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for Environment
Food & Rural Affairs

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UK Report on measures for 2013 exceedance of the Target Value for Benzo[a]Pyrene

November 2015



Llywodraeth Cymru
Welsh Government

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1. Introduction

A cleaner, healthier environment benefits people and the economy. 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 to our prosperity. Our ambition is to make the UK a country with some of the very best air quality in the world.

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 benzo[a]pyrene (B[a]P) in the United Kingdom (UK) for the compliance year 2013 and reported to the European Commission in September 2014. More information on the compliance assessment for 2013 can be found in the document *Air Pollution in the UK*¹. More detailed information on these exceedances and measures being taken to address them can be found in the individual zonal reports provided as an Annex to this document.

Copies of previous annual air quality submissions can be found on the Commission website: <http://cdr.eionet.europa.eu/gb/eu/annualair>. Defra also publish an annual Air Pollution in the UK report alongside the compliance assessment submission and these can be found here: <http://uk-air.defra.gov.uk/library/annualreport/index>

1.2 Background and Context

The EU Directive² 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 for B[a]P. The target value for B[a]P is an annual mean concentration of 1 nanogram (one billionth of a gram (10^{-9})) per cubic metre (m^{-3}) of ambient air or lower and must be achieved across Member States where there is relevant exposure.

¹ http://uk-air.defra.gov.uk/assets/documents/annualreport/air_pollution_uk_2013_issue_1.pdf

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

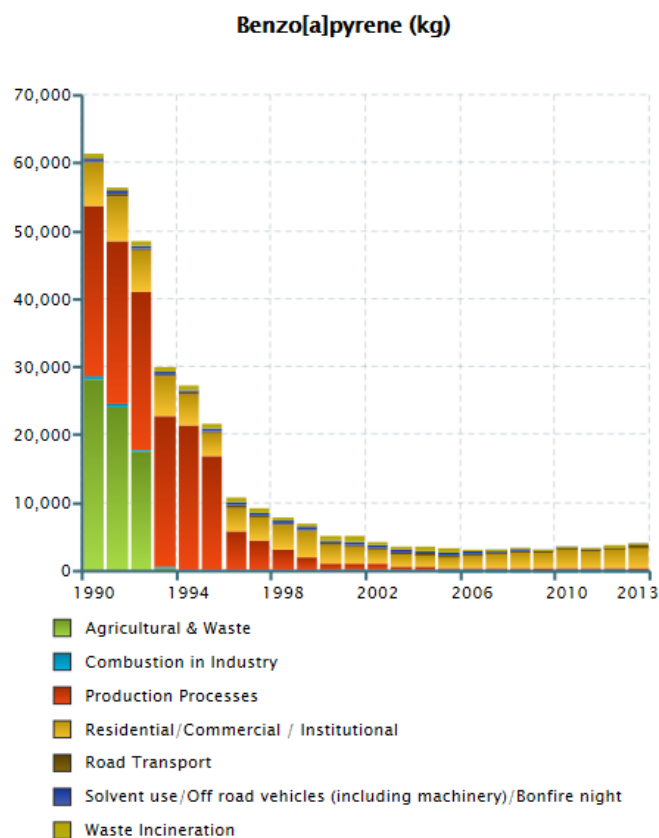
About Benzo[a]Pyrene (B[a]P)

B[a]P is used as a 'marker' for a group of compounds known as polycyclic aromatic hydrocarbons (PAHs). PAHs are a large group of persistent, organic compounds that accumulate in people and animals and which have toxic and carcinogenic effects. Lung cancer is most obviously linked to exposure to PAHs through inhaled air³. These pollutants can bio-accumulate and be passed up the food chain thus having health impacts as well as environmental impacts.

B[a]P is a by-product of incomplete combustion. The main sources of emissions to air of B[a]P in the UK are from domestic coal and wood burning, industrial processes (e.g. coke production) and fires (e.g. accidental, bonfires etc.). Figure 1 shows the main sources of emissions of B[a]P in the UK. This shows that total emissions have fallen by an order or magnitude since 1990 due to significant reductions in contributions from 'agriculture and waste' and 'production processes'.

