

PROSIECT GWYRDD JOINT SCRUTINY PANEL

INQUIRY INTO THE HEALTH AND ENVIRONMENTAL CONCERNS ASSOCIATED WITH ENERGY FROM WASTE INCINERATION PLANTS

July 2012



CHAIRMAN'S FOREWORD

The Joint Scrutiny Panel have made great strides to become an effective critical friend in the determination of the Prosiect Gwyrdd process. I should like to thank the Panel's members for their diligence and probity and officers from the 5 Partner Authorities and the Project Team for their dedication and commitment to the process over the years thus far.

It has been a most interesting journey and we can be proud of our efforts to ensure that the Prosiect Gwyrdd procurement has been undertaken with reasoned debate and challenge.

This report results from a public 'Call for Evidence' two day meeting to establish whether there is any 'validated scientific evidence' that an 'energy from waste incinerator' causes harm to human Health and Environmental damage. This investigation was a most informative experience and I am grateful to those who gave their time to submit evidence and take part in the oral evidence sessions.

The Health Protection Agency (HPA), responsible for Public Health advice, has concluded that, "whilst 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". However, there is concern from various individuals and groups about the health implications of ultra fine and nano particles. The HPA accept this is an emerging area of scientific research. It is therefore, imperative that more research is undertaken to accurately conclude the ongoing debate about the impact of ultra fine and nano particles.

I am satisfied that we consulted widely and fairly and I am sure that the new Panel will continue to do an excellent job of scrutiny.

Councillor Christopher Williams
Chair, Prosiect Gwyrdd Joint Scrutiny Panel 2009/2012

1. BACKGROUND

1.1 Prosiest Gwyrdd is a partnership of local authorities (Cardiff, Caerphilly, Newport, Monmouthshire and the Vale of Glamorgan Councils) undertaking a complex procurement to secure a solution for the treatment of waste after composting and recycling have been maximised.

1.2 Prosiect Gwyrdd is resourced by the partnership and is supported by a Project Team of full time officers, a Project Board made up of senior officers representing each of the partner councils and, a Joint Committee of 2 senior members from each authority. In addition, legal, technical and financial external advisors have been appointed to provide expert advice.

1.3 Each Council agreed to form a Joint Scrutiny Panel as part of the agreement to establish and participate in the project. The Prosiect Gwyrdd Joint Scrutiny Panel was established in December 2009.

2. EXECUTIVE SUMMARY

2.1 This report outlines the key evidence and messages received by the Scrutiny Panel's investigation into the health and environmental concerns associated with energy from waste incineration.

2.2 The Panel set a very focussed terms of reference for their review and although interesting and wide ranging evidence was received by the Panel, this report concentrates solely on its agreed areas of investigation.

2.3 Scrutiny Panel members are not public health or environmental specialists but as lay people have carefully considered the evidence provided by contributors before making the recommendations contained in this report. Perhaps naturally, this report focuses mostly on the emissions from energy from waste incinerators and the associated validated and emerging science.

3. INTRODUCTION

3.1 The Prosiect Gwyrdd Joint Scrutiny Panel agreed to undertake a call for evidence to investigate the health and environmental concerns associated with energy from waste incineration. Although the project specification is 'technology neutral', the decision to undertake the inquiry was taken as the final two final bidders both proposed energy from waste incineration solutions.

3.2 The Panel issued an 8 week call for evidence to targeted stakeholders and the wider public from 8th November 2011 to 3rd January 2012. The call for evidence asked for responses to the following terms of reference:

To conduct an investigation to evaluate:

a. Is there any validated scientific evidence that an energy from waste incineration plant operating within the UK's current statutory framework causes harm to human Health and Environmental damage?

b. If there are example(s) of validated scientific evidence, what are the causes of/effects on human health and the environment?

3.3 Nineteen responses were received from a wide variety of individuals and organisations. A full list of the individuals and organisations that responded to the call for evidence is attached at appendix 1. Following consideration of the written responses, the Panel invited a balanced shortlist of stakeholders to outline their submissions in person and take part in a question and answer session (attached at appendix 2). These meetings were held on 14th and 16th March 2012 in Penallta House.

