

Health Impact of Energy from Waste Plants in Leeds

1. Background

There are currently two proposals to build energy from waste plants in the Leeds area:

1. Veolia ES: recycling and energy recovery facility to treat non-hazardous residual municipal waste and small amounts of commercial and industrial waste. This proposal is currently in the planning process and is in the process of applying for an environmental permit from the Environment Agency.
2. Biffa: energy from waste plant using non hazardous residual commercial and industrial waste to be built on the old Skelton Grange Power Station site. This proposal is currently in the planning process.

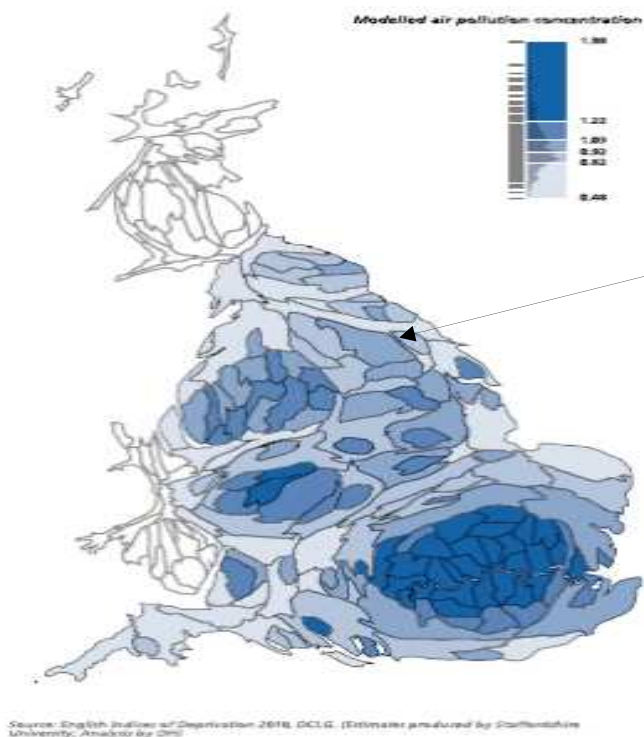
There are also two small incinerators already in existence (SRCL clinical waste and YWS sewage sludge) in the area of Cross Green.

2. Air Pollution

National levels of air pollution have improved significantly over recent years due to improvements in technology (cleaner car engines and industrial processes amongst others) and changes in the law (Clean Air Act, Waste Incineration Directive, Environmental Permitting). However, urban outdoor air quality still has an effect on health, particularly among older people and those with pre-existing conditions.

70% of air pollutants in urban areas are caused by road transport. Particulate air pollution (very small particles in the air) are of particular concern as there is evidence that these small particles are carried deep into the lungs where they cause inflammation and can make heart and lung disease worse. Average figures at local authority level suggest that the poorest air quality and highest particulate concentrations in England are found in and around London and Birmingham. Poor air quality therefore remains a significant public health issue. Other major urban areas such as West Yorkshire and Leeds in particular still have poorer air quality than other less populated areas (Figure 1). Poor air quality therefore remains a significant public health issue.

Air quality by upper tier local authority, England, 2010



Leeds

Population Cartogram of Air Quality

Map where each geographical unit has been scaled so that it is approximately proportional to the size of the resident population in that area. Darker blue areas are those with poorer air quality.

Air pollution, specifically the level of very fine particulates (called $PM_{2.5}$), is one of the indicators in the Public Health Outcomes Framework. It is estimated that the burden of particulate air pollution in the UK is equivalent to 340,000 life years lost through premature death across the whole UK population.

The inclusion of air quality in the Public Health Outcomes Framework is intended to enable Local Authorities and their Directors of Public Health to prioritise local action on air quality to help reduce the health burden from air pollution.

Air pollution in England and Wales is addressed through government Air Quality Regulations and local Air Quality Strategies developed at the Local Authority level. These strategies put in place standards which are designed to bring about improvements and therefore protect the public health. Air Quality Standards exist for particulate matter, oxides of carbon, sulphur and nitrogen, benzene, lead, among others.

3. Health Effects of Air Pollution

Despite improvements in air pollution evidence shows that many thousands of people still die prematurely every year because of its effects. Air pollution from man-made particles is currently estimated to reduce average UK life expectancy (from birth) by 6 months. Moreover, it is now firmly established that air pollution (particulate matter, sulphur dioxide and ozone) contributes to thousands of hospital admissions per year.

