

To: wastestrategy@wales.gsi.gov.uk

Kindly acknowledge receipt of this e-mail message.

United Kingdom Without Incineration Network (UKWIN)
c/o Shlomo Downen, National Coordinator
25 Birchlands, Forest Town
MANSFIELD, Nottinghamshire NG19 0ER

Friday 24th July 2009

Consultation on a new Waste Strategy for Wales

Thank you for this opportunity to comment on the draft Wales Waste Strategy 2009-2050. This submission is made on behalf of United Kingdom Without Incineration Network (UKWIN), in my capacity as the National Coordinator. UKWIN (www.ukwin.org.uk) is an independent organisation representing a network of groups opposing the expansion of waste incineration in the UK. The aim of the Network is to provide information and act as a coordinating focus for local community groups and members of the public who are campaigning against the building of incinerators or facilities to produce Refuse Derived Fuel (RDF) or Solid Recovered Fuel (SRF) in the UK. We have as member groups Friends of the Earth Cymru and other groups in Wales, and acknowledge their support in compiling this response.

1.0 General Comments

1.1 The Minister is correct to say, in the Foreword to the strategy that:

How we deal with waste in Wales can have huge benefits for not only the environment, but also our economy and well-being. There are tremendous opportunities to reduce waste, save money and create valuable high quality industry in Wales by using the valuable material resources contained in waste.

1.2 The body of the strategy does not, however, match the promise of the introduction. The proposed 70% recycling rate for 2025 includes up to 7% (hazardous) incinerator ash. When Flanders is already recycling more than 70% of their waste it is difficult to take seriously claims that any strategy that takes until 2025 to achieve lower rates is really "*bold and ambitious*". The 2025 target would take Wales no further than the 2007 levels of waste management in Germany in 2007 which Eurostat data shows was recycling 46%; composting 18%; incinerating 35% and landfilling 1%.

1.3 We are particularly concerned at the rush to incineration technology evident in the Strategy and supporting documents. The pro-incineration bias in the strategy is underpinned by a range of simplistic assumptions like incinerator bottom ash being "inert" and all suitable for re-use, showing the hold of industry-promoted myths rather than factual analysis. A second myth is that burning to extract some thermal value is better than nothing – methodologies have been developed internationally for proper assessment (LCA and BPEO) and a strategy that ignores these cannot meet Wales's requirement for sustainable development.

1.4 It appears that some badly founded assumptions have distorted the choices of options. These include the ideas that:

- Getting some energy out of residual waste must be better than sequestration of carbon (without properly considering the efficiency of recovery)
- Incinerator bottom ash is “inert” – in spite of the increasing weight of evidence to the contrary
- CHP incinerators are the way to go although on the ground WAG, through international Business Wales, is promoting the largest incinerator in Europe at Merthyr – without a likely user for the immense amount of heat. WAG ignores the failure of CHP development in the UK and the lack of future prospects without large public subsidy
- Wales will ban using treated organic wastes on land – in spite of a long history of disposing of sewage sludge to land with similar levels of contamination to MBT residuals including compost and digestate

1.5 The concept of *high efficiency ‘energy-from-waste’ plants* generating heat and power, as assumed by WAG officials, has not been technically assessed. Where there are heat grids (Sheffield centre, Scandinavian towns), this may work. Where a heat grid needed building from scratch (Shetlands) it proved very costly. In Wales, it’s a non-starter* (more below). A feasible and more efficient alternative is GfW (gas-from-waste) for supplying the existing gas grid. Though the National Grid company issued their report¹ on 2 February, WAG must have known the National Grid had been talking about it with Defra for months. There was time for gas-grom-waste to be included as a strategic alternative.

1.6 UKWIN is concerned about the apparent promotion of incineration [P Gwyrd Press Release²]. WAG could have heeded the National Grid’s warning against Local Authorities entering into *long term contracts with companies to incinerate the waste, meaning that the opportunity to convert to renewable gas and gain the associated benefits is missed*. We consider it has very clear advantages for Wales, where the LAs are largely free of long-term contracts and investment in large incinerators, to go in the waste-to-gas direction. National Grid estimates half the country’s household gas heating could come from biogas made from waste, so providing a reliable source of energy as North Sea reserves run down.

1.7 The overall objective is weak: “The primary objective of the Strategy is to progress more sustainable waste management in Wales”, as shown by a weak recycling target postponed far too long into the future, so deferring really sustainable practices to future generations, i.e. “cheating on our children”.

1.8 The headline “towards zero waste” by 2050 is window-dressing. By the end of the Strategy in 2025 there would be rather little progress to reducing the ecological footprint – 10% rather than the 45% target (footprint report, Fig.22). This Figure also shows that the transition rate is higher up to 2015 but then slows up (as the planned incinerators come on line). Evidently, postponing high levels of recycling, linked to the transition to an incinerator-led plan for residual waste, is part of the reason for the failure of the Strategy to match the Minister’s chosen indicator.

1.9 The SA/SEA uses the term Energy from Waste (EfW) throughout and disposal to mean by landfill, with not a single mention of incineration, despite the WFD definition

* Said by two or three participants at WAG’s ‘Consultation Event’, Swansea, 20 May 2009

setting incineration = disposal. It ignores the 2003 judgment by the European Court of Justice in which the principal purpose of municipal incinerators was found to be waste disposal (ENDS Report 339, pp 57-59; also ENDS Report 381, October 2006 *UK incinerators set to fall under 'disposal' label*).

1.10 The draft strategy is described as “a complete revision of *Wise About Waste, The National Waste Strategy for Wales 2002*”. However we find the analysis and information base is inadequate for reviewing the present policies and developing a revised strategy. In scope and quality it compares poorly with England’s Waste Strategy. Furthermore the draft hasn’t been revised to meet the requirements Waste Framework Directive 2008 and claims that this is a key driver are not supported by the evidence.

2.0 Failure to Review and Report on existing policy

2.1 The SA/SEA main report says the new strategy “adds to *Wise About Waste - The National Waste Strategy for Wales (2002)*” but elsewhere says it will replace it. Replacement is wrong, as much in the new document is advocacy and inappropriate as planning framework, while the planning principles of the present Strategy are missing. Without such additional material, it would not be a waste plan complying with the WFD.

2.2 The Report describes *Wise About Waste* as:

This document sets out the way Wales will deal with its waste in the next 10 years. It aims to move Wales away from an over-reliance on landfill to a more sustainable way of waste management. This will be achieved by adopting a sustainable, integrated approach to waste production by minimising waste production, reducing its environmental impacts and maximises the use of unavoidable waste as a resource:

- *to re-use and recycle at 85% of construction and demolition waste by 2010; and*
- *to reduce the amount of hazardous waste generated by at least 20 % by 2010.*

2.3 This is not only a biased summary, but also fails to assess successes and failures. The strategy actually sought to “minimise landfill and incineration” (note in the present documents the word ‘incineration’ is taboo). *Wise About Waste* actually set MSW recycling targets, largely succeeding. And the targets given for C&D waste and hazardous waste are not reported on. It is quite inadequate as a review.

