Is Local Air Quality Management a Successful Strategy in Achieving Selected European Union (EU) Limit Values PM_{10} and NO_2?

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1. Background

The UK Government has failed to meet 2005 EU air quality limit values for particulate matter (PM_{10}) and looks set to breach 2010 limit values for nitrogen dioxide (Defra 2009a). In addition to national actions (e.g. incentivising cleaner fuels), one of the Government's main strategies for meeting the requirements of the EU Air Quality Framework Directive (1996/62/EC) (CEU 1996) is through the implementation of Local Air Quality Management (LAQM) Review and Assessment, as laid out under Part IV of the Environment Act 1995 (HM Government 1995) (Figure 1).

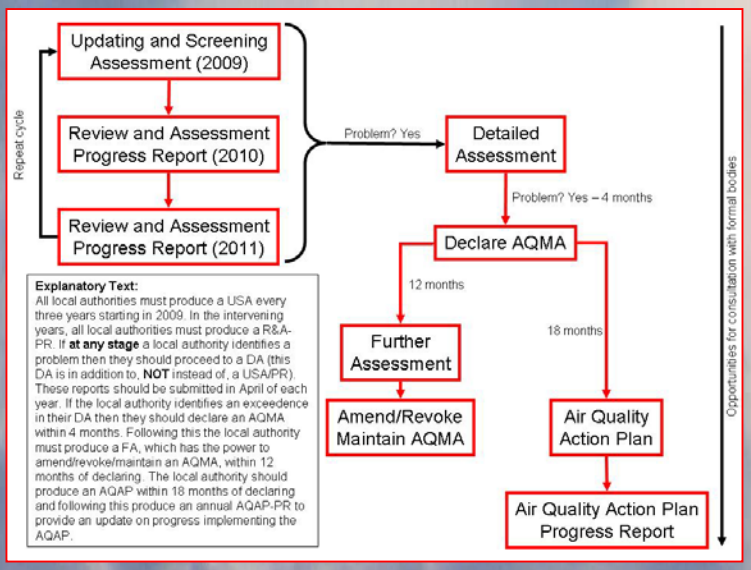

Figure 1: Review and Assessment process

2. Aims and objectives

This research will draw on the extensive body of evidence provided by the Review and Assessment process between the completion of Round 1 (2001) and Round 3 (2009) (Figure 2) to establish whether Air Quality Action Plans (AQAPs) have been effective in achieving their aims and in improving air quality at a local level. The aim of this research is therefore to evaluate the degree of success achieved through individual AQAPs in order to assess the effectiveness and efficiency of the LAQM regime as a national strategy to assist in meeting the EU air quality legislative requirements. The research objectives are therefore:

Objective 1: Determine whether there has been any change in the concentration of pollutants in Air Quality Management Areas (AQMAs) declared in Round 1 of Review and Assessment;

Objective 2: Evaluate whether the measures included in the AQAPs produced following Round 1 are being achieved; and

Objective 3: Critically assess whether implementation of the AQAPs has resulted in the change in pollutant concentrations identified in Objective 1.

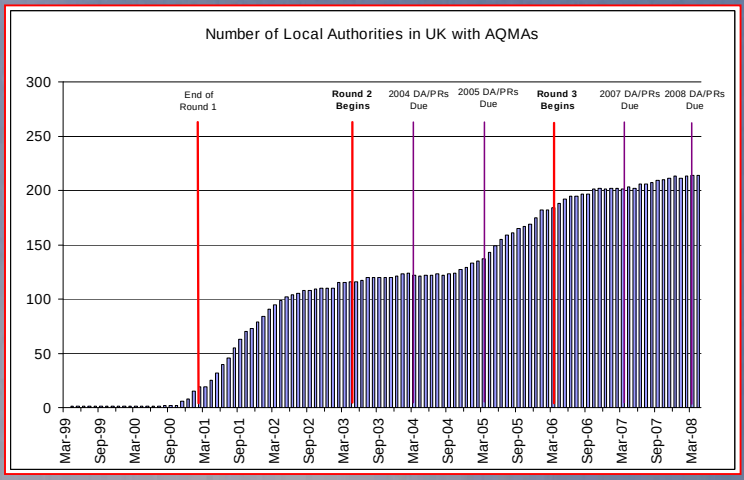

Figure 2: Number of local authorities in the UK with one or more AQMAs (June 2008)