Total emissions have remained stable in recent years and average concentrations at all monitoring sites were below 0.5 ng/m³ in 2013.

Figure 1. B[a]P emissions by sector (1990-2013)



³ WHO AQG 2000, PHE Compendium of Chemical Hazards

UK Assessment

Assessment of levels in the UK with regards to the EU Target Value are made through a combination of modelling and fixed monitoring. 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 B[a]P concentrations across the UK. National assessment is carried out each year for the previous calendar years and results are reported to the Commission on an annual basis (submitted by 30th Sept for the previous calendar year). The 2013 compliance assessment reported that the UK exceeded the target value for benzo[a]pyrene in six zones; four in England and two in Wales.

Reporting requirements for the exceedance of a target value

Where a target value is exceeded, Member States shall specify the areas of exceedance and the sources contributing to it⁴. Following this report of exceedance Member States are required to submit a report (this report) detailing the measures already taken, or that will be taken, to reduce levels of this pollutant - particularly those measures directed at the main emission sources in order to attain the target value. It is required that all reasonable measures should be taken that do not entail disproportionate cost. The report must be submitted by the end of the year following the exceedance being reported (i.e. the end of 2015 for 2013 compliance year – see Table 1)..

Table 1. Reporting timetable

Compliance year	“Year” (e.g. 2013)
Compliance assessment reporting	Sept 30 th “Year”+1 (e.g. 2014)
Report on Measures	Dec 31 st “Year”+2 (e.g. 2015)

In the UK, 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 national administration.

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

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 agglomeration (large urban areas) and non-agglomeration zones. There are 15 non-agglomeration zones and 28 agglomeration zones. 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 of the Environment in Northern Ireland.

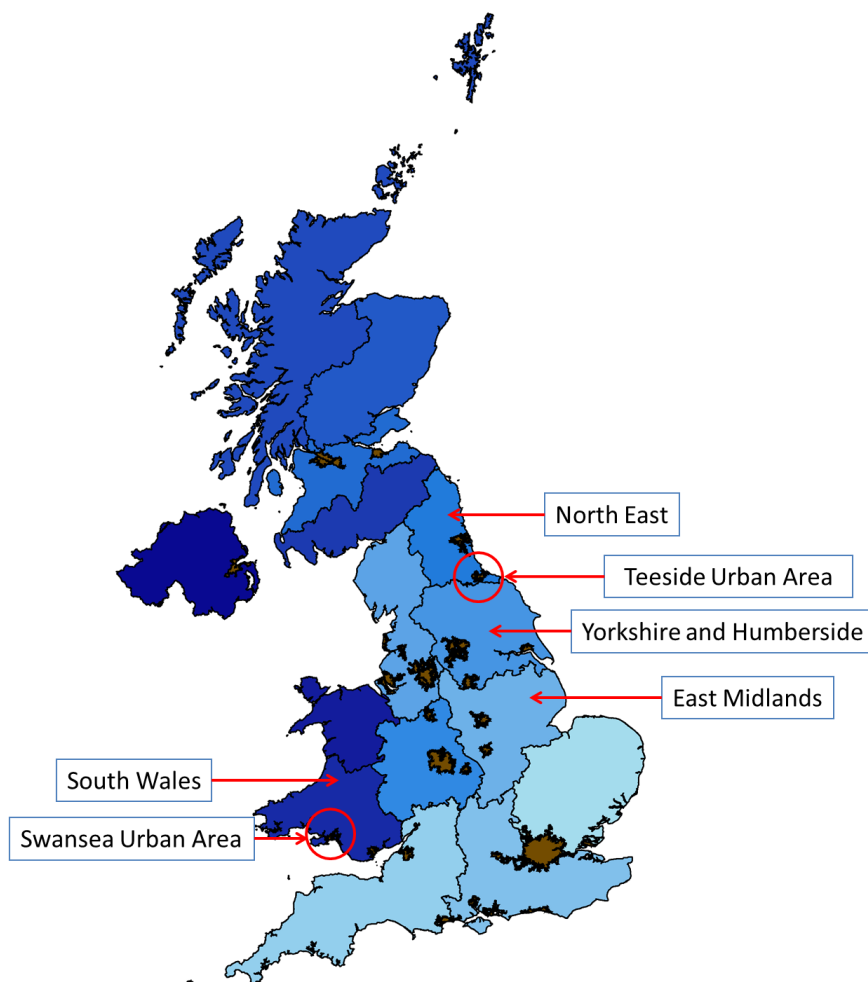
An agglomeration is defined as any urban area with a population greater than 250,000.