3.0 Failure to Consult on the Strategic Environmental Assessment

3.1 All the questions posed for consultation relate to the draft strategy TZW. While the other documents are nominally offered up for comment, it’s only the SEA on which there is a legal requirement to consult and amend in response to criticisms (under Reg. 8(3)³). And this SEA is submerged in the Environmental Report (ER) on the supposedly combined SEA/SA.

3.2 The few and limited responses to the SEA will prove WAG has failed to genuinely consult, but just pretended to comply with the SEA Directive:

in order to ensure that the decision-making process is transparent and that the information supplied for the assessment is comprehensive and reliable, it is necessary to provide that authorities and/or bodies with relevant environmental responsibilities and the public are to be consulted during the assessment of plans and programmes.

3.3 While the Welsh Assembly Government says public consultation is a vital part of its sustainable development agenda, and issues guidance to Local Authorities and through its NHS arm on adhering to Consultation Codes, its own internal practice is erratic. Recent evidence to the All Wales Convention⁴ traces unfulfilled promises to produce something comparable to Westminster's Consultation Code.

3.4 At present, WAG's internal *Consultation Guidance* (from the Strategic Policy Unit) says "Consultation and participation is not an option. It is a statutory duty." It refers to the Voluntary Sector Scheme under the Government of Wales Act, which "sets out the formal basis for participation". A review by the Independent Commission on the VSS wanted a good practice guide along lines of Westminster's Code, but WAG has done nothing since this 2004 recommendation. Hence to guarantee quality in how WAG consults and takes account of the public's views, we have to rely on the legal right to good administration, says the evidence to the Convention.

3.5 This is relevant because WAG has contracted out the analysis of responses to this consultation, potentially to the same consultants contracted to draw up this inadequate SEA/SA. The consultants then have no guidance on quality, independence and completeness of reporting, as under the Westminster Code and the WAG officials duck responsibility under Civil Service codes. The way the SEA/SA authors allowed WAG to restrict the options in contravention of the SEA Regs (requiring consideration of reasonable alternatives – see below) shows the deficits inherent in this divided responsibility.

3.6 We note the way in which WAG has identified 'consultation bodies' for the purpose of the Directive's Article 6 (3):

Member States shall designate the authorities and/or bodies to be consulted which, by reason of their specific environmental responsibilities, are likely to be concerned by the environmental effects of implementing plans and programmes.

3.7 WAG chose three 'business' groups, Cylch, Wales CBI and Wales Co-op Centre. All may be "concerned" over the Waste Strategy, but not, primarily, over the "environmental effects". Cylch has some claim here, having promoted 'zero waste' partly on environmental grounds, but not the other two. We as UKWIN do have a claim, but not nearly as strong as Friends of the Earth and in particular FoE Cymru who have engaged with Welsh waste planning for years. It is astounding that WAG implements the Directive regarding 'consultation bodies' in this biased manner.

3.8 Because of these deficits, we agree with Friends of the Earth that the Strategy needs to go through a further stage of revision that should be conducted under the auspices of the National Assembly itself.

4.0 Need for Carbon footprint as indicator

4.1 Meeting the eco-footprint indicator appears largely dependent on reducing waste through reducing consumption, yet policies to do this have to range beyond waste strategy. We argue that Carbon Footprint should therefore be a key indicator, with appropriate targets; this indicator is understood by the public and officialdom, there are ways to measure it on a community scale (town/city) and could better motivate people to re-use, recycle and prefer recyclate-based goods. The WRAP programme (supported by WAG) has emphasised the associated carbon savings⁵. We know that the EA's methodology (WRATE) does not assess properly assess carbon emissions

from incineration⁶, but the international IPCC methodology is implemented in other software tools.

4.2 The head of waste strategy at Defra, Daniel Instone told *LetsRecycle's* 'Collection Conference' on 19 May: "waste is going to play a very important part in how we take forward these carbon budgets." He envisaged a greater role for carbon measurement in the waste sector, in response to criticisms that key policy instruments for achieving carbon reduction, such as emissions reduction and trading, appeared to overlook the sector⁷. It would be a mistake for Wales to similarly take off focus on carbon reduction in the waste sector, just when Defra is switching to greater focus on it.

4.3 The high-profile report from the Committee on Climate Change (1 Dec 2008) identified anaerobic digestion and mechanical biological treatment technologies for the waste sector as having "significant potential" to reduce greenhouse gas emissions in the UK. The report '*Building a Low Carbon Economy*', lays out how the UK can reach targets to achieve an overall 80% reduction in greenhouse gas emissions by 2050. It outlines three carbon budgets - for the periods 2008-12, 2013-17 and 2018-22 as starting towards the 2050 goal, judging that the waste sector could achieve emissions reductions of up to six MtCO_{2e}. 75% of this would come from AD and MBT technology, plus increased recycling rates as a "cost-effective" option for reducing emissions.

4.4 Already Wales has lost focus on carbon in waste policy, by assuming climate impacts are captured in the WRATE assessments. This is mistaken⁸ because, in the first place, WRATE omits biogenic CO₂ emitted via incineration. This is permitted only for the restricted Kyoto budgeting - the IPCC specifies:

If incineration of waste is used for energy purposes, both fossil and biogenic CO₂ emissions should be estimated⁹

4.5 That this is the appropriate approach was confirmed in a strongly worded editorial by Ari Rabl in the International Journal of Life Cycle Assessment¹⁰:

In a part of the LCA community, a special convention has been established according to which CO₂ emissions need not be counted if emitted by biomass. For example, many studies on waste incineration do not take into account CO₂ from biomass within the incinerated waste, arguing that the creation of biomass has removed as much CO₂ as is emitted during its combustion... The logic of such a practice would imply absurd conclusions, e.g. that the benefit of adding carbon capture and sequestration (CCS) to a biomass fuelled power plant would not be evaluated because that CO₂ is totally omitted from the analysis. By explicitly counting CO₂ at each stage, the analysis is consistent with the 'polluter pays' principle and the Kyoto rules which imply that each greenhouse gas contribution (positive or negative) should be allocated to the causing agent.