3. Method

The research will sample from the 407 British[1] local authorities those 119 Air Quality Action Plans that were accepted by Defra and the Devolved Administrations (DAs) following the first Round of Review and Assessment. As the most prevalent cause of AQMA declarations (~89% of AQMAs) (Table 1), the research will focus on AQAPs based on air quality objective exceedences of nitrogen dioxide and particulate matter (PM_{10}) from traffic sources. These local authorities' Review and Assessment reports will be critically reviewed, and the authors interviewed via questionnaire, to identify monitoring results, AQAP measures and variables/externalities that may affect the relationship between the implementation of AQAP measures and local concentrations of traffic-related pollutants. Having identified any statistically significant changes in pollutant concentrations between Rounds 1 and 3 (Objective 1) and attributed scores of success to Round 1 AQAPs (Objective 2), the research will assess whether there is any statistical association between successful AQAPs and improvements in air quality. Pooled data analysis of the other variables, i.e. country, urban/rural, and site type, will also be used to determine whether correlation exists within these categorisations that may not be apparent in the larger dataset.

[1] Northern Ireland authorities did not participate in Round 1 Review and Assessment.

Table 1: AQMA statistics – pollutants and sources (June 2008)

Country	Pollutants for which LA declared AQMA						
	CO	Ben	1,3-but	Lead	NO_2	PM_{10}	SO_2
England (excl. London)	-	1	-	-	149	35	9
London	-	-	-	-	33	28	-
Scotland	-	-	-	-	6	3	1
Wales	-	-	-	-	6	1	-
N Ireland	-	-	-	-	6	6	1
TOTAL	**-**	**1**	**-**	**-**	**200**	**73**	**11**

Percentage of AQMAs by Source	
Road Transport	**89%**
Industrial	**4.5%**
Domestic	**2.5%**
Transport & Industrial	**3.5%**
Transport & Domestic	**0.5%**
Others	**0.5%**

4. Conclusions

As a critical evaluation of Local Air Quality Management, this research will rigorously assess whether Air Quality Action Plan measures are being achieved and, using suitable techniques, determine whether this approach is leading to improvements in air quality both locally and nationally. A strong positive relationship would indicate that AQAPs are achieving their objectives to reduce pollutant concentrations, whereas no significant improvement in air quality associated with very few implemented AQAP measures would suggest that the Action Planning process is inefficient and ineffective. Implemented AQAP measures that are not linked with a corresponding decrease in pollutant concentrations indicate that the Action Planning element of the LAQM process is ineffective in improving air quality or that there are confounding factors. Conversely, a significant reduction in pollutant concentration independent of any AQAP measures may suggest that Action Planning is unnecessary and that other factors are likely to have a greater effect on local air quality.

These conclusions will assist Defra and the DAs in assessing the suitability of the LAQM mechanism within the Air Quality Strategy in contributing towards the fulfilment of UK and EU air quality legislation for nitrogen dioxide and PM_{10}. A thorough examination of both successful and unsuccessful measures and the identification of problems experienced in implementing Air Quality Action Plans will help to inform all local authorities in the preparation and execution of their own Action Plans and will be developed as a 'better practice' strategy paper. This research thus will have valuable implications both for air quality policy research and enhancement of practice.

5. References

CEU (Council of the European Union), (1996). Council Directive 96/62/EC on ambient air quality assessment and management. Official Journal L296, 0055-0063.

Defra, (2009a). Consultation on the draft UK notification to the European Commission to secure additional time to meet the limit values for particulate matter for certain zones/agglomerations in accordance with the Council Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe, http://www.defra.gov.uk/corporate/consult/air-quality/index.htm. [Accessed 1 March 2009].

HM Government, (1995). Environment Act 1995. The Stationery Office, London.