In 2013 six of the 43 zones in the UK were reported to have exceeded the target value for B[a]P (four non-agglomeration (non-AZ) and two agglomeration zones (AZ)). The affected zones were:

1. Teesside Urban Area (UK0013) (AZ);
2. East Midlands (UK0032) (Non-AZ);
3. Yorkshire and Humberside (UK0034) (Non-AZ);
4. North East (UK0036) (Non-AZ);
5. Swansea Urban Area (UK0027) (AZ);
6. South Wales (UK0041) (Non-AZ).

The locations of these zones are agglomerations are indicated on the map shown in figure 2. These exceedances are due to either domestic or industrial emissions or a combination of both. Of the six exceedances reported, one was monitored ((Yorkshire and Humberside (UK0034)) and five were modelled (see section 2.2 below). In Teesside, Swansea and the North East, the exceedances are attributed to emissions from industrial sources. In the East Midlands, the exceedance is attributed to domestic solid fuel use. In South Wales, the exceedance results from a combination of industrial sources and domestic solid fuel use while in Yorkshire and Humberside it is predominantly due to industrial emissions with some contribution from domestic sources. The annexes to this report provide a detailed breakdown of the affected area in each zone or agglomeration including information about where the exceedance occurs, how it was assessed, information on sources of the exceedance and location maps.

Figure 2. Map of the UK showing locations of the zones and agglomerations exceeding the B[a]P target value in 2013 (note: the arrows are for the purposes of labelling the zone or agglomeration and do not point to the location where the exceedance occurred – see zonal reports for more detail)



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, allows for a reduction in the number of monitoring stations required and has the added benefits 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.

Of the zones reported as exceeding due to modelling, monitors located in South Wales, North East and Teesside did not exceed the target value. Locations of monitoring are primarily sited to assess emissions from industrial locations so may not always reflect the highest concentration, particularly when emissions from domestic heating predominate. There may be a number of reasons for this such as:

- a) The instrument is located to assess a predominant source (industrial source rather than domestic)
- b) The instrument is located to monitor *where there is relevant exposure or*;
- c) Practical restrictions for siting an instrument.

Through assessment using both modelling and monitoring, consideration is given to the likely distribution of emissions from the predominant source and therefore a fuller picture of the distribution of B[a]P in the area is reported.

Monitoring

Burning of certain types of solid fuel can emit significant amounts of B[a]P. Levels emitted will depend on the type of fuel, the type of burner, the efficiency of the burner and level of emissions mitigation that is in place. Large industrial sites where solid fuel burning is undertaken (e.g. coke and sinter plant activities at steel works) are the most significant sources of B[a]P emissions in the UK due to the amount of solid fuel used. Monitoring situated near to large industrial sources of these types is important for assessing the impact of industrial emissions on concentrations where there is relevant public exposure.

There are 31 monitoring sites measuring B[a]P concentrations in the UK. These monitors collect samples of particulate matter from the air (PM₁₀ – Particulate Matter of size fraction up to 10 microns). Samples are analysed to determine the concentrations of 32 individual PAHs, including B[a]P, and concentrations of B[a]P assessed against the target value. More information on the UK monitoring of pollutants covered by the Fourth Air Quality Daughter Directive (EU Directive 2004/107/EC) can be found on UK-Air^{5,6}.

