

## Waste incineration – questions and answers

### General

#### 1. How much municipal waste do we produce?

Local authorities collected 29.1 million tonnes of municipal waste in England and 1.8 million tonnes in Wales during 2006/07. This included 25.9 million tonnes of waste from households (1.6 million tonnes in Wales) – that's around half a tonne or 509kg per person every year (equivalent to the weight of a small truck!)

#### 2. Are we producing more waste than we did ten years ago?

We are producing more waste than ten years ago but the growth in the amount of waste is declining. In England the average annual increase in municipal waste from 2001/02 to 2006/07 was 0.2, percent compared with a growth rate of 3.3 percent in the previous decade. For Wales, the equivalent increases were 0.5 per cent 4.3 per cent respectively.

#### 3. What is municipal waste?

This is the waste we generate in our homes, schools, shops and small businesses and waste collected by local authorities. Nearly 90 per cent of municipal waste comes from households.

#### 4. How is municipal waste disposed of?

Traditionally, most waste in England and Wales has been disposed of at landfill sites. But, limited space and challenging Government targets under the European Landfill Directive to reduce the amount of biodegradable municipal waste being sent to landfill mean we have to find alternative ways of disposing of waste.

In 2006/07 16.9 million tonnes (58 per cent) of municipal waste was disposed of in landfill sites in England (1.3 million tonnes (68 per cent) in Wales, a decrease of four per cent on the previous year (three per cent in Wales). However, in England the Landfill Directive requires us to reduce this significantly further to 11.2 million tonnes by 2009/10 and 5.2 million tonnes by 2019/20. In Wales the amount of biodegradable municipal waste that local authorities are allowed to landfill is 709,325.5 tonnes in 2009-10, and 329,686.5 tonnes in 2019/20.

In England in 2006/07 we reused or recycled (including composting) around 31 per cent of municipal waste, with a further 11 per cent pre-treated, mostly by incineration with energy recovery. In Wales we recycled (including composting) 30 per cent, with a further 2 per cent treated by incineration.

#### 5. What is energy from waste?

Energy from waste or incineration is where waste is burnt at high temperatures to reduce its weight and volume and to produce heat and/or electricity.

#### 6. How many energy from waste plants are there in England and Wales?

There are currently <sup>1</sup> 17 energy from waste (EfW) plants in England and one in Wales permitted to burn municipal waste.

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<sup>1</sup> As of September 2008

**7. With the proposed increase in landfill taxes in 2010, will this lead to an increase in incineration?**

The intention of the landfill tax increase is to discourage landfill. Waste producers must seek alternative mechanisms for managing their waste that should include; reduction, recycling and recovery. Incineration with energy recovery is one of many options.

**8. Are all new incinerators going to be energy from waste facilities?**

We expect that all new municipal waste incinerators will be energy from waste facilities. The Waste Incineration Directive requires that the heat that is generated during incineration or co-incineration is recovered as far as practicable. In addition, revenues raised from energy recovery are economically important for the operation of these plants.

**9. How energy efficient are incinerators?**

Energy to waste plants that produce only electricity are about 25% efficient.

**10. Why do we need incinerators, can't recycling be increased, eliminating the need?**

Recycling can and should be increased. However, there will inevitably remain wastes that cannot be technically or economically reused or recycled. With declining landfill availability and landfill directive requirements alternatives are needed such as incineration or co-incineration to recover energy from residual wastes.

**11. I hear incineration causes a decrease in recycling, is this true?**

Incineration can be compatible with high rates of recycling. Countries that have high levels of incineration (compared to the UK) also have high rates of recycling e.g. Germany, Denmark.

**12. Aren't more suitable modern technologies available to dispose of waste?**

The only practicable alternative is landfill which results in poor energy recovery and greater greenhouse gas emissions than incineration.

**13. How does recovering energy from waste in England and Wales compare with other EU countries?**

We currently recover energy from 11 per cent of municipal waste. By comparison, the European average is 17.3 per cent and Denmark recovers energy from 54 per cent of its municipal waste.