3.4 The Panel wish to place on record their grateful thanks to all those that engaged with this investigation by providing oral and/or written evidence or, attending the 2 days of public evidence meetings to listen to discussions. It was clear from the quality of responses that contributors had invested a considerable amount of time in collating responses. The Panel carefully considered each of the call for evidence responses in developing this report.

3.5 As might be expected, energy from waste incineration is a highly emotive issue for some. A great breadth of scientific papers and studies about health and environmental factors from around the globe were brought to the attention of the Panel. It is clear that there is a spread of different opinions (as distinct from validated scientific evidence) about the health and environmental impacts associated with energy from waste incinerators.

3.6 When considering evidence the Panel considered responses in light of their strict terms of reference that seeks to identify validated scientific evidence that an energy from waste plant operating within the UK's current statutory framework causes harm to human health and the environment.

4. PROSIECT GWYRDD JOINT SCRUTINY PANEL: MEMBERSHIP

4.1 The Panel was made up of 2 councillors from each of the 5 authority partners:

Caerphilly County Borough Council
Councillors M.G. Parker and D.V. Poole

Cardiff Council
Councillors R. McKerlich and S. Wakefield

Monmouthshire County Council
Councillors S. Howarth and V. Smith

Newport City Council
Councillors B. Bright and S. Jones

Vale of Glamorgan Council
Councillors Mrs M. Kelly Owen and C.J. Williams (Chair)

Note: the membership of the Panel changed following the local elections in May 2012.

5. FINDINGS

Welsh Government Waste Management Policy Position

5.1 The National Assembly for Wales has legislative competence for health and environmental issues within Wales.

5.2 The Welsh Government's waste management policy is set out in 'Towards Zero Waste' published in June 2010. The policy includes the EU Waste Framework Directive 2008, which includes a requirement that waste is managed in accordance with the waste hierarchy.

5.3 The waste hierarchy gives top priority to waste prevention. Where waste is created, it should be prepared for re-use, followed by recycling or composting before energy recovery (energy from waste incineration) and finally disposal to landfill. It should be noted that the solutions proposed by Viridor and Veolia for the Project Gwyrdd contract are consistent with the Welsh Government's Towards Zero Waste Policy.

5.4 The Welsh Government states that its waste management priority is to reduce the amount of waste produced and to maximise recycling. The Welsh and Scottish Governments have set a household recycling target of 70% by 2025. By comparison the Northern Ireland executive has confirmed a 60% target by 2025 and while there is no formal target for household waste in England, the UK as a whole has a national target of 50% by 2020 in accordance with the EU Waste framework Directive. The Welsh Government has included its recycling target in the Waste (Wales) Measure 2010 to give it statutory effect.

5.5 The Welsh Government have confirmed that its Toward Zero Waste Policy is underpinned by evidence in respect of Health and Environmental impacts. In particular, the Welsh Government points to advice received from its own Health Department and external public sector bodies, notably the Health Protection Agency and the Environmental Agency Wales.

5.6 During the oral evidence session a Welsh Government official stated that the Welsh Government did not make policy where there is room for doubt. It was also stated that the Welsh Government undertook life cycle and risk assessments for all waste disposal technologies before concluding that energy from waste incineration was the best environmental method for dealing with residual waste (after recycling and composting) as it provided for the recovery of energy prior to landfill.

Public Health Advice

5.7 The Health Protection Agency (HPA) is an independent UK organisation that was set up by the government in 2003 to protect the public from threats to their health from infectious diseases and environmental hazards. It does this by providing expert advice and information to the general public, to health professionals such as doctors and nurses, and to national, devolved and local government on all public health matters.

5.8 In 2009 the HPA published its review of research undertaken to examine the suggested links between emissions from municipal waste incinerators and effects on health. The document entitled 'The Impact on Health of Emissions to Air from Municipal Waste Incinerators' states:

"The Health Protection Agency has reviewed research undertaken to examine the suggested links between emissions from municipal waste incinerators and effects on health. 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. The Committee on Carcinogenicity of Chemicals in Food, Consumer Products and the Environment has reviewed recent data and has concluded that there is no need to change its previous advice, namely that any potential risk of cancer due to residency near to municipal waste incinerators is exceedingly low and probably not measurable by the most modern techniques. Since any possible health effects are likely to be very small, if detectable, studies of public health around modern, well managed municipal waste incinerators are not recommended".