Modelling

The UK's modelling for compliance assessment is undertaken using a national-scale model known as Pollution Climate Mapping (PCM)⁷. PCM has been designed to

⁵ http://uk-air.defra.gov.uk/assets/documents/annualreport/air_pollution_uk_2013_issue_1.pdf

⁶ <http://uk-air.defra.gov.uk/networks/network-info?view=pah>

⁷ <http://uk-air.defra.gov.uk/data/gis-mapping>

assess compliance with EU limit and target values at locations defined within EU Air Quality Directives. Modelling is undertaken for 11 air pollutants each year, including B[a]P 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 grid square. These squares are assigned to each of the 43 zones and agglomerations for the purposes of assessing compliance status with respect to limit and target values in the Directives.

Modelling calculates concentrations based on estimates of emissions of B[a]P from all known sources. The model calculates background concentration of B[a]P from all area sources (e.g. domestic solid fuel use, commercial and traffic sources). Modelled B[a]P concentrations are calibrated to those measured at background monitoring stations to ensure concentrations from modelling and monitoring are consistent. Source apportionment shows that exceedances due to domestic sources are largely driven by contributions from domestic combustion of coal and wood.

Large and small point sources (e.g. from activity at steel works and industrial activity) are modelled separately and added to the background concentrations from all other sources. In order to obtain a model result that is consistent with measured concentrations, the modelled contribution from the point source is calibrated using monitoring data from the national network. Industrial sites only are used to calibrate these large point source contributions. Source apportionment from the industrial sectors indicates that the modelled exceedances are largely driven by the contribution from emissions from coke production (i.e. steel works).

Exceedance situations established either by national scale modelling or fixed monitoring are further examined using additional modelling (outside of the PCM model) to understand the scope of the exceedance. Such assessments help validate or refine the national scale PCM assessment. Additional information input into the finer scale models might include more detailed emissions source information or more granular information on local domestic heating, for example from local survey or other local authority sources, as well as finer spatial information regarding local topography or localised meteorological data. Such assessments enable a more detailed assessment of the exceedance situation helping to establish the key sources and reasons behind an exceedance. 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. Additional modelling of this type has been undertaken for the industrial exceedance in the Swansea Urban Area and South Wales zones and further details are available in the zonal annex. Further investigation will be undertaken to assess if such an approach can be applied at other industrial locations.

3. Measures

3.1 Overview of Measures

The UK has a number of measures that are being taken to address emissions of B[a]P from both domestic and industrial sources.

3.1.1 Domestic Measures

Within the domestic sector the main source of B[a]P emissions is from combustion of solid fuels such as wood and coal on open fires or inefficient stoves and boilers.

Limiting emissions

The Clean Air Act 1993 (CAA) provides Local Authorities with the power to create Smoke Control Areas⁸. It also provides for the Secretary of State and Welsh Ministers to create Smoke Control Areas (SCA) should they consider it necessary. Within these areas it is an offence to emit smoke from the chimney of a building unless using an authorised fuel or exempted fireplace or stove. These fuels and fireplaces have passed tests which confirm they are capable of being used without the production of smoke (or a substantial quantity of smoke). The current maximum level of fine is £1,000 for each offence committed. Local Authorities are the regulators for the CAA.

Many towns and cities across the UK already have SCAs. In order to create an SCA, the Local Authority must advertise in The Gazette⁹ and consult within the local area. Costs can be incurred by Local Authorities in creating a SCA as the CAA sets out levels of compensation for different types of occupiers of premises if they need to adapt existing fireplaces to avoid contravening the law.

Levels of B[a]P should be lower in areas where the emission of smoke is limited by an SCAs and this is reflected in the emission inventory used within the modelling of B[a]P in the compliance assessment submitted to the EU. Not all existing smoke control areas are currently included in the emission inventory used within the model – where this is the case in an area that has been identified as contributing to an exceedance from domestic emission sources, this is explained within the relevant zonal report in the annexes to this document. Where there is a smoke control area in place, no B[a]P exceedance from that area is assumed as only authorised fuels or

⁸ <https://www.gov.uk/smoke-control-area-rules>

⁹ [The Gazette | Official Public Record](#)

appliances (which have been tested to show that they emit none or very little smoke) can be used in these areas.