## Managing municipal waste

**14. Who is responsible for managing municipal waste?**

There are a number of organisations that have different roles to play in managing waste in England and Wales. These include Government departments and devolved administrations, local authorities and the Environment Agency.

**Department for Environment and Rural Affairs (Defra) and the Welsh Assembly Government (WAG)**

Defra decides on waste policy in England. The Welsh Assembly Government decides on waste policy in Wales. These waste policies determine what should happen on waste and who should implement it. Policy implementation is supported by objectives and targets, some of which are statutory.

### Local authorities

Local authorities collect and manage municipal waste. They have to plan for managing municipal waste, including deciding whether energy from waste is needed in their area and, if so, how much is needed.

As the waste planning authority, local authorities also decide where waste management facilities could be built.

### Environment Agency

The Environment Agency is involved at national, regional and local levels. We provide advice on the development of national and local waste strategies. At a local level, we comment on local authority spatial plans and on individual planning applications, for example for energy from waste (EfW) plants.

We also regulate EfW plants in England and Wales under the Environmental Permitting Regulations. These Regulations require compliance with European Directives.

### The public

The public have a major role to play in reducing the amount of waste produced through their activities and purchasing decisions and making the maximum use of their local recycling schemes.

## Energy from waste - permitting

### 15. What are the main issues that the Environment Agency considers in determining an application?

The aim of an Environment Agency permit is to ensure that the plant is operated in such a way and under such conditions that human health and the environment remain protected from any harmful emissions.

**Health:** We have a key role to play in protecting human health from regulated processes. We consider health issues in four ways:

- comparing stack emission concentrations with guidance and regulations. For example, the European Waste Incineration Directive has limits that should prevent any unacceptable impact on the environment or health for the majority of locations;
- modelling emissions to determine the ground level concentrations of pollutants and comparing these with the Environmental Quality Standards (EQS or equivalent). This includes food uptake paths for dioxins and using Department of Health guidance;
- considering literature on health effects due to emissions;
- using statutory consultees including the Food Standards Agency and the local Primary Care Trusts or Local Health Boards. If we need to address specific issues, we use external experts for advice.

**The environment:** The applicants must produce an assessment of the environmental impact of the process. For this they generally use our guidance (H1) on Environmental Assessment and Appraisal of BAT (Best Available Techniques). This includes background levels of pollution as well as the process contribution and their comparison with Air Quality Standards. For nearby special sites there may be special methodologies for different receptors.

#### **16. Who does the Environment Agency consult before it issues a permit?**

We consult the public, the local authority, the health authority and other interested organisations for their views on the potential effect on the environment and public health before issuing an environmental permit for a new energy from waste (EfW) plant.

We will only grant a permit if:

- the applicant has demonstrated that the proposed facility meets the requirements of the Environmental Permitting Regulations and uses Best Available Techniques in its design and operation;
- the proposed design, construction and operational standards for individual EfW plants meet or exceed stringent controls;
- we have consulted members of the local community, the local authority and the health authority for their views on the potential effect on the environment and public health.

We believe well managed EfW plants that meet modern requirements such as the Waste Incineration Directive will not cause significant pollution of the environment or harm human health.

We make sure that the standards used in designing, maintaining and operating EfW plants are at least as good as the European standards set to protect the environment and human health.

#### **17. What is the role of the local authority?**

Local authorities decide if an energy from waste (EfW) plant is needed, where it should be built, and how big it should be. The local authority is responsible for land use planning, approving or rejecting applications for planning permission for waste disposal sites such as energy from waste plants and landfills.

#### **18. What is the role of health authorities?**

We consult Primary Care Trusts (PCTs) in England and Local Health Boards (LHBs) in Wales when we receive an application for an environmental permit for an energy from waste (EfW) plant under the new Environmental Permitting Regulations (EPR). Under these Regulations, we ask the health authorities to comment on the potential health impacts of proposed energy from waste plants based on emissions information sent to them. We will take their views into account when we make our decision. The Health Protection Agency (HPA) provides specialist public health advice to support local health authorities with this role. Local Health Boards in Wales may also involve the National Public Health Service for Wales (NPHS).