4.6 Additionally, the Environment Agency's WRATE software is not (yet) consistent with their guidance on generating power from Biomass. Their *Biomass: Carbon Sink or Carbon Sinner* points out the need to take into account emissions from transport, nitrogen fertilizer production, land use changes and conversion efficiency, because these could increase the biomass total to as much or more than the emissions from gas-fired power. For example, short-rotation coppice woodchips for electricity would emit 35-85% fossil GHGs compared with gas CCTG per kWh. Yet WRATE assumes zero fossil GHGs in biomass. The fossil GHGs released in producing and supplying

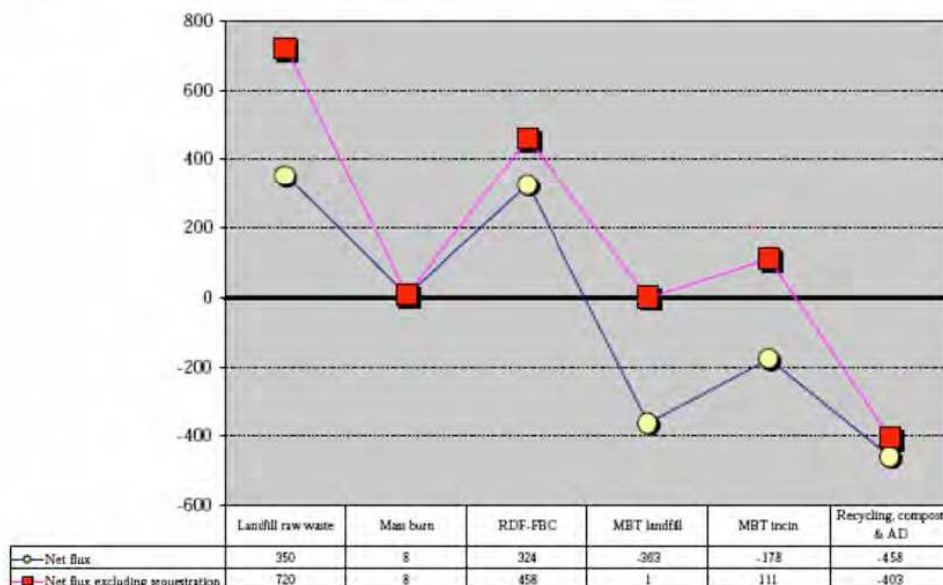
the food that we waste should similarly be included in assessments that claim GHG savings from energy recovered from that waste.

4.7 The same is true of wood wastes that we burn for energy (rather than recycling it or returning it to nature) – in this case proper LCAs include the wood-carbon sequestered long-term in landfill or spread on land as char, a factor ignored by WRATE. The EA has developed its Biomass Environmental Assessment Tool¹¹ to address this deficit in GHG accounting.

4.8 Furthermore, the WRATE tool does not give robust results, validated in comparison with internationally adopted life-cycle analysis. It may work for relative comparisons of incineration options, but fails for comparison with non-thermal alternatives as shown by the very different outcomes of using the ATROPOS model for Ireland’s waste management options (Greenstar¹²). With a similar dispersed settlement pattern and urban-rural mix to Wales, this found that “scenarios using incineration were amongst the poorest performing” while those using MBT were much better.

4.9 A detailed review by AEAT¹³ for the European Commission similarly found that MBT when sequestration is taken into account performs much better than energy from waste. The graph shows their findings when landfill gas is allowed for and incineration is competing with wind power (or other renewables) as applies when incineration competes for subsidy with renewables, as in the UK. The lower line applies when Carbon sequestration is included (which WRATE fails to do), when MBT to landfill (Col.4) comes out much better than incineration (Col.2) including MBT output to incinerators (Col.5) and almost as good as recycling/composting (Col.6). WRATE takes the landfill comparator as Col.1 (raw waste) which the Landfill Directive excludes.

Figure 21: Overall net greenhouse gas fluxes from waste management options – EU-average landfill gas collection and wind electricity replaced kg CO2 eq/tonne MSW.



4.10 In summary, carbon budgets and targets are an issue for waste management, which has been wrongly ignored in the present strategy. Wales needs not only to retain the carbon indicator in waste for Welsh accounting and consistency with

England, but also to explicitly count CO₂ at each stage for consistency with the 'polluter pays' principle and the Kyoto rules.

5.0 Strategic and technical advantages of BioGas-from-Waste

5.1 The National Grid's report looked at the use of biodegradable waste streams including sewage, food and wood to make biogas for injection into the national gas pipelines. This is already widespread in Europe (Germany, France, Austria) and parts of the US. The report summarises a major study for the NGC by analysts Ernst & Young and calculated that biogas could offer 18% of the UK's total gas consumption, 48% total domestic gas demand and 10% of the overall UK energy demand. Such a scenario would require £30 billion of capital expenditure, the report suggests, but adds that £20 billion investment is needed anyway in the UK's waste management infrastructure.

5.2 A small quantity of energy-rich biogas is already being made around the country in a growing network of anaerobic digestion facilities. Biogas is also being produced from many of the nation's landfill sites. United Utilities, the UK's largest listed water company recently announced plans to sell surplus sewage gas to the National Grid. However, at the moment almost all biogas from AD and sewage is burned to generate electricity at efficiency levels of around 30%. If the gas was to be injected into the gas grid and delivered straight into consumers' homes, it would be utilised for heating at efficiency rates in excess of 90%.

5.3 The "valuable resource" of biomethane just requires removal of contaminants using established technology. The main hurdle, says NGC, is getting the right incentives in place to drive biogas injection, rather than electricity generation which is driven by current 'renewables' subsidies. Use of gas through the grid would more than double the contribution of existing renewable gas sources to the renewables target, and negotiations are in process with Defra to set a rational structure for heat and power subsidies.

5.4 To exploit biomass as government desires, transporting and storing large quantities of biomass at consumers' premises has significant logistic difficulties. Alternatively, the NGC report points out, district heating networks to bring low carbon heat to existing premises mean costly street-works with major disruption. Gasification of the biomass at a few central locations, with injection of the gas into the grid would remove these logistical issues. Seasonally varying demand requires substantial storage capacity, not available in the old-time coal cellars that people filled with cheaper summer coal supplies.

5.5 Wales needs to plan for cutting down our use of fossil gas by some figure like the 80% overall target. Retrofitting homes on the gas grid with alternative heat solutions would be highly costly and time consuming in comparison with renewable gas. For other homes the choice between extending the gas-grid, direct biomass supply or district heating would have to be made. If fast-growing algae prove to be a practical source of biomass (using power station waste heat) cultivation could be phased to meet the seasonal demand cycle and Wales might look forward to biogas replacing all of our domestic demand.

5.6 WAG is currently grant-aiding AD plants which burn the gas on-site for electricity - these waste the heat (that not used in heating the waste, especially in the summer). Thus WAG is subsidising a low-efficiency use for the biogas, when they could instead

grant-aid technology for supply to the National Grid. They have similarly agreed to subsidise large scale incineration - 25% of the gate fee for Prosiect Gwyrdd with 20-25% efficient electricity generation (no condition set on heat use) – but not to support MBT which could include supply of biogas to the Grid.