Ecodesign

The introduction of emission limits under the Ecodesign Directive for solid fuel stoves¹⁰ and solid fuel boilers¹¹ that will come into effect in 2020 and 2022 respectively will also be beneficial. Any products covered by these regulations will have to meet the emission limits specified for the fuels that the manufacturer indicates are for use with the product. This applies to their use inside or out of smoke control areas and over time should see more widespread benefits for B[a]P emission levels from these products.

The Stove Industry Alliance is developing an industry led voluntary scheme that would see its members committing to producing only Ecodesign compliant wood burning stoves by 2020 (two years ahead of it coming into force). For those products that are already Ecodesign compliant, as demonstrated by independently verified testing, it is developing a scheme to enable manufacturers to promote the benefits of these cleaner stoves. It is hoped that such a scheme will increase consumer awareness of the benefits of choosing more efficient solid fuel stoves and drive further improvements from manufacturers in reducing emission levels from their products.

Guidance and information on fuels and appliances

HETAS (The Heating Equipment Testing and Approval Scheme) is an official body recognised by the Government to approve biomass and solid fuel heating appliances, fuels and services. It operates in England and Wales and has a number of approval schemes including a Quality Assured Fuel Scheme which provides a recognised standard for wood and biomass fuel quality and a scheme for testing and approval of solid fuel and biomass appliances. Additional schemes include approval of retailers and chimney sweeps and a registration scheme for installers of appliances providing customer assurance on standards to be expected. Details of solid fuel stoves, appliances and associated services are listed in an annual guide. This guide includes information on appliances and fuels that are exempt under the CAA (see below). A copy of the guide and further details about HETAS can be found on its website: <http://www.hetas.co.uk/>.

HETAS has begun a long-term national information campaign with their registered installers and chimney sweeps to provide its customers with information on and

¹⁰ http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1437551981787&uri=OJ:JOL_2015_193_R_0001

¹¹ http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1437551981787&uri=OJ:JOL_2015_193_R_0005

encourage uptake of more efficient and clean stoves. It is also asking members to raise awareness with customers that burning wood on an open fire can be damaging to the environment and health and that in a smoke control area (see below) it is illegal.

There are a range of sites available with information on cleaner solid fuels. Examples of these are set out in table two below.

Table 2: information on solid fuels

Website	Information provided
http://smokecontrol.defra.gov.uk/fuels.php	- provides details about fuels that have been authorised for use in smoke control areas
www.woodsurre.co.uk	- The Woodsure assurance means reliable wood fuel that fulfils manufacturer specifications and burns with optimum efficiency, without the risk of damage to an appliance.
www.enplus-pellets.eu	– the ENplus certification process ensures that wood pellets meet the European standard for wood pellets (EN 14961-2)

Modelling

As part of an ongoing improvement programme for the National Atmospheric Emissions Inventory, which forms part of the underlying data for the PCM model (see section 2.2), Defra is currently exploring options for improving estimates of the spatial distribution of emissions (particularly regarding smoke control areas), and ensuring emission factors for domestic combustion take account of best available evidence.

3.1.2 Energy Efficiency and Fuel Poverty Measures

In England and Wales, measures being taken by the Government or the energy industry to address fuel poverty and energy efficiency may help reduce levels of B[a]P as they have the potential to impact on the level or type of fuel used in households in the affected zones. Some schemes are available directly to households, some are run by local authorities and some are available through the energy industry or civil society.

Energy Efficiency Measures

Measures taken by households to improve their energy efficiency will benefit local air quality, including emissions of B[a]P, by reducing the amount of fuel required overall to heat homes.

The Energy Company Obligation, which was introduced at the beginning of 2013, is the largest domestic energy efficiency programme operating across Great Britain. The scheme runs until 2017.

The Energy Company obligation has three distinct parts:

The Carbon Emissions Reduction Obligation target forms the majority of the obligation and provides support for solid wall, cavity wall and loft insulation measures, and connections to district heating systems, alongside secondary measures including double glazing and draught proofing.