5.9 The above report is extremely influential as it forms the basis of health professional advice to central and devolved governments, the Environment Agency and professional bodies.

Environmental Regulation

5.10 The regulation of municipal waste incinerators is the responsibility of the Environment Agency. The Environment Agency Wales is a Welsh Government Sponsored Body while also being part of the Environment Agency for England and Wales. It has a statutory role to safeguard the environment and human health from all processes and activities within its powers of regulation, including waste management.

5.11 The Environment Agency has 3 main roles:

- environmental operator
- environmental regulator
- environmental adviser and partner

5.12 The Environment Agency is responsible for issuing an environmental permit before any energy from waste plant is allowed to operate. In considering any application for a permit the Environment Agency will:

- Compare emissions with industry best practice and limits set by legislation. The Waste Incineration Directive has strict limits that should prevent any unacceptable impact.

- Look in detail at what the energy from waste plant will release and how this could impact on the local environment.
- Consider proposals for how emissions will be monitored and reported.
- Consider expert scientific opinion from specialist bodies like the FSA and Health Boards.
- Look at the proposed management of the facility, including maintenance and staff training.
- Involve local communities to listen to and take on board their concerns.
- Ensure that there is efficient use of raw materials, water and energy.

5.13 Following the issuing of any environmental permit, the Environment Agency will undertake inspections to ensure the plant operates inline with conditions and limits set out in the permit. Enforcement action can be taken against any operator that fails to prevent or minimise harm to the environment or human health.

5.14 The Environment Agency has a statutory role in protecting human health and work closely with health professionals. In terms of emissions released from energy from waste plants, the Environment Agency rely on advice from the Health Protection Agency as outlined in paragraph 5.8 above.

Emissions

5.15 The biggest issue of controversy for the Joint Scrutiny Panel to consider was the various claims made about the contents of the emissions released by energy from waste incineration plants.

5.16 Controls over incineration emissions have steadily increased with the enacting of various pieces of environmental legislation since 1989. The introduction of the Waste Incineration Directive 2000 further tightened emission limits and controls. Prior to this suite of legislation to control emissions, incineration was less tightly regulated and emissions were higher.

5.17 In 2006 the World Health Organisation confirmed that short and long term exposure to particles up to PM10 (from a variety of sources) can damage health. This statement is generally accepted, however, the divergence of views is centred around the type, toxicity and damage caused by particles contained in Energy from Waste incineration emissions.

5.18 The Environment Agency estimate that the UK's annual emission of air particulates has decreased 58% between 1990 and 2009. The UK's particles can come from a wide variety of sources including; industry, road traffic, energy from waste plants, power generation, domestic boilers, agriculture, domestic, accidental fires and fireworks etc.

5.19 If it is accepted that exposure to particles can damage health, it is important to put into context the sources of airborne particles. The National

Atmospheric Emission Inventory's Report 'Air Quality Pollutant Inventories for England, Scotland, Wales and Northern Ireland: 1990 – 2009' published in 2011, estimates that energy from waste incineration plants contribute about 0.03% to UK national particulate levels per annum. By comparison road traffic (24%) and domestic sources (14%) are the most significant sources of particulate emissions. Other sources include industry, agriculture and quarrying etc. However, it is significant that iron and steel production contributed up to 11% of particulates in Wales during 2009 but only 4% in England and very low or no emissions in Scotland and Northern Ireland.

5.20 By comparison to many other more common activities, energy from waste incineration emissions produce an insignificant contribution to particulate numbers. Whilst energy from waste plants have strict particulate emission controls, filtering and monitoring systems, other processes do not operate to the same strict standards. Given the very high level of particulate emissions from road traffic, domestic sources and iron and steel production, it is surprising that the Westminster and Welsh Governments do not take action to reduce particulate emissions from these sources.

5.21 Whilst it can be demonstrated that energy from waste plants do not significantly contribute quantitatively to particulate emissions, the Panel received conflicting views about the harm to health caused by the content of emissions released by energy from waste plants. These issues are discussed in more detail below.

5.22 Government, devolved administrations and government agencies rely on public health advice provided by the Health Protection Agency (HPA). In evidence to the Panel the HPA recognise that both short term and long term exposure to particulates can damage health. Significantly, there is no threshold for the safe exposure to particulates and any increase in particulate concentrations should be assumed to have some potential adverse effect on health, however, small.