5.7 The further advantage of Gas-from-Waste is its avoidance of the dioxins produced in thermal treatments of mixed wastes, in compliance with the Persistent Organic Pollutants Convention and POPs Regulations 2007, which require “*priority consideration*” to processes which do not generate persistent organic pollutants. Indeed, continuing WAG’s bias to combustion processes would breach this legislation.

6.0 The Strategic Environmental Assessment fails to meet legal requirements

6.1 SEA as European legislation has priority over the fashionable, skimpy Sustainability Appraisal (*The Sustainability Appraisal of the Wales Waste Strategy: Sustainability Appraisal Report*). SEA is aimed to ensure the development of a proper factual basis for policies, that they meet legislative requirements, that the policies are coherent and sound, and to assess reasonable alternatives to the ‘preferred’ strategy. The dummed-down Sustainability Appraisal (SEA/SA) compiled by ERM with its two Appendixes admits to having the character of “scoping” and being “compiled within a very short timeframe”. It fails to meet these requirements, primarily because it was commissioned late in the process to support already-chosen policies. It does not meet the ODPM/WAG guidance on SEA. It claims

“compliance with the SEA Directive and Welsh Assembly Government SEA/SA Guidance. It represents a key output of the Appraisal process and is put forward for 12 weeks’ consultation from 29th April 2009”.

We pick out some important deficiencies in respect to SEA requirements, showing the claim of ‘compliance’ is unfounded.

6.2 Requirements of the SEA Directive and Regulations

The Environmental Assessment of Plans and Programmes (Wales) Regulations 2004 (Welsh Statutory Instrument 2004 No. 1656 (W.170)) implements the SEA Directive. The SEA fails to comply adequately with the following in material respects:

Reg. 12 (2) The report must identify, describe and evaluate the likely significant effects on the environment of -

(a) implementing the plan or programme; and

(b) reasonable alternatives, taking into account the objectives and the geographical scope of the plan or programme.

6.2.1 We illustrate (a) in respect of incinerator ash. Fly ash is hazardous waste as much bottom ash (IBA) may also be. To handle this waste requires disposal routes in each region of Wales (required for Regional Self-sufficiency), probably hazardous waste landfills, to take 20 000 t/yr flyash and 100 000t/yr IBA. The SA/SEA makes no mention of ash, on which detail is given below.

6.2.2 To illustrate (b), Mechanical & Biological Treatments (MBT) with outputs used on land or sent to landfill, are widely used as alternative residual waste treatment to incineration, yet not covered explicitly or in the options. MBT is another taboo word for the writers, yet MBT is a “reasonable alternative’ for purposes of the Directive.

6.2.3 Let us cite the Waste assessment for Ireland, which includes MBT options and finds them better environmentally than incineration. Ireland’s urban and rural areas

and population makes its scope similar to Wales, while the overall objectives are similar to the Welsh ones:

- ***promote sustainable development***
- ***reduce Wales' ecological footprint; and***
- ***reduce the impact of climate change.***

Ireland's is concerned with the Carbon footprint, but that is 50% of the ecological footprint, and the latter fits just as well in the methodology.

6.2.4 We understand that WAG did tell the SA/SEA team to exclude sending MBT outputs to land on policy/political grounds, but in the final Plan WAG officials rescinded this as incompatible with their acceptance of WRAP's Quality Protocols and requirements for 'science based' decision-making. This late change alone makes the SEA and draft Plan defective.

6.2.5 It is proposed (in "*Future Directions...*") that the question of a ban on MBT outputs to land is revisited for 2016 but without reason. Such prejudice-based decision-making on this issue is unacceptable – it is present policy to perform BPEO assessment if there are concerns about particular waste streams. The prejudice of WAG officials against MBT cost Caerphilly council dearly in forcing them to abandon a proposed Biffa Waste contract; it is similarly costing Sterecycle dearly in forcing them to design an RDF + incinerator project rather than use their fibre-output on land as permitted in South Yorkshire. If WAG maintains that there are problems to justify suspending approval, SEA Reg 12(2) requires them to be described.

6.3 Requirements for information under Schedule 2 of the SEA Regs

- 4. Any existing environmental problems which are relevant to the plan or programme including...*
- 5. The environmental protection objectives, established at international, Community or Member State level, which are relevant to the plan or programme*
- 6. Likely effects on (c) human health (f) soil;*
- 7. The measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan or programme.*
- 8. An outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties encountered in compiling the required information.*

We specify material omissions under each heading:

6.3.1 Failure to take into account the new Waste Framework Directive

While this was adopted only in October 2008, its terms were well-known months, even a year earlier. The Plan claims to be driven by the 2008 WFD, But the SEA/SA report just mentions "as amended by Directive 2008/98/EC (p.26) and says nothing about the changed waste hierarchy. In particular, it ignores the 2008 WFD's classification of incineration as "disposal" at the base of the hierarchy, equivalent to disposal by landfill, and its restriction to 'energy recovery' only those incineration processes reaching a specified formula/standard.

6.3.2 Failure to address POPs

The POPs Convention is incorporated into European law by Council Regulation (EC) 850/2004 and implemented in Wales through the Persistent Organic Pollutants Regulations 2007. These regulations require that "*priority consideration*" be given to

processes which do not generate persistent organic pollutants, which include dioxins/furans produced in incinerator ash. Yet no mention is made.

6.3.3 Failure to address significant health effects with public involvement

The HIA is poor, relying on the Defra study of mid-2004, and ignoring many technical papers since that time, which identify ultrafine particulates from incinerators that can carry toxic components, eg: Cormier et al. "Origin and Health Impacts of Emissions of Toxic By-Products and Fine particles from Combustion..." *Environmental Health Perspectives* Volume 114. It also ignores other recent studies of emissions from incinerators during start-up or upset conditions that show far higher levels of dioxins are emitted eg. Tejima et al. Characteristics of dioxin emissions at startup and shutdown of MSW incinerators, *Chemosphere* 66 (2007) 1123–1130. Dioxins and toxic metals from incinerators are cumulative in the soil etc. around incinerators – the HIA does not cover the likely effects on (f) soil. This poor HIA review is also a technocratic desk study, failing to meet Welsh policy for a participative Health Impact Assessment (*Developing Health Impact Assessment in Wales* (WAG 1999)). It does not meet Reg. 12(2) for information on likely significant effects.