There are also two other parts of the obligation which specifically focus on lower income households, on households in deprived and rural areas, and on hard-to-treat homes:

- **The Carbon Saving Communities Obligation** target, which provides insulation measures and connections to district heating systems for those living in low income areas; and
- **The Affordable Warmth** target, which provides support for heating and insulation measures for the most vulnerable and those more likely to be in fuel poverty.

The Affordable Warmth Obligation requires energy suppliers to provide support for heating and insulation measures to consumers living in private tenure properties that receive particular means-tested benefits (e.g. income support or pensions credits). Under the scheme eligible consumers may get all or part of the cost of insulation work, e.g. to their loft or cavity walls, or the cost of replacing or repairing their boiler. The scheme also covers some additional upgrades to heating systems. This obligation supports low income consumers that are vulnerable to the impact of living in cold homes.

Welsh Government Warm Homes is the Welsh Government's strategic initiative to tackle fuel poverty by improving the energy efficiency of homes across Wales. The programme is targeted at those on low incomes living in deprived communities across Wales. Wales has a significant problems with fuel poverty with the most recent statistics reporting that 30% of households are living in in fuel poverty and about 30% are solid wall or hard to treat. Since 2012 Welsh Government Warm

Homes has provided energy efficiency improvements to over 27,000 homes across Wales. Welsh Government Warm Homes is designed to work alongside wider UK Government schemes, particularly the Energy Company Obligation.

Welsh Government Warm Homes

Welsh Government Warm Homes is delivered through two approaches:

- Welsh Government Warm Homes Nest, which is demand led and responds to requests for support from individual households across Wales.
- Welsh Government Warm Homes Arbed, which targets deprived communities across Wales and delivers energy efficiency improvements on an area basis. This element of the initiative has been part funded by the European Union through EU structural funds.

Welsh Government Warm Homes Nest provides advice on saving energy, money management, fuel tariffs, benefit entitlement checks and information on other support available. In addition to advice and support, it offers a package of free home energy improvement measures to households who are in receipt of a means tested benefit and who live in a very energy inefficient home. Home energy improvement packages are designed for individual properties so there is no standard package of measures but it can include fuel switching when appropriate.

Welsh Government Warm Homes Arbed takes an area based approach to providing households with energy efficiency improvements. It targets deprived communities across Wales. Each property in a scheme area is assessed individually and a whole house assessment is undertaken. Therefore, as with Nest there is no standard package of measures. In some schemes properties will receive external wall insulation while in others more basic measures will be undertaken.

In addition to the above schemes, energy efficiency scheme the **Green Deal** was also available to households in England and Wales from January 2013 to July 2015. The scheme provided loans or grants to households for energy efficiency measures (e.g. insulation, new boiler) following an assessment of the property. These loans were to be paid back through the householder's energy bills.

Fuel switching

Schemes which encourage switching to cleaner, more energy efficient fuels will benefit local air quality as they should lead to lower emissions.

In addition to the fuel switching elements of the Energy Company Obligation, the Government is also running the **Central Heating Fund**, which provides funding to

Local Authorities (LAs) in England to be used to improve the housing of those in fuel poverty living in their areas. The scheme aims to deliver first time central heating systems to fuel poor households who do not use mains gas as their primary heating fuel. The Fund is designed to incentivise first time central heating systems and therefore houses with pre-existing central heating systems, whatever the heat source, are not eligible for funding. The scheme is targeted at those households that can be evidenced as being in fuel poverty in line with the low income/high costs measure. DECC has announced the winning authorities and details can be found at <https://www.gov.uk/government/news/residents-across-england-win-share-of-25-million-to-warm-their-homes>.

Properties that switch to generating their own electricity from renewable sources may also be able to benefit from the Government's Feed-in-Tariff scheme¹². If approved, members of the scheme receive payment from their energy supplier for generating their own electricity.

The Renewable Heat Incentive (RHI) provides financial incentives to householders to install renewable heating technologies such as Heat Pumps in place of fossil fuels. It is designed to bridge the gap between the cost of fossil fuel heat sources and renewable heat alternatives through financial support for owners of participating installations. The RHI is open to England, Wales and Scotland. A similar scheme is available in Northern Ireland. The domestic RHI is targeted at, but not limited to, homes off the gas grid. Those without mains gas have the most potential to save on fuel bills and decrease carbon emissions. The scheme opened to applications on 9th April 2014 and is available to homeowners, private and social landlords and people who build their own homes.