5.23 Long term exposure affects the risk of mortality, especially from cardiovascular disease and lung cancer. Short term increases in concentrations can cause cardio-respiratory effects such as heart attack, respiratory disease and increases in hospital admissions and related symptoms.

5.24 The Health Protection Agency stated that the UK Committee on Toxicity recommends a Tolerable Daily Intake (TDI) measure of 2pg WHO-TEQ/kg bw/day can be used to undertake risk assessments for the exposure to particulates. It recommends this is the amount that can be ingested daily over a lifetime without an appreciable risk to health.

5.25 The HPA point to 23 peer reviewed studies into cancer outcomes (10 studies), respiratory disease (6 studies) and reproductive outcomes (7 studies) based on data relating to incinerators' emissions prior to the introduction of the Waste Incineration Directive 2000. Although energy from waste incineration plant emissions can be expected to contain a greater level of pollutants before 2000, the HPA conclude that there is no consistent case for any adverse health outcomes being caused by incinerator emissions.

5.26 The HPA insist that modern, well managed incinerators make only a very small contribution to local concentrations of air pollution. As a result, the impact on health, if any, would be very small and likely not to be detectable.

5.27 The HPA's conclusion was disputed by a number of individuals and organisations that gave evidence to the Panel including, Friends of the Earth, Professor Vyvyan Howard, Cardiff Against the Incinerator, Stop Newport Incinerator Campaign and South Wales Without Incineration Network. Their concerns centre on the toxicity and number of ultra fine particles (those below a measurement of PM_{2.5}) and nano particles (those below PM_{0.1}).

5.28 It is accepted that modern energy from waste incinerators have bag filtration systems which have significantly reduced the number of emitted particulates. It is estimated that modern bag filtration systems capture up to 99% of particulates up to PM₁₀. However, it was argued that the bag filtration systems measure captured particulates by weight rather than number. The significance is that large numbers of the smallest particulates remain within energy from waste incinerators' emissions. Due to their size these ultra fine and nano particulates are more mobile than larger particulates and can spread over a wider geographical distance.

5.29 In England and Wales energy from waste incineration operators must monitor particulate emissions up to PM₁₀.

5.30 Concern was expressed that there is research to suggest that inhaled ultra fine and nano particles are likely to be more toxic than larger particles and can gain access to the blood stream before being distributed to organs throughout the body. In particular, the Panel heard evidence from Professor Vyvyan Howard, a credible and respected academic from the Centre for Molecular Biology at the University of Ulster. Professor Howard said that emerging studies suggested particles emitted from energy from waste plants were likely to be more toxic than other particulate sources. However, this is a new area of scientific research and to date the research undertaken had not been subject to peer review. As a result some organisations and individuals called for these particles to be managed according to the 'precautionary principle' where they should be considered dangerous unless proven otherwise.

5.31 There is uncertainty about the level of health impacts associated with ultra fine and nano particles as there is no validated scientific evidence to provide a definitive answer.

5.32 It is clear that this is a developing area of science where there are uncertainties and various developing schools of thought. All parties are agreed more research must be commissioned to establish a robust and validated understanding of the health impacts associated with ultra fine and nano particulates.

6. CONCLUSIONS AND RECOMMENDATIONS

6.1 The Joint Scrutiny Panel's terms of reference set the Panel the task of establishing whether there is any validated scientific evidence that an energy from waste plant causes harm to human health and the environment. There is no doubt that waste incinerators are controversial and the Panel received different options about their safety. However, the only validated scientific evidence received by the Panel was issued by the Health Protection Agency. The HPA evidence concludes that 'possible health effects are likely to be very small, if detectable'.

6.2 The Panel recognise that the HPA's advice will be disputed by some individuals and groups who are concerned that the affect to human health caused by particulates below PM 2.5 is not understood. While there are studies to suggest this is the case, to date there is no conclusive validated scientific evidence.