Air pollution may also have a long term effect on children's lung function. European and US studies have shown that air pollution may reduce lung development in children from the ages of 10 to 18 yrs old. A recent US study found a 6.3% difference in lung growth between children at the lowest and highest levels of exposure to some forms of particulate air pollution.

Asthma is a common disease particularly in childhood, when it is a major cause of illness and hospital admission. There is some evidence that living close to heavy traffic may cause asthma and also that the symptoms of asthma are made worse by air pollution. The respiratory health of children, particularly those with asthma, will benefit substantially from a reduction in air pollution especially that from motor vehicle exhausts.

The short term health effects of nitrogen dioxide (NO₂) are also well established. At higher concentrations it may cause irritation of the lungs and can exacerbate existing lung conditions including asthma and COPD. Ground level ozone (O₃) may also be formed by reactions of oxides of nitrogen in sunlight and can cause breathing problems and reduced lung function.

4. Air Quality in Leeds

Air quality in Leeds, particularly in relation to particulate matter, has improved over recent years. Figure 2 shows that the concentration of PM₁₀ has fallen gradually since 1993 and remains well below the air quality standard of 40 µg / m³.

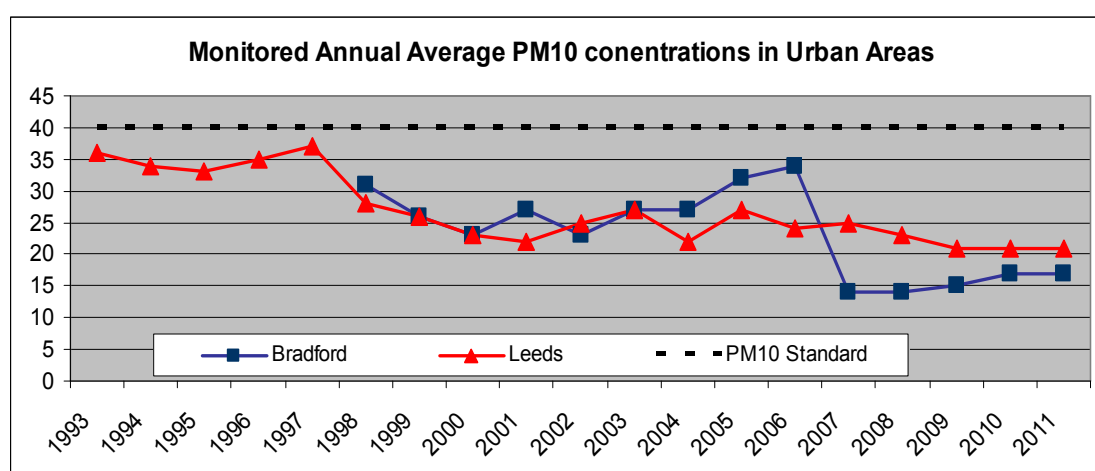


Figure 2

In Leeds the areas with poorest air quality are the city centre and the areas surrounding the motorways (M1, M62, M621) and the A1, the area surrounding the Stanningley Bypass in Pudsey and the area surrounding the Leeds-Bradford airport in Yeadon. Figure 3 shows average estimates of PM_{2.5} concentrations based on areas of 1km², and the actual concentration at specific points within these areas (e.g. next to busy and congested roads) may be higher.

DEFRA notes¹ that Leeds City Council has 6 “Air Quality Management Areas” where national targets are or are predicted to be exceeded – all AQMAs in the Leeds area are caused by levels of Nitrogen dioxide (NO₂). Furthermore, two thirds of NO₂ emissions in Leeds are attributable to traffic. Discussions with council officers suggest that the number of AQMAs in Leeds may rise to 17; all due to concentrations of NO₂. These areas of poor air quality often occur close to deprived areas where the burden of disease is likely to already be higher than the more affluent areas of the city.