The Welsh Government Warm Homes Arbed has supported a number of schemes that have enabled communities to receive access to the main gas grid and switch from solid fuel to gas and this includes Brynamman in South Wales, one of the areas identified by modelling as having an issue with high levels of B[a]P.

3.1.3 Industrial Measures

Industrial emissions of B[a]P are regulated under the Environmental Permitting (England and Wales) Regulations (EPR). (Scotland and Northern Ireland have similar legislation in place which performs the same function). In particular, the EPRs transpose a number of EU Directives on industrial emissions. Foremost amongst these, and most relevant for B[a]P emissions, is the Industrial Emissions Directive EU Directive 2010/75/EU (IED)¹³. This Directive sets stringent Emission Limit Values

¹² <https://www.gov.uk/feed-in-tariffs/overview>

¹³ <http://ec.europa.eu/environment/industry/stationary/ied/legislation.htm>

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 BAT-associated emission limits (BAT AELs). BAT and their BAT-AELs are set out in BAT reference documents (BREFs)¹⁴. There are 42 BREFs, covering a huge range of industrial sectors, all of which are due to be reviewed by 2020.

The iron and steel sector is the principal source of B[a]P emissions from UK industry. The iron and steel BREF does not contain BAT or BAT-AELs for the reduction of B[a]P or PAH emissions. However, it does contain stringent requirements for iron and steel works to significantly reduce their fugitive emissions¹⁵ of a variety of pollutants, including PAHs. The Environment Agency (EA), the regulator in England, is expecting the operators of iron and steel works in England to make major changes and upgrades to their facilities, including considering the replacement of existing coke ovens, to achieve these reductions. Given the large-scale financial and technical investment involved in this work, many operators of iron and steel works may not feel that they will be able to make the requisite changes within the specified limit for compliance of four years following the adoption of the BREF. Given that meeting target values as defined in EU Directive 2004/107/EC should not entail disproportionate cost and that the IED states that facilities should not be forced to close due to the financial implications of achieving compliance with BREF requirements, the EA will be considering applications from operators for temporary derogations from the IED and BREF conditions for the relevant sites to allow them to make the necessary upgrades to their facilities in a sustainable manner. This will ensure the achievement of the environmental and human health benefits delivered by reducing B[a]P emissions as soon as possible and without imposing an unreasonable burden on industry.

Modelling

In Wales, Natural Resources Wales, the regulator of large industry in Wales, has undertaken a further fine scale modelling assessment of the off-site impacts of its industrial exceedance sites using additional local data. This modelling suggests that it is unlikely that the industrial emissions resulted in off-site concentrations of B[a]P exceeding the target value in 2013. Further work is underway to fully evaluate these findings and consideration is being given to how best it may inform future compliance assessments.

¹⁴ <http://eippcb.jrc.ec.europa.eu/reference/>

¹⁵ emissions due to unintended escape from an industrial process or location, often from unknown/unmitigated routes or sources

Energy Efficiency Measures

The **Renewable Heat Incentive (RHI)** provides financial incentives to install renewable heating in place of fossil fuels, such as heat pumps, biomass boilers and on-site biogas and injection of biomethane into the grid. The non-domestic RHI scheme has been open to commercial, industrial, public sector, not for profit and community generators of renewable heat since November 2011.

The Departments for Energy and Climate Change and Business, Industry and Skills are working together with Energy Intensive Industries (EIs) on the **Industrial 2050 Roadmaps**¹⁶ project. In March this year a suite of 'decarbonisation and energy efficiency roadmaps' were published, assessing the potential for a low-carbon future across each of the eight most heat-intensive industrial sectors (e.g. iron and steel) in the UK. This will be followed up with joint Government-Industry actions plans, setting out how cost effective decarbonisation and energy efficiency can be delivered for UK EIs whilst maintaining and growing a competitive industrial base.

