations based on estimates of emissions of nickel from all known sources. The model also calculates the background concentration of nickel from all area sources (e.g. domestic fuel use, commercial and traffic sources).

---

<sup>6</sup> [https://uk-air.defra.gov.uk/assets/documents/annualreport/air\\_pollution\\_uk\\_2017\\_issue\\_1.pdf](https://uk-air.defra.gov.uk/assets/documents/annualreport/air_pollution_uk_2017_issue_1.pdf)

<sup>7</sup> <http://uk-air.defra.gov.uk/networks/network-info?view=metals>

<sup>8</sup> <http://uk-air.defra.gov.uk/data/gis-mapping>

Large and small point sources (e.g. from industrial activity) are modelled separately and added to the background concentrations from all other sources.

Exceedance situations that are established - either by national scale modelling or fixed monitoring - are further examined using additional modelling (outside of the PCM model) carried out at a more detailed spatial resolution in order to understand the scope of the exceedance. Such assessments can help validate or refine the national scale PCM assessment.

Additional information input into the finer-scale models includes more detailed information for emissions sources (with up to date information on emission amount and release characteristics obtained from the process operators and regulators) and local meteorological data. Such assessments enable a more detailed assessment of any exceedances, helping to establish the key sources and reasons behind any exceedances. Depending on the conclusions of such finer scale modelling, additional understanding may then be incorporated into the PCM model for future year assessments. Such fine scale assessments are only conducted where exceedance situations are identified, and therefore did not apply during 2017.

## 3. Measures

### 3.1 Overview of Measures

The UK has a number of measures that are being taken to address emissions of nickel from industrial sources.

#### Industrial Measures

Industrial emissions of nickel are regulated under the Environmental Permitting (England and Wales) Regulations, 2016, as amended (EPR). Scotland and Northern Ireland have similar legislation in place which performs the same function. In particular, the EPR transpose a number of EU Directives on industrial emissions. Foremost amongst these, and most relevant for nickel emissions, is the IED (EU Directive 2010/75/EU<sup>9</sup>) and it's implementing BATC Decisions. The IED sets stringent Emission Limit Values (ELVs) for pollutants emitted from a number of industrial sectors such as Large Combustion Plants and incinerators. The IED also requires that the operators of industrial facilities use the 'best available techniques' (BAT) to reduce their emissions and that they demonstrate this by complying with

---

<sup>9</sup> <http://ec.europa.eu/environment/industry/stationary/ied/legislation.htm>

BAT-associated emission limits (BAT AELs). BAT and their BAT-AELs are set out in BAT reference documents (BREFs)<sup>10</sup>. There are 32 BREFs/BATCs, covering a broad range of industrial sectors.

The Non-Ferrous Metals BREF for example was reviewed, recently adopted and its requirements will be reflected in permits from 2020. BAT Reference Document (BREF) contains stringent requirements for iron and steel works to significantly reduce their fugitive emissions including Nickel. Depending on the size and location of the plant, the regulator for these sites is either Natural Resources Wales (when in Wales), the Environment Agency (in England) or the relevant local authority.

All necessary measures not entailing disproportionate costs have been taken by the local industrial operators with emissions of nickel to air.

## 4. Next steps

A further assessment was undertaken for the annual compliance assessment for 2018 and this was submitted in September 2019. The next compliance assessment for levels of nickel in 2019 will be submitted to the European Commission in September 2020.

In the compliance report for 2016, published in 2018, there were reported exceedances in Wales. These were investigated and measures put in place to identify and reduce the emissions that led to the exceedances; the compliance reported for 2017 is evidence of the effectiveness of these measures, whilst Defra continues to work with national environmental-regulators and industry to improve our understanding and management of Nickel emissions.

---

<sup>10</sup> <http://eippcb.jrc.ec.europa.eu/reference/>

## Annex B: Acronyms

AZ	Agglomeration Zone
BAT	Best Available Techniques
BAT-AEL	BAT-associated emission limits
BREF	BAT Reference Documents
EPR	Environmental Permitting (England and Wales) Regulations
IED	Industrial Emissions Directive
Ni	Nickel
Non- AZ	Non- Agglomeration Zone
PCM	Pollution Climate Mapping