6.3.4 Failure to provide rationale for framing options

The options were developed in a non-transparent way by WAG officials, as stated in 7.2.2, involving "environmental sustainability but also wider economic and social considerations", and no structured process is described nor any reasoned explanation given. The ecological footprint is mentioned only in one, carbon footprint not at all. There is no explanation for selecting the dates 2025 and 2050 (EU commitments are for 2020 and cover carbon). WAG wants to claim "high recycling" which would be 80% (or more) under the WLGA/Eunomia study, yet 70% was chosen (later reduced to 63%) without reason. No explanation of how they chose the (impractical) maximum 5% to landfill. The consultants ARUP recommended targets to reduce "both the total volume of waste arising in the municipal waste stream and the total volume of household waste generated per capita", but there's no reasoning on why WAG officials ignored the second.

6.3.5 Failure to justify exclusion of an MBT with outputs to land option

There is no justification for excluding MBT with outputs to land. The late change to the Strategy that accepted the WRAP protocols should cover this was not taken into account in the SEA/SA.

6.3.6 Failure to consider domestic gas-from-waste

There is no mention of gas-from-waste for domestic use, which the National Grid Company is promoting, with distinct benefits over incineration.

6.4 Basic Options defined by WAG Consultants are not covered by the SEA

6.4.1 These policy options in the Waste area were disclosed in papers of the Wales Commission on Climate Change (June 2008) as reproduced below. Note in these options that MBT plant stabilising waste before disposal to landfill is 'mature' technology and that the increase of CO₂ emissions particularly from "mass burn incineration" is an issue, said to be relatively small if "energy recovery" at presumed high efficiency levels is achieved. Table 8 (not reproduced) says these options give zero abatement of greenhouse gases, above those caused by the Landfill Directive. Note too that the target date is 2020, while little can be said about options post 2020.

6.4.2 Table 6 summarises the consultants' recommendation for all five alternative waste options, though not biogas-from-waste which they were ignorant of. The point here is the options of MBT plant producing compost and MBT plant stabilising waste pre-landfill were not taken for SEA/SA appraisal subsequently in late summer of 2008, on the excuse that WAG officials were still developing options. Secondly that the final SEA/SA does not admit these options had been considered and dropped – and of course fails to give reasons. Moreover, the SEA/SA fails to mention the entire issue mentioned by the consultants of CO2 increased by incineration (depending on 'energy recovery' but as we explain below, it would be wrong to assume that incinerators in Wales could meet the energy recovery standard of the Directive and still less that they could meet the 60% thermal efficiency minimum target).

Appendix 5: Waste

Table 6 Full list of options for the waste sector

Policy option
Promotion of alternative waste treatment options to 2020
Ban disposal of biodegradable waste in landfill by 2040

Table 7 Definition of options, state of deployment for the waste sector

Ref	Policy Option	Technical measure	State of deployment	Other issues
W1	Promotion of alternative waste treatment options to 2020	Green waste composting	Newly deployed	Could be some increase in CO2 emissions from waste sector particularly if mass burn incineration is the alternative route for waste disposal - but should be relatively small net increase due to energy recovery from plant
		Anaerobic digestion of biowaste	Newly deployed	
		Energy from waste	Mature	
		MBT plant producing RDF for incineration and compost	Mature	
		MBT plant stabilising waste before disposal to landfill	Mature	
W2	Ban disposal of biodegradable waste in landfill by 2040	Alternative treatment technologies	Some matures/other Newly deployed	

7.0 Local Small CHP Incinerators – Problematic and Unproven

7.1 The failure of CHP is shown by GE's 500MWe gas-fired power station at Baglan, promoted by the WDA for a modern 'energy park' and offering "competitive electricity and steam to the industrial and commercial businesses". This has found no significant heat users since the 2003 start - no industrial users of cheap heat have been attracted to set up nearby (Sofidel paper mill declined; another wasteful generator, Abernedd Power proposes to set up next to it) and no moves made to fund a heat network to supply the nearby Sandfields estate. The Baglan failure disproves claims as Covanta makes for their 800MW incinerator at Merthyr (promoted by WAG's International Business Wales) that major industrial energy users will be attracted.

7.2 In the UK generally, waste incinerators have failed to be genuine CHP despite exhortation. DEFRA admitted (ENDS Report 2006) that only one plant in the UK would meet the efficiency criteria set as 'recovery' threshold in the revised Waste Framework Directive. This exception is Veolia's Sheffield incinerator which, thanks to a district-heating scheme, would score a 61% efficiency rating. In Europe, by contrast, the Confederation of European Waste to Energy Plants (Reimann 2005) found that around half of the 97 plants reviewed would meet or, in many cases, comfortably exceed the threshold.

7.3 AEAT in work for government has identified hundreds of industrial sites with sufficient heat loads for CHP incinerators (<http://www.industrialheatmap.com/>), yet WAG has not prioritised the ~40 sites in Wales. Instead it promoted Regional Waste Plans that identified all B1-industrial sites as potentially available for waste incinerators. The applications that have resulted are unrelated to heat users and include no tangible proposals to set up heat supply networks. For example the Cardiff and Barry proposals (Viridor, Sterecycle, BioGen) talk of the possibility of supplying heat, but offer no practical scheme for funding and delivery. They talk of supplying new housing development, but do not say how they would meet the highly variable demand cycle – that they need to operate in tandem with peak and standby boilers, in order to provide back up through breakdown and maintenance downtimes.

7.4 The cost and logistics of laying heat pipes @ £1 million per km – more through developed areas – have to be recognised. The only way to get "high efficiency" CHP is to gear operations to the variable heat load rather than electricity generation, yet all applicants propose to operate continuously at full power. Operating to meet the daily demand cycle is less efficient and MSW cannot be stored to meet weekly and monthly variations (conversion to RDF is more flexible in this way, but not for the full winter peak). The Renewable Obligation system rewards continuous operation to produce electricity; whether the long-postponed RO for heat will advantage peaking is unlikely.

7.5 If WAG were serious about "high efficiency CHP", one would have expected them to commission a study. In default, we can turn to Pöyry's report for DECC (2009) *The potential and costs of district heating networks*¹⁴, which assesses the barriers to investment and deployment and finds the prospects for commercially viable district heating technologies look poor; incentives plus public project (low) rates-of-return are needed. Schemes work more effectively at large scale, for which cases there is sufficient power generation within 15km of major conurbations to deliver waste heat, as for Cardiff and Barry (Aberthaw PS), Newport (Usk PS), Swansea (GE Baglan). A scheme of similar size to Vienna's (270 000 people) could cost ~£1.5bn to construct and connect. So there is no point in siting CHP incinerators in Welsh cities.