#### **19. Is there any guidance on the roles of Primary Care Trusts/Local Health Boards in EPR determinations?**

The Health Protection Agency (HPA) has set out guidance for PCTs and LHBs on their role in the regulation of industrial activities. This advice is available on the HPA website at:

<http://www.hpa.org.uk/>.

### **Energy from waste – regulation**

#### **20. How does the Environment Agency make sure that energy from waste (EfW) plants are operated in a safe way?**

We regulate the performance of EfW plants by:

- issuing an environmental permit;
- carrying out a continued assessment of plant operations and its environmental performance in a number of ways;
- operators must monitor emissions at given times and report the results to us;
- we regularly inspect installations, review monitoring techniques and assess monitoring results to measure the performance of the plant;
- we carry out independent routine monitoring of emissions (once a year for all EfW plants, as well as making spot checks);
- operators must inform us within 24 hours of any breach of the emissions limits, followed by a fuller report of the size of the release, its impact and how they propose to avoid this happening in the future;
- operators' monitoring results are placed on the public registers;
- depending on the seriousness of any breach, we will take appropriate enforcement action and/or prosecute.

**21. Is it true that the Environment Agency relies too heavily on reports from the operators?**

No, this is not true. We carry out frequent inspections of energy from waste (EfW) plants, using both announced and unannounced visits. Some announced visits are needed to investigate plant performance, explore the opportunities for improvements in performance and any investigation of malfunctioning. In these circumstances it is essential that the relevant staff are available. However, we have every confidence in the reports we do receive as plants are run by competent professional operators and part of our inspection of the sites considers how the reports are generated from raw data.

**22. What is the Duty of Care?**

Under Section 34 of the Environmental Protection Act 1990, the producers of controlled waste have "general responsibility for waste in their control", for example:

- they are responsible for preventing any other person from keeping, treating or disposing of their waste in a way that could pollute the environment or harm human health;
- they must also make sure that waste is handled to prevent it escaping and, when waste is transferred, make sure it is only transferred to someone authorised to handle it;
- they must provide a written and accurate description of waste to prevent a third party unwittingly committing offences.

## Health issues

**23. What is the Environment Agency's role in protecting human health?**

We have a key role to play in protecting human health as part of our regulatory duties. We are not health professionals so we work in partnership with others by seeking advice from medical and public health experts at the Department of Health, Health Protection Agency and National Public Health Service. We consult Primary Care Trusts or Local Health Boards on all energy from waste applications.

**24. Are there health risks from energy from waste plants?**

Energy from waste (EfW) plants are frequently perceived by some of the public to be a particular risk to human health. However, despite many detailed studies into the health of communities living near to EfW plants, none have been able to demonstrate a conclusive link between incinerator emissions and public health impacts. Modern EfW plants must meet tight emissions standards so they make a very small contribution to the background levels of air pollution.

**25. What were the findings of the Defra review into the health effects of waste management?**

The most recent independent review of evidence on the health effects of management and disposal of household and similar waste was published by the Department for Environment, Food and Rural Affairs (Defra) in 2004. The *“Review of the Environmental and Health Effects of Waste Management: Municipal Solid Waste and Similar Wastes”* considered 23 high quality studies of the patterns of disease around energy from waste (EfW) plants and also four review papers looking at the health effects of EfW plants.

The report considered cancer, respiratory disease and birth defects and found no evidence for a link between the incidence of the disease and the current generation of EfW plants.

**26. Are there safer ways of managing the nation’s waste?**

All waste management activities pose some risk to human health and the environment. It is because of this risk that we control the way they operate and their emissions through the environmental permit. Energy from waste plants comply with new and high emissions standards, and this means that they are unlikely to pose a threat to health.

**27. How can you be sure modern energy from waste (EfW) plants are much safer?**

There have been substantial cuts in emissions from incinerators since 1996. All EfW plants are new or have been significantly modified to meet the much tighter emission standards under the European Waste Incineration Directive.

