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Policy disconnect: A critical review of UK air quality policy in relation to EU and LAQM responsibilities over the last 20 years☆

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ABSTRACT

This paper critically reviews United Kingdom (UK) air quality policy in relation to European and Local Air Quality Management (LAQM) responsibilities over the last 20 years. The arguments articulated in this paper highlight the gulf between national and local air quality management in the UK, including differences in legislation, legal responsibilities, scales of operation, monitoring and modelling requirements, exceedence reporting and action planning. It is argued that local authorities cannot be held responsible for the UK's failure to achieve the European Union (EU) nitrogen dioxide (NO_2) limit values due to fundamental differences between local government responsibilities under LAQM and the UK compliance assessment reporting to the EU. Furthermore, unambitious and counterproductive national policies and the failure of EU light-duty vehicle type approval tests and Euro standards to reduce real-world emissions of nitrogen oxides (NOx) are the main reasons for continued NO_2 limit value exceedences. This failure of EU and national air quality policies has effectively undermined local authority action to improve local air quality, resulting in delays in achieving the standards, wasted resources at local and national levels, and, ultimately, unnecessary loss of life and increased morbidity in the UK population. This paper concludes that the current emphasis that the UK government is placing on implementation of Clean Air Zones (CAZs) to achieve the Ambient Air Quality Directive (2008/50/EC) (AAQD), and avoid substantial fines imposed by the European Court of Justice (CJEU), is flawed. Based on the arguments presented in this paper, a series of recommendations is proposed for the European Union, the UK government, devolved administrations and local authorities.

1. Introduction

Air pollution is a significant global issue. In 2014, the World Health Organization (WHO) declared air pollution to be the world's largest single environmental health risk, with ambient air pollution causing 3.7 million deaths annually (WHO, 2014). The World Bank has also reported air pollution to be the fourth leading risk factor for premature deaths worldwide, resulting in 1 in 10 total deaths in 2013, at a cost to the global economy of about US$225 billion in lost labour income (World Bank and Institute for Health Metrics and Evaluation, 2016). In urban areas, particularly in developed countries, road traffic is often the major contributor to local ambient air pollution and is largely responsible for elevated concentrations of nitrogen dioxide (NO_2), among other pollutants.

Exceedences of the Ambient Air Quality Directive (2008/50/EC) (AAQD) annual mean limit value for NO_2, derived from WHO health-based thresholds, are widespread across much of the UK (and Europe). In 2010, when the annual mean limit value for NO_2 was to be achieved (and five years after the UK's own parallel domestic NO_2 objectives should have been met), the UK was in breach of regulations in 40 (93%) of its 43 designated zones and agglomerations. The UK Government Department for the Environment, Food and Rural Affairs (Defra), which is responsible for compliance reporting against the AAQD to the European Commission, applied for a Time Extension Notification (TEN) of five years for 24 of its exceeding zones and agglomerations in September 2011, leaving the remaining 16 areas of exceedence in breach of the AAQD, resulting in infraction proceedings launched by the European Commission against the UK government in February 2014.

It is the European Commission's legal action against the UK government for its failure to achieve the annual mean limit value for NO_2 by 1st January 2010 as set in the AAQD, and the potential that this poses for the imposition of substantial fines by the European Court of Justice (CJEU) that set the policy context for the paper.

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Within this context, in the same year that the government applied for the TEN, the UK Localism Act 2011 (Part 2) introduced a legal framework enabling fines imposed on national government by the EU to be passed down to local government. On receipt of the infraction proceedings from the European Commission, Defra also reinforced this by sending an email to all local authorities reminding them of the discretionary powers of the Localism Act (Defra, 2014). This is despite an amendment to the Act, lobbied for by the UK Local Government Association (Local Government Association, 2011), which requires the local authority to have to have had a responsibility to comply with the AAQD, and despite local authorities not having any say over which zones or agglomerations were included in the TEN application.

Defra reported that in 2015 (the latest available data and the year by which the extension period granted by the European Commission expired) only six zones and agglomerations met the limit value for annual mean NO_2 (Defra, 2016a) and that exceedences are likely to continue until at least 2025 in eight urban areas (Defra, 2015a), meaning that rather than just the 16 zones and agglomerations currently subject to infraction proceedings, there are actually 37 areas currently reported in breach of the AAQD. Three years after its initial proceedings were launched, the European Commission (2017) issued a 'final warning' to the UK, escalating the potential for fines if the UK government cannot produce plans setting out 'appropriate measures, so that the exceedance period can be kept as short as possible' as per Article 23 of the AAQD.

The UK's decision to leave the EU means the AAQD may lose its relevance to UK air quality policy in the longer term. However, the process of leaving could take up to 2021 as the UK Prime Minister invoked Article 50 of the Treaty on European Union, the means by which a Member State officially gives notice of its intention to withdraw from the EU, on 29th March 2017, and has recently announced an intention to seek to extend the withdrawal process for two years beyond the original 2019 deadline. It is not clear what may happen if the European Commission imposes fines within this negotiation period, or whether, since the infraction proceedings were initiated within the period of EU membership, liability for fines would remain regardless of 'Brexit'.