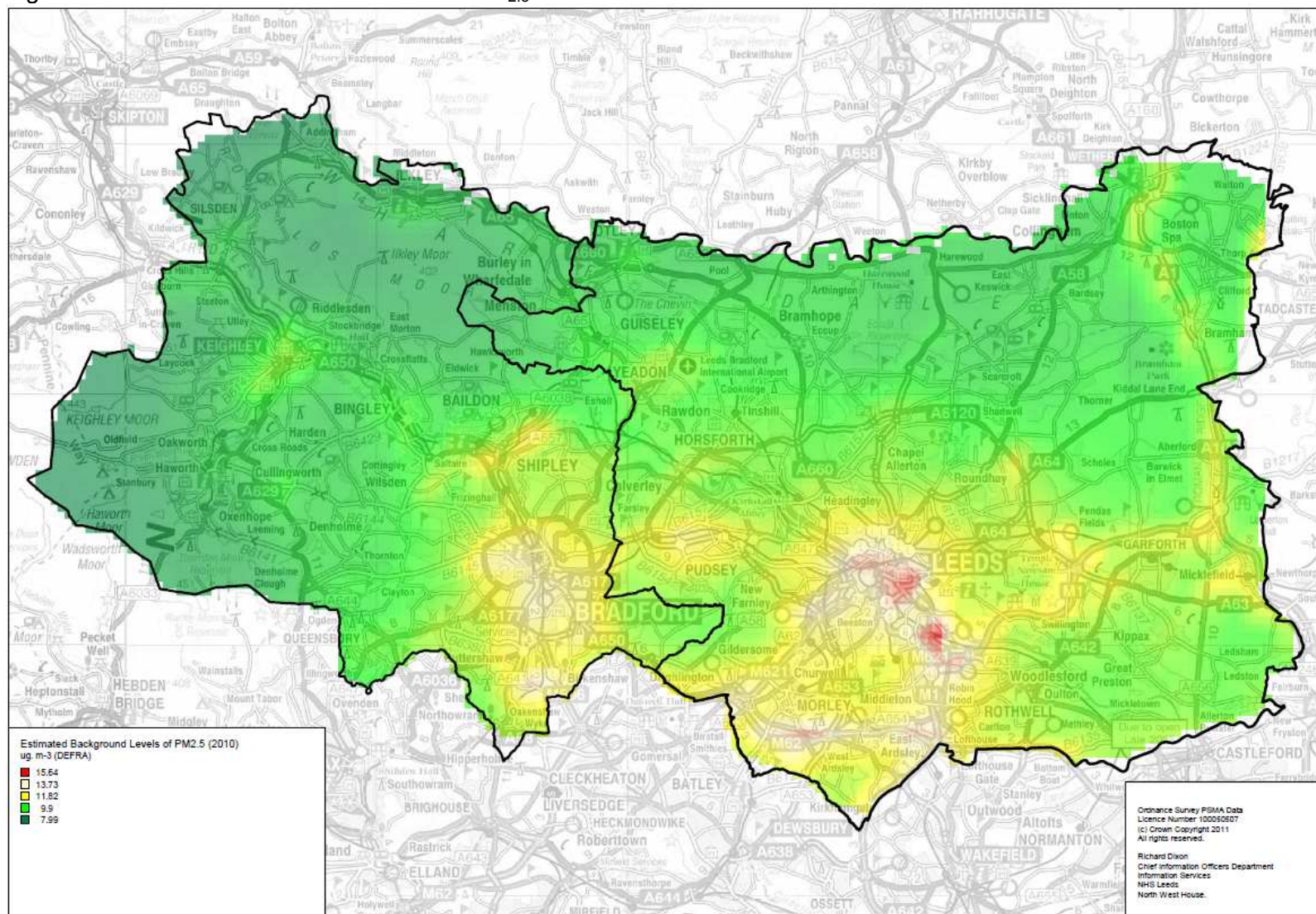
The increasing number of NO₂ triggered AQMAs that may be required in the West Yorkshire area reflect a national trend in NO₂ levels; continuing the downward trend of NO₂ is increasingly seen as a challenge for local government.

¹ http://aqma.defra.gov.uk/aqma-details.php?aqma_id=665

A feasibility study is being undertaken at the moment into implementing a Low Emission Zone in Leeds and Bradford to reduce the volume of high polluting vehicles that enter the conurbation. This will include a health impact assessment and an economic evaluation.

An AQMA caused by concentrations of PM₁₀ exceeding the air quality standard was addressed by Leeds City Council through localised measures to phase out solid-fuel heating systems. Other local authorities in the West Yorkshire have declared AQMA's, the majority of which are associated with NO₂ emissions caused by traffic.