The UK government has put into place a number of policies that incentivise energy efficiency and emissions reductions in business and industry at both EU and UK levels.

EU Emissions Trading System scheme

Launched in 2005, the European Union Emissions Trading System (EU ETS) is the first and largest cap-and-trade system of allowances for emitting greenhouse gases in the world. It sets an emissions target (cap) for installations covered by the system but allows trading and the carbon market to determine the carbon price and therefore where emissions can be reduced most cheaply. The underlying principle of emissions trading is to ensure that emissions reductions are made where it is most cost-effective to do so. The UK recently published its position on reform of the EU ETS for post-2020.

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/474050/The_UK_s_position_on_Phase_IV_of_EU_ETS_.pdf

UK energy efficiency schemes

The Climate Change Agreements scheme is a targeted scheme to support competitiveness and energy efficiency in energy intensive industry. It provides a tax discount in return for companies signing up to stretching energy efficiency improvement targets.

¹⁶ <https://www.gov.uk/government/publications/industrial-decarbonisation-and-energy-efficiency-roadmaps-to-2050>

The **CRC** is a mandatory scheme covering large, non-intensive, users of energy in both the public and private sectors. The CRC seeks to incentivise the uptake of energy efficiency measures where the energy use by organisations is not covered by other schemes namely Climate Change Agreements and the EU Emissions Trading System (EU ETS).

The Energy Savings Opportunity Scheme (ESOS) is an energy assessment scheme that is mandatory for all large undertakings (non-SMEs). Qualifying organisations must measure their total energy consumption and carry out audits of the energy used by their buildings, industrial processes and transport to identify cost-effective energy saving measures, by 5 December 2015 and every four years thereafter.

4. Next steps

Compliance assessment for 2014 was submitted in September 2015. Comparisons of the results between 2013 and 2014 can be seen here: <http://uk-air.defra.gov.uk/data/gis-mapping>. The next compliance assessment for levels of B[a]P in 2015 will be submitted to the European Commission in September 2016.

We will continue to monitor and/or model the affected areas and implement existing measures set out in this Report. We will also keep the measures contained in this Report under review to enable us to track progress towards meeting the target values.

Annex A: Zones

Zone or agglomeration	Zone code	Link to zonal report
Teesside Urban Area	UK0013	http://uk-air.defra.gov.uk/assets/documents/reports/bap-nickel-measures/bap_teesside_UK0013_reportonmeasures_2013.pdf
Swansea Urban Area	UK0027	http://uk-air.defra.gov.uk/assets/documents/reports/bap-nickel-measures/bap_swansea_UK0027_reportonmeasures_2013.pdf
East Midlands	UK0032	http://uk-air.defra.gov.uk/assets/documents/reports/bap-nickel-measures/bap_eastmidlands_UK0032_reportonmeasures_2013.pdf
Yorkshire and Humberside	UK0034	http://uk-air.defra.gov.uk/assets/documents/reports/bap-nickel-measures/bap_yorkshireandhumberside_UK0034_reportonmeasures_2013.pdf
North East	UK0036	http://uk-air.defra.gov.uk/assets/documents/reports/bap-nickel-measures/bap_northeast_UK0036_reportonmeasures_2013.pdf
South Wales	UK0041	http://uk-air.defra.gov.uk/assets/documents/reports/bap-nickel-measures/bap_southwales_UK0041_reportonmeasures_2013.pdf

Annex B: Acronyms

AZ	Agglomeration Zone
B[a]P	Benzo[a]Pyrene
BAT	Best Available Techniques
BAT-AEL	BAT-associated emission limits
BREF	BAT Reference Documents
CAA	Clean Air Act 1993
EA	Environment Agency
EPR	Environmental Permitting (England and Wales) Regulations
HETAS	The Heating Equipment Testing and Approval Scheme
IED	Industrial Emissions Directive
Non- AZ	Non- Agglomeration Zone
PAHs	Polycyclic aromatic Hydrocarbons
PCM	Pollution Climate Modelling
SCA	Smoke Control Area