6.3 Environment Agency estimate that the UK's annual emission of air particulates has decreased 58% between 1990 and 2009. This is a positive record, however, the vast majority of particulate pollution (up to PM10) is caused by road traffic (24%), homes (14%) industry, agriculture and quarrying etc. By contrast it is estimated that energy from waste incineration accounts for up to 0.3% of all particulate pollution (up to PM10). By comparison to many other more common activities, energy from waste incineration emissions produce an insignificant contribution to particulate numbers

6.4 The Welsh Government undertook life cycle and risk assessments for all waste disposal technologies before concluding that energy from waste incineration was the best environmental method for dealing with residual waste (after recycling and composting) as it provided for the recovery of energy prior to landfill. Environmental groups disagree and believe Mechanical Biological Treatment (MBT) techniques offer a more sustainable and flexible solution.

6.5 In light of the evidence received the Joint Scrutiny Panel make the following recommendations

- a. Welsh Government legislate for locality ambient monitoring of airborne particulate matter up to PM2.5 at urban and industrial locations and specifically sites of proposed incinerators. This will allow for baseline monitoring and the impact, of an incinerator to be measured and monitored.
- b. The health impacts associated with ultra fine and nano particles is a developing area of knowledge. More research is urgently needed to establish the environmental and health impacts of ultra fine and nano particles. The Health Protection Agency, UK Government and Welsh Government should take a leadership role and urgently commission research into the environmental and health impacts of ultra fine and nano particles.
- c. Incinerator emission controls have increased steadily over time. The Project Gwyrdd contract must assume that the emission controls will continue to increase and more effective filtration and monitoring systems will be

required. The contract must be flexible enough to accommodate tighter statutory emission controls.

d. In response to concerns about fine and nano particulates, the Project Team must ensure the contract specification requires the most effective emission filtration systems available to maximise the removal of particulates from the incinerator's flue gases. The Joint Scrutiny Panel would welcome discussions with the Project Team about the available options to achieve this.

e. The Welsh Government should take immediate action to develop a strategy to reduce the particulate pollution caused by the road traffic, homes, industry and agriculture.

**INDIVIDUALS AND ORGANISATIONS THAT PROVIDED WRITTEN
RESPONSES TO THE JOINT SCRUTINY PANEL'S CALL FOR EVIDENCE**

1. Julie Barratt, Director, Charter Institute of Environmental Health Wales.
2. Ronnie Alexander, Chief Environmental Health Adviser, Welsh Government.
3. Dr Dick van Steenis.
4. Jasper Roberts, Deputy Director Waste and Resource Efficiency Division, Welsh Government.
5. Gareth O'Shea, Area Manager South East, Environment Agency Wales.
6. Pippa Bartolotti and Robert Hepworth, Stop Newport Incineration Campaign.
7. Janet Rawlings, Chepstow Friends of the Earth.
8. Rod Walters, Abergavenny Friends of the Earth.
9. David Roman.
10. Edmund Schluessel, Cardiff Against the Incinerator.
11. Matthew Farrow, Welsh Environmental Services Association.
12. Dan Cooke, Viridor Waste Management
13. Prosiect Gwyrdd Project Team.
14. Tim Peppin, Director of Regeneration and Sustainable Development, Welsh Local Government Association.
15. Max Wallis, South Wales Without Incineration Network.
16. Joyce Giblin.
17. Professor Vyvyan Howard, Nano Systems Biology, Centre for Molecular Bioscience, University of Ulster.

**INDIVIDUALS AND ORGANISATIONS INVITED TO GIVE ORAL EVIDENCE
TO THE JOINT SCRUTINY PANEL**

Wednesday 14th March

- 10.00am Jasper Roberts and Andy Rees, Welsh Government
- 11.00am Janet Rawlings and Rod Walters, Friends of the Earth
- 12.00 noon Professor Vyvyan Howard, Centre of Molecular Biology,
University of Ulster
- 2.00pm Dr David Russell, Health Protection Agency
- 3.00pm Dr Mark Broomfield, AEA Technology on behalf of
Environmental Services Association
- 4.00pm Mr Edmund Schluessel, Cardiff Against the Incinerator

Friday 16th March

- 10.00am Nadia De-Longhi and Cantor Mocke, Environment Agency
Wales
- 11.00am Rob Hepworth, Stop Newport Incinerator Campaign
- 12.00 noon Julie Barratt, Charter Institute of Environmental Health Wales
- 2.00pm Max Wallis, South Wales Without Incineration Network
- 3.00pm Mike Williams, Prosiect Gwyrdd

Dr Dick van Steenis was invited to give evidence to the Joint Scrutiny Panel on 16th March but was unable to attend.