Figure 3: Estimated concentration levels of PM_{2.5} in Bradford and Leeds



5. Energy from Waste Plants

All operators of large EfW plans are required to apply for an Environmental Permit in order to operate the site. If granted, by the Environment Agency, the permit sets out strict operating requirements which must be complied with to protect the environment and public health. The permit application has to demonstrate that the proposed plant will use Best Available Techniques (BAT) to control emissions to air, land and water. As part of the permit operators of modern waste incinerators are required to monitor emissions to ensure that they comply, as a minimum, with the emission limits stated in the EU Waste Incineration Directive (2000/76/EC) (WID).

During its assessment process for Environmental Permits, the EA consults the local Primary Care Trust; the Health Protection Agency (HPA), the Local Authority and the Food Standards Agency. The PCT and HPA assess the potential public health impact of an installation and make recommendations based on a critical review of the information provided for the EP application. They may request further information at the environmental permitting stage if they believe that this is necessary to be able to fully assess the likely public health impacts.

In addition, the HPA continues to review research to examine potential links between emissions from municipal waste incinerators and reported health effects and has concluded that, “while it is not possible to rule out adverse health effects from modern, well regulated municipal waste incinerators with complete certainty, any potential damage to the health of those living close-by is likely to be very small, if detectable”. This view is based on detailed assessments of the effects of air pollutants on health and on the fact that modern and well managed municipal waste incinerators make only a very small contribution to local concentrations of air pollutants.

6. Regulation

It is important that such plants are well managed and that a strict monitoring regime is in place and, if necessary, rigorously enforced. Should planning permission and the necessary environmental permits be given for the developments then monitoring and regulation of the plants will be carried out by the Environment Agency to strict standards as set out in the environmental permit. Thus, any effects on air quality would be detected and the companies involved required to take action if necessary.

7. Emissions from the Proposed Energy from Waste Plants in Leeds

Planning and Environmental Permit applications for Energy from Waste plants must make a detailed analysis of their potential impact on air quality in the surrounding area. These emissions analyses are critically examined by the Environment Agency and the HPA for accuracy and form part of the HPA’s assessment into potential public health implications of the proposals.

Modelling carried out as part of the Veolia planning application found that the pollutants produced by the plant would, in the majority of cases, be considered as “non-significant” (i.e., any increase in concentration of a pollutant (that is attributable to the Veolia installation) would be less than 5% of the relevant assessment criterion).

An additional assessment of heavy metal emissions noted that the “process contribution” of chromium emissions from the installation would be insignificant (less than 1% of the environmental quality standard) but notes that the background assessments show that the

environmental action levels are already exceeded in parts of the locality. This indicates an existing local source of chromium in the area².

With reference to particulates, the assessment noted the additional particulate matter released by the process would be negligible when compared to existing background levels:

	Air Quality Standard ($\mu\text{g m}^{-3}$)	Existing Background Level ($\mu\text{g m}^{-3}$)	Contribution from Veolia EfW plant ($\mu\text{g m}^{-3}$)
PM ₁₀ annual mean	40	25.7	0.12
PM _{2.5} annual mean	25	13.5	0.12

PM₁₀ and PM_{2.5} refer to the size of the particles and have a size of less than 10 and 2.5 micrometres respectively.

The planning application for the proposed Biffa installation undertook a separate analysis of the impact on air quality of that proposed facility when combined with emissions from present and proposed industrial sources in the area. This included projected emissions from the Veolia installation. Their modelling of the combined impact of these sources found that the air quality standards would not be exceeded. It should also be noted that assessments of the impact of installations such as the proposed energy from waste plants normally assume a conservative scenario of maximum permitted emissions; such plants normally have a lower emissions profile.

8. Conclusions

- Despite considerable improvement, air quality remains a problem and has a significant effect on the health of people in Leeds.
- The largest contribution to air pollution in Leeds comes from road traffic and improving air quality across Leeds and West Yorkshire could potentially have a significant impact on premature deaths and hospital admissions in the city.
- If approved Energy from Waste plants add little to the overall burden of pollution, provided they are well managed and maintained.

Dr Ian Cameron
Director of Public Health
Leeds

Dr Simon Balmer
Public Health Consultant
Leeds PCT

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² Appendix D1: Assessment of impacts to air quality arising from the operation of the Proposed Leeds RERF (Environmental Resources Management Limited – Veolia ES Leeds Limited Environmental Permit Application)