The final warning, issued by the European Commission to the UK in February 2017, was also issued to Germany, France, Spain and Italy for their failure to address repeated breaches of air pollution limits for NO_2. It is clear that the inability to achieve the NO_2 limit value is widespread, with exceedences in 23 of the 28 Member States and infringement proceedings against 12 of them (European Commission, 2017). This critical examination of UK air quality policy may therefore have broader applicability for the majority of EU Member States as well as for other countries seeking to implement the EU model of air quality management.

Governments of many of the world's most polluted cities, particularly in developing nations, look to the EU and UK approach to air quality management as an example of better practice, for example in India (Gulia et al., 2015) and South Africa (Naiker et al., 2012). While it is clear that there has been considerable success in minimising exposure to industrial and domestic emissions since the Clean Air Act 1956 (Longhurst et al., 2016), the UK has not yet managed to achieve the same for road traffic, despite 20 years of air quality policy seeking to reduce traffic pollution (Longhurst et al., 1996; Beattie et al., 2001; Longhurst et al., 2006; Longhurst et al., 2009; Barnes et al., 2014).

This paper adds to this body of evidence critically reviewing the UK government's approach to managing traffic-related pollution, particularly NO_2, over the last two decades in order to present an appraisal of its achievements and limitations upon which lessons, both positive and negative, may be learnt. The unique premise for this paper, however, is its criticism of the dual approaches implemented in responding to separate EU and UK air quality legislation for NO_2. It is argued that local authorities cannot be held responsible for the UK's failure to achieve the EU limit values due to fundamental differences between local government responsibilities under Local Air Quality Management (LAQM) and the UK compliance assessment reporting to the European Commission. Furthermore, it is argued that unambitious and counterproductive national policy and the failure of EU light-duty vehicle type approval tests and Euro standards to reduce real-world NOx emissions are the main reasons for continued limit value exceedences. This failure of EU and national air quality policy has effectively undermined local authority action to improve local air quality, resulting in delays in achieving the standards, wasted resources at local and national levels, and, ultimately, unnecessary loss of life and increased morbidity in the UK population.

This premise is based on extensive policy research (Longhurst et al., 1996; Beattie et al., 2001; Longhurst et al., 2006; Longhurst et al., 2009; Barnes et al., 2014), and more than 60 person years' cumulative experience of the authors developing air quality policy in other countries, advising the European Commission on its review of the AAQD, assisting Defra and the Devolved Administrations with conducting the Review and Assessment aspect of LAQM, including contributing to the development of statutory guidance, and working with local government in fulfilment of their LAQM responsibilities.

1.1. Impacts of NO_2 exceedences in the UK

The ambient air quality objectives and limit values set in UK and EU legislation are derived from health-based standards, originally published by the WHO in 1987 and subsequently revised and interpreted by UK governmental advisory groups (Jones et al., 2016). In a recent review of the growing body of epidemiological and mechanistic evidence, the Committee on the Medical Effects of Air Pollution (COMEAP, 2015, p.5) stated that, as well as being a marker of the effects of other traffic-related pollutants, "*…evidence now suggests that it would be sensible to regard NO_2 as causing some of the health impact found to be associated with it in epidemiological studies*". Furthermore, evidence suggests that, similarly to fine particulates, NO_2 is a non-threshold pollutant (Jarvis et al., 2010; WHO, 2013) indicating that health effects are experienced at concentrations below the WHO standards (and consequently the existing EU limit values and national ambient air quality objectives).

Based on recommendations from COMEAP, Defra have revised previous estimates of the UK annual equivalent attributable deaths (29,000 based purely on long-term exposure to anthropogenic $PM_{2.5}$ (COMEAP, 2010)) to include both PM and NO_2. The combined mortality (44,750–52,500 p.a.) is therefore greater than the combined impacts of obesity (~30,000 deaths), alcohol consumption (8697) and road traffic accidents (1732), and has an associated social cost in the range £25.3bn–£29.7bn and productivity costs of £2.6bn (Public Health England, 2016; Office for National Statistics, 2016; Department for Transport, 2016a; Defra, 2015b; Ricardo-AEA, 2014). With 81.5% of the 2011 population of England and Wales living in urban areas (Office for National Statistics, 2013), the potential for acute and chronic effects of traffic-related pollutants, including PM and NO_2, is substantial. In addition to the health effects and consequent cost of air pollution, there are also significant additional social impacts. With the young, elderly and infirm, and those living in the most deprived areas (Brunt et al., 2017), most at risk, there are environmental justice implications as families with young children and those living in poverty are more likely to reside in areas with the highest NO_2 and road NOx, although households in more affluent areas provide the greatest per household contribution to road NOx emissions by owning more vehicles, having on average higher household NOx emissions from private vehicles and driving further distances than poorer households (Barnes and Chatterton, 2016).

1.2. UK air quality policy

The UK has operated a twin-track approach to air quality policy since the UK Environment Act 1995 and the EU Air Quality Framework Directive (Council Directive 96/62/EC). At an EU level, the UK national