The contribution to pollution from EfW plants is very small compared to other sources, such as traffic, road development and other industrial sites.

**28. What are dioxins and furans?**

These are a group of substances with similar chemical structures which are often referred to simply as dioxins. They are not deliberately produced but are formed during fires and from other activities such as burning fuels like wood, coal and oil, waste incineration, bonfires and from a number of industrial processes. They remain in the environment for a long time and accumulate in all living things.

**29. How have the dioxins emissions changed in the last decade?**

Over the past eighteen years there has been a very large decrease in the discharge of dioxins from energy from waste (EfW) plants. In 1990 the older generation of municipal incinerators released about 600 grams of dioxins, as measured on the ITEQ (International Toxic Equivalent) basis and accounted for around 50% of national dioxin emissions... According to our pollution inventory data for 2006, all incineration plants (not just the EFWs) produced about 2.4 g of dioxins which is 6% of the dioxin emissions from all industrial plants that we regulate.

**30. Is it true that energy from waste plants are the biggest source of heavy metal and dioxin emissions?**

No, this is not true. The contribution from energy from waste plants to the total amount of pollution nationally is very small and has been decreasing over the past years due to stricter controls on emissions through the Waste Incineration Directive. For example, in 2006, EFw plants produced less than 0.5% total lead released from industrial plants in our control. Figure for nickel was 1.7% for the same year.

**31. What is an acceptable percentage of dioxins in the air we breathe, beyond which it is likely to be harmful?**

Over 90 per cent of human exposure to dioxins is through the food we eat, with meat, fish, eggs and dairy products being the main sources.

There is no safe limit for exposure to dioxins but the Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT) have provided advice on tolerable daily intake (TDI) of dioxin. TDI is the amount that can be ingested (mainly eaten) daily during our lifetime without a significant chance of harm. COT has recently recommended a TDI for dioxins and dioxin-like PCBs (man-made chemicals) of two picograms per kilogram of a person's body weight per day. Harmful effects, such as cancer and heart disease, are generally associated with concentrations at least ten times higher than most people carry in their bodies.

**32. Is the exposure of the UK population below the TDI?**

Our main source of exposure to dioxins is through our diet. Based on 1997 figures, average intakes for the UK population were 1.8 picograms per kilogram of bodyweight per day and therefore close to the recommended TDI (there are 1,000,000,000,000 picograms in a gram). In common with other developed countries such as the USA and other EU Member States, about one third of the UK population may exceed the TDI through its diet.

**33. Is it true that a study established a definite link between cancer and living near an energy from waste plant?**

This is not true. Even the most careful and detailed high quality research studies have failed to demonstrate elevated risks of cancer associated with the emissions from energy from waste (EfW) plants. Work by the Small Area Health Statistics Unit (SAHSU) at Imperial College, London University, which examined cancer incidence of over 14 million people living near to 72 municipal solid waste incinerators in Great Britain (from 1974-1986 (England), 1974-1984 (Wales), and 1975-1987 (Scotland) failed to find any convincing evidence of an increase in cancer rates due to the incinerators. This is despite the fact that emissions of dioxins from the older generation of incinerators are around ten to one hundred times greater than those from modern EfW plants.

The UK Government's expert advisory Committee on Carcinogenicity reviewed the results of this further investigation and concluded that any potential risk of cancer due to living near to EfW plants for more than ten years was exceedingly low.

## Impact on the environment

**35. Don't energy from waste plants produce more carbon emissions than coal fired power stations?**

No. Coal-fired power stations produce many more times more carbon dioxide than incinerators. Whilst a coal-fired power will generate energy more efficiently than an incinerator generating electricity only (i.e. no CHP) these stations are much larger than incinerators and use more carbon rich fuels.

**36. Do energy from waste plants contribute more to global warming than landfilling waste?**

No. Energy from waste plants do produce carbon dioxide gas as a result of burning waste. However, the energy they produce replaces that generated by other fuels such as coal, oil and natural gas that would otherwise be burnt at power stations to generate electricity. Landfilling waste generates both methane and carbon dioxide gases. Methane has a global warming potential of more than twenty times that of carbon dioxide.