7.6 The moderate-sized BioGen (Energos) incinerator proposed for Barry (80 000t waste/yr; ~30MW heat) would supply all Barry's 18 000 homes (if fitted with cost-effective home insulation). Yet the neighbouring docks development that they might actually supply numbers around 1500 homes, half already constructed. With existing Barry homes on the gas mains, there's no incentive say Pöyry, to switch to heat mains that might be laid. For smaller Welsh towns around 5000 homes, building perhaps a few hundred new homes, the Shetlands CHP plant is proposed as the model. This is sized at 26 000t/yr (the smallest in the UKWIN list www.ukwin.org.uk) and heats some of Lerwick's 3000 homes. After 10 years, 1000 of these have connected to a basic boiler of 8.5MW (with older boilers totalling 6MW as back-up). Lerwick is of course colder and more exposed than Welsh towns and lacks town gas. 2MW would suffice for 1000 of the new homes on Barry dock and 5MW would be ambitious for the 5000-

house town. The Energos basic module (40 000t/yr) gives three times that capacity. Lerwick's is also way too big. Pöyry's model for appropriately lower power CHP from waste is to use anaerobic digestion (AD) and feed a gas engine (minimum 1.5MWth).

7.7 Successful incinerator-based CHP schemes in Europe have had strong public sector involvement. There's no indication that would be coming in Barry or any other urban areas of Wales. Pöyry's Community modelling concludes there is little economic potential to penetrate the existing housing stock (economic only for electricity-heated homes), but estimates a few % of total domestic heat load could realistically be met given social subsidies. With retrofitting not economic (Pöyry gives capital cost ~ £10 000/dwelling, less for flats etc.), the Waste Strategy cannot presume on any decision to fund incinerator-based heat networks. Even if some heat users were initially signed up for a new incinerator with intentions to gradually extend connections over decades (as Lerwick), the take-off would be far below capacity for more than a decade and therefore efficiency would be far below optimum. The winter/summer variation (not considered by Pöyry) means still further inefficiency. The proposal in the Strategy for a minimum of 60% energy efficiency appears unattainable for any plausible incinerator project supplying domestic properties. Pöyry remark in respect of major public users such as hospitals that they tend to be tied by long-term contracts.

7.8 Heat and Power plants tend to produce a lot of dioxins/furans in the heat exchanger, as they cannot use a quench to pass the gases quickly through the critical 400°C to 200°C range. The UNEP toolkit's closest example - mixed biomass firing – produces 50 times more than with coal firing¹⁵. Of course, most of the biomass dioxins are filtered out because the plants have to meet the Waste Incineration Regulations. But as stated elsewhere, the very production has to be preferentially avoided under the POPs legislation. As that can be done by a quench for an electricity-only incinerator, this must be preferred over CHP. If heat is required from the waste, the alternative above of gasification via AD and feeding a gas engine is to be preferred.

8.0 Issue of Ash from Incinerators

8.1 As mentioned, the change to say ash re-use can be considered as "recycling" was a political deal between WAG and the local authorities in autumn 2008 (Letter from Jane Davidson to Cllr Aled Roberts, WLGA, 15 December 2008¹⁶). The lobby for such a change in England was turned down¹⁷. The change in Wales has not been subject to assessment in the SEA/SA or anywhere, nor is it disclosed and offered for consultation. The pre-deal exclusion of ash was undoubtedly an option that was considered. The ER is clearly defective in not saying this and giving reasons for not following it.

8.2 One can ask, how significant was this change? The December deal was followed by lobbying to secure that the incineration cap was "net", meaning that the 30% is really 37% of total MSW, as spelt out in *Future Directions...* In comparison, the Scottish Waste Strategy proposals¹⁸ have the real 70% recycling target and cap incineration at 25%. So the numerical changes reduce recycling proportionally by 10% below the Scots and increase incineration to 50% above theirs, turning Wales's claim to leadership in Waste Strategy into transparent fiction. Publicising the 70%:30% headline, when the real split is 63%:37% is the kind of trickery over headline targets that can be expected of corrupt or failing states. The failure to mention the very

significant change counter to sustainability flouts Wales's commitment to transparency in governance.

8.3 Welsh officials have promoted the industry myth that incinerator ash is "inert"

8.3.1 'Wise about Waste' (2002) claimed the: *"composition of ash is well understood"* as an advantage of mass burn incineration. Recently WAG declared in the 2007 Consultation on the Regional Waste Plans First Review:

"The...bottom ash is inert, and can be used as a construction material for building roads or as a substitute for aggregates."

8.3.2 The Environment Agency denies the 'inert' tag, defining incinerator bottom (or grate) ash (IBA) for interim purposes as 'non-hazardous'. However, in international tests IBA has generally been found to be ecotoxic and tests in the UK find samples that should be classed as hazardous waste (Annex). Even when toxic metals etc. in a sample do not reach 'hazardous' levels, these chemicals do leach out into the environment or reach the environment in blown dust. The Minister termed her proposal to include it for recycling in Wales as a "concession", but in reality it shows that interests in promoting incineration are over-riding environmental protection. Despite being told, her officials refuse to face up to the issue that incinerator bottom ash is to be treated as toxic waste and wrote condescendingly "I am sure you will agree that if incinerators are used that it is better to recycle their bottom ash than not" (29 January 2009 to FOE Cymru).

8.3.3 Yet the United Nations Environment Programme 2005 report¹⁹ warned against using incinerator ash in engineering works, saying

"Both fly ash and bottom ash contain chemical constituents that pose potential serious risks to operating personnel and the public. The chemical constituents of concern include heavy metals, dioxins, and furans".

Article 9 of the Waste Incineration Directive 2000/76/EC requires:

Prior to determining the routes for the disposal or recycling of the residues from incineration and co-incineration plants, appropriate tests shall be carried out to establish the physical and chemical characteristics and the polluting potential of the different incineration residues. The analysis shall concern the total soluble fraction and heavy metals soluble fraction.

8.3.4 The Welsh claims that bottom ash is inert, readily recyclable, or even well understood were denying the international experience that shows bottom ash from modern incinerators is in many cases hazardous waste (see ANNEX: *Toxicity of Incinerator Bottom Ash*). Till mid-2008, the Environment Agency maintained the 'non-hazardous' label, despite a series of tests they agreed with the industry that found a significant fraction of samples to be in the hazardous category. The authoritative ENDS Report²⁰ of March 2009 showed the EA has conceded this and is starting to require testing. But the proposed Welsh strategy continued to ignore the issue.

8.4 How important is the Incinerator Ash Issue?

We maintain it is of critical importance for the strategy, in both financial and environmental terms. There is no argument that incinerator flyash caught in filter systems is hazardous waste, which currently goes for disposal in landfill.

8.4.1 There is no hazardous waste landfill in any of the Welsh regions, nor is any proposed in the three Regional Waste Plans. Nor is there any other disposal route. The production of waste for which no disposal facilities exist in each Welsh region

contravenes the regional self-sufficiency principle and proximity principle; special exemptions are not allowed for large and/or regular wastes that can only be disposed outside the region (see TAN 21 Waste).

8.4.2 The IBA that is hazardous waste (including post-weathering, see Annex) if at the 40% level told to the EA (see ENDS) would amount to 10-12% by mass of the original inputs to the incinerator, additional to the 2-3% flyash. These two ashes exceed the proposed 10% limit landfill (2019/20) of municipal residual waste, and far exceed the 5% limit for 2024/25.

8.4.3 The Strategy proposes to address the lack of landfill for hazardous waste in Wales by saying (p.24) “the landfilling of hazardous waste will be phased out in the medium term” and “a pathway to zero hazardous waste will be a key part of our sector plans”. Producing incinerator ash, whether from MSW combustion or commercial waste combustion (eg. waste wood) is not consistent with this.

8.4.4 When ash below the hazardous threshold is to be used as aggregate, the environmental impact of toxins leaching from that material will have to be assessed for regulatory and planning purposes. The testing and assessment will carry a cost and restrict the use.

8.4.5 Customs & Excise have been taxing incinerator ash as ‘inactive waste’ at ~£2.50 per tonne, but now accept it is not inactive and propose landfill tax on it at the higher rate (currently £40 and rising to £72 per tonne). Such tax would encourage the use of ash in construction (currently only 45% is used, says ENDS), but for the hazardous fraction the landfill tax and fees would rise to £200 or £250 per tonne. Such figures would knock sideways the assessments for WAG’s approval of Prosiect Gwyrdd, for example.

9.0 Flawed (biased) description of Incineration v. Landfill in the SEA

⇒ Energy recovery converts energy stored within the materials to useful energy, thereby reducing demand for fossil fuels. However the original material is effectively ‘lost’ and consequently there remains a demand for more materials to replace them, with associated impacts of extraction, production etc.

⇒ Landfill is the least favourable option. There is no recovery of energy, the landfilled materials are ‘lost’, and landfill releases methane

9.1 Conversion to ‘useful energy’ is very inefficient, 20% or less as practised in the UK; the original material is not ‘lost’, much ~30% by mass remains as ash high in toxins, with immediate or future pollution.

9.2 Landfill is not the ‘least favourable’ but can be BPEO. Methane gas is recovered and should be used beneficially, possibly for recovery of energy. Materials are sequestered with carbon returned to this ‘sink’ rather than released harmfully by incineration. Both are classed as ‘disposal’ at the bottom of the waste hierarchy and proper environmental impact assessments show little difference between them.

9.3 All this is well-known and properly accounted in life-cycle assessments. The faulty description in the SEA could be cover for accepting the WRATE appraisal, without any acknowledgement of its faults and limitations (as 5.B.11 of the ODPM/WAG guidance).

10.0 Deficit of genuine consultation and evidence-based choices

10.1 The SEA Directive under Art 6(2) says

the public shall be given an early and effective opportunity within appropriate time frames to express their opinion on the draft plan or programme and the accompanying environmental report. The public includes relevant non-governmental organisations, such as those promoting environmental protection and other organisations concerned.

10.2 The ER though written in October 2008 was not released for 6 months into 2009, after all decisions had been made. There was a failure to write the SEA in advance of policy determination - as part of the development of policy - in accordance with ODPM/WAG guidance (*A Practical Guide to the Strategic Environmental Assessment Directive* Sept.2005). Instead it was written as a support for policy determined through processes pre-SEA and outside the formal process, specifically the “Future Directions...” draft of October 2007 and negotiations with selected stakeholders leading to changes in this. For example, the 70% recycling figure was fixed not on the basis of evidence, but as “what LAs will accept” (Answer at the Swansea consultation seminar).

11.0 Objectives set in part on political grounds not sustainable development grounds

11.1 As the ODPM/WAG guidance says, Government policies and guidance increasingly require objectives to be based on sustainability considerations, yet the 70% recycling figure was fixed on political grounds as was the classing of incinerator ash used as aggregate as “recycling”, to mean the real recycling figure is only 63%. Similarly, delaying the 70% recycling level till 2025 was based not on what is achievable (relating to current best practice) but on Flanders having taken from the 1970s (WAG’s answer at the Swansea consultation event – see footnote*).

12.0 The SEA process failed to identify problems, including environmental problems

12.1 The ODPM/WAG guidance 5.A.10 talks of “*opportunity to define key issues and improve the SEA objectives. It is important however to look for any potential problems, on the basis of... consultation with the Consultation Bodies and the public*”. Yet major problems are unacknowledged:

- No disposal route for hazardous incinerator ash in each Welsh region, contrary to the Regional self-sufficiency principle (in TAN21 as well as in the Waste Framework Directive)
- the assumption that (all) bottom ash can be recycled is dubious (on UK and international practice)
- no report on the real Carbon footprint using IPCC methodology – instead of the faulty WRATE assessment that does not comply with the Directive Art. 5(3).
- the 10% and 5% landfill targets (defined on political grounds) are not based on data in the SEA and are clearly unsound, when MRF rejects, reprocessor rejects, rejected loads and low CV materials are excluded from incineration and ash that is hazardous waste or otherwise unsuitable as aggregate is included²¹. (Explicit argument on the hazardous waste ash is given above.)

12.2 The ER shows a failure to meet SEA (Wales) Reg 12(2) and ensure that the SEA “identifies, describes and evaluates the likely significant effects on the environment” of the strategy:

- waste of energy and resources in incineration (the market will not deliver high efficiency incineration)
- production of persistent Organic Pollutants in incineration is not covered
- problems in disposal of incinerator ash are ignored

12.3 Schedule 1(d) of the SEA(Wales) Regs requires regard in particular to “environmental problems relevant to the plan or programme”. 5.B.11 of the ODPM/WAG guidance says the Environmental Report must document any difficulties such as uncertainties or limitations in the information underlying both qualitative and quantitative predictions. Assumptions, for instance about underlying trends or details of projects to be developed under the plan or programme, need to be clearly stated.

- how much bottom ash is likely to be ‘hazardous waste’ under the new EA procedures implementing the Waste Incineration Directive (WID) is uncertain, but highly important for disposal routes (and costs). Yet no mention is made.
- though proposed that incinerators are high-efficiency CHP, nowhere is it considered how far efficiency in practice could meet the WFD minimum standard, or what real efficiencies are likely to be based on experience and economics.
- WRATE software cases were used without testing relevance and including Coventry with its fictitious heat user.

We have given detail on the first two bullets elsewhere in this response, showing the SEA assumptions deriving from WAG are highly dubious.