### **37. What are PM<sub>2.5</sub> ?**

These are tiny particles which are present in indoor and outdoor environment. They have a maximum length/width of 2.5 micrometers (thirty times smaller than the thickness of human hair). Outside, they mainly come from vehicle exhausts, paved and unpaved roads, burning of fuels in power stations, wood burning, open burning, incinerators and other industrial activities including grinding, milling and construction works. They can also be formed by some chemical reactions in the air. Indoor activities, such as smoking, cooking, burning candles/oil lamps and fireplaces also produce these particles. These particles can be carried long distances from their source and hence activities/incidents happening hundreds of miles away may affect their concentration.

Although EFW plants do produce these particles but their contribution is very small compared to other sources. Our pollution inventory data for 2006 shows that all incineration plants contributed around 0.03% of all PM<sub>2.5</sub> emitted from industrial plants.

### **38. What health effects are associated with PM<sub>2.5</sub> ?**

Because these particles are very small, they can travel deep into respiratory tract and reach the lungs. Short term effects will include irritation of eyes, nose and throat, sneezing and shortness of breath. Long term exposure could result in increased rates of bronchitis, reduced lung function and cardiovascular problems. Older people, children and those with existing heart and lung disease are particularly sensitive to these particles.

## **Further information**

### **39. Where can I get more information about recovering energy from waste?**

You can find out more about recovering energy from waste and the environment by visiting our website at [www.environment-agency.gov.uk](http://www.environment-agency.gov.uk). Some other information sources are given below.

#### **Environment Agency publications**

What's in my backyard?

Position statement on waste incineration in waste management strategies

Booklet on municipal waste incineration

Regional Strategic Waste Management Assessments

Technical guidance on waste incineration

Enforcement and Prosecution Policy

All of the above can be obtained via our website at [www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)

#### **County or Unitary council**

Contact your County or Unitary council to find out about their strategies and plans for waste, including the:

Municipal Waste Management Strategy

Waste Development Plan

Policy on recycling waste

Regional Waste Strategy to which the council contributes



**Department for the Environment, Food and Rural Affairs (Defra)**

Visit Defra website at [www.defra.gov.uk](http://www.defra.gov.uk) for:

“Waste Strategy 2007”

Guidance on Waste Management and Best Value

Guidance on Joint Municipal Waste Management Strategies

Guidance on Directive 76/2000/EC on the incineration of waste

**Department for Communities and Local Government (CLG)**

Contact the Department for Communities and Local Government ([www.communities.gov.uk](http://www.communities.gov.uk)) for:

Central Government Development Planning policy for waste, including:

Planning Policy Statement 10 “Planning for Sustainable Waste Management”

Planning Policy Statement 11 “Regional Spatial Strategy”

Planning Policy Statement 12 “Local Development Frameworks”

**Department of Health**

Contact Department of Health website ([www.doh.gov.uk](http://www.doh.gov.uk)) for further information about central government health policies and research (including health advisory committees and other bodies).

**Welsh Assembly Government**

Contact the National Assembly of Wales or Welsh Assembly Government ([www.wales.gov.uk](http://www.wales.gov.uk) in English or [www.cymru.gov.uk](http://www.cymru.gov.uk) in Welsh) for information about waste policies, including:

Planning Technical Advice Note 21 on Waste

“Wise About Waste” Waste Strategy in Wales

**Health Protection Agency**

Contact the Health Protection Agency at [www.hpa.org.uk](http://www.hpa.org.uk) for expert advice on protecting the health of local communities.

The HPA are the primary source of health advice upon which we base our regulation and decisions.

National Public Health Service is the operational arm of the Health Protection Agency in Wales and it provides the resources, information and advice to enable the Welsh Assembly Government, Health Commission Wales, Local Health Boards, local authorities and NHS Trusts to discharge their statutory public health functions. <http://www.wales.nhs.uk/sites3/home.cfm?orgid=719>