13.0 Faulty presentation in the ER of the aim of ‘zerowaste’

To achieve ‘zero waste’ per se, will require the reduction of all waste arisings and elimination of waste sent to landfill.

13.1 Since incineration *per se* is inefficient, perhaps 20% and certainly well below 100% in energy terms, and it destroys potentially useful materials and it creates waste ash that has to be landfilled, ‘zerowaste’ requires its elimination. There may be ways to convert ash into harmless or even useful products (eg. vitrification) but this takes large amounts of energy and no evidence is given for the practicality or economics of such a process. The ‘zerowaste’ aim should therefore be framed in terms of reducing disposal by landfill and incineration. This follows naturally from the present policy (in Wise About Waste) of *minimising landfill and incineration*.

14.0 Rectify the Inconsistencies of a politically-driven strategy

14.1 The Ban on Mechanical-Biological Treatments (MBT)

14.1.1 The Welsh Local Government Association (WLGA) has complained²² at WAG’s ban of MBT to produce refuse-derived fuel (RDF):

It needs to be noted that currently Flanders has a ban on the building of any new EfW plants but has a problem of how to deal with an additional 600,000 tonnes of waste. Instead they have decided to invest in MBT plants to produce RDF which can be utilised in the existing EfW plants. The Assembly’s ban on MBT is therefore at odds with the policy it is trying to emulate."

14.1.2 One example of WAG’s contradictory policy came with Sterecycle’s 2009 proposal for Cardiff of autoclave treatment of residual waste that outputs a fibre. The

fibre from Sterecycle's Rotherham plant is used in land reclamation, but WAG told them the Cardiff plant would have to incinerate it and hence produce hazardous ash.

14.1.3 Digested sewage sludge is spread on land as standard practice (EU regulations). MBT stabilised biological waste may meet same standards - MBT outputs are similar to sewage sludge for many contaminants²³. WAG had no justification on environmental grounds for banning MBT outputs from landfill, or landspreading if the standards are met.

14.1.4 For present, the Strategy proposes to abide by the quality protocols for use on land but still retains the political threat to re-introduce a ban in 2016. No justification is given for this threat, contrary to environmental principle (and to the good governance aim of providing certainty). Presumably leaving it in the Strategy was a concession to the official long identified with the proposal for a ban – such personal interests have no place in Welsh policy.

14.2 Artificial Financial Bias

14.2.1 The UK Treasury wants landfill to be driven by taxing it out of existence, but is also using it as a tax raising measure (though on introducing the landfill tax, they said it would be revenue-neutral). The taxation levels are now going far beyond the costs attributed to environmental impacts of landfills. In so forcing the disposal of materials unsuitable for incineration – including low calorific value materials that the EU excludes – this taxation policy has potentially high economic and environmental costs, so would operate contrary to BPEO.

14.2.2 The WLGA also objected to WAG's Regional Capital Access Fund excluding *intermediate treatments such as MBT* when it has been established that its use for producing RDF is the most sustainable option. They point out (s.54) that the absolutist presumption that a business case cannot be made *may make procurement exercises anti-competitive*.

14.2.3 Such financial bias not only produces severe market distortion but also severe environmental distortion. It runs counter to basic EU policies for a competitive market with environmental costs and benefits as far as possible included.

14.3 Policies in Wales must be based on Sustainable Development

14.3.1 This requires a level playing field for alternative modes of residual waste disposal, accepting the EU determination of the waste hierarchy and disposal modes. Wales cannot set tax levels, unlike Ireland where an incineration tax is now being proposed. We should argue with Westminster for conversion of the landfill tax into a disposal tax. In the interim, Wales should continue to use the landfill tax receipts returned by Westminster for offsetting part of the landfill tax paid by LAs (and others). WAG should also consider requiring LA-procured waste disposal plants to pay over sums equivalent to a disposal tax annually to WAG (in the case of Prosiect Gwyrdd, deduct from the 25% gate fee that WAG has promised to pay).

14.3.2 In order to restore decision-making based on environmental principles encompassed by Sustainable Development, the Strategy must

- withdraw the political and financial restrictions on MBT
- restore the current policy principle to “minimise disposal by landfill and incineration”
- properly use SEA and BPEO for choosing policy and technical options.

14.3.3 The BPEO process has a well-established pedigree, deriving from the Royal Commission on Environmental Pollution and adopted by government. It is needed to firm up 'sustainability appraisal' as a systematic, evidence-based participative procedure, as well as offering a framework for testing naïve initial assumptions. As described above, it would have been useful in approaching the issue of MBT outputs to land/landfill, of designating environmentally-damaging use of IBA as 'recycling', of assuming incineration is preferable to landfill (whatever the waste stream), and of fiscal distortion of environmentally preferred choices. It could have been the framework for a valid challenge to the Waste Framework Directive's ranking of waste disposal via incineration at the bottom of the hierarchy. Since the Strategy is not overtly challenging that – UK WIN is confident such a challenge would fail – it needs to reaffirm the principle in *Wise About Waste* of minimising both landfill and incineration for disposing residual waste.

ANNEX 1 Toxicity of Incinerator Bottom Ash

The Environment Agency had declared since 2002 that bottom ash is non-hazardous rather than inert (unreactive; leachates contain minimal pollutants). (http://www.seas.columbia.edu/earth/wtert/sofos/UK-env-agency_incin-residue_2002.pdf). However, their "non-hazardous" designation was not scientific but an interim UK decision resulting from industry lobbying and a political decision to promote waste incineration. They required the industry (ESA: Environment Services Association) to conduct tests on IBA samples from 2006, which showed at least 12% of samples would be "hazardous" waste according to the Waste Incineration Directive. Then in mid-2008, the EA concluded its non-hazardous designation could be sustained no longer and that IBA would have to be tested²⁴.

The Environment Agency's Gill Ross-Jones, policy advisor on hazardous wastes wrote to Mr Sam Corp of the ESA on 2 April 2008:

In a principal report on this subject, "Ecotoxicological characterisation of waste – Method development for determining the ecotoxicological (H14) risk criterion", where the WAF loading rate is used as basis for a 'leaching test', this is then as a consequence linked to hazardous property H13 rather than H14. The additional terrestrial ecotoxicity tests are then required to assess H14.

In the case of the report in question, and others, IBA was found to be ecotoxic (H13/H14) by direct testing.

If waste has pH of 11.5 or greater the Environment Agency Technical Guidance WM2 indicates (Environment Agency 2008) that it should be assumed to be corrosive and thus be hazardous waste according to the H8 criteria. The results presented by Vehlow²⁵ in 2002 showed that fresh bottom ash exceeded the hazardous waste pH threshold in every case.

Nevertheless the EA website since mid-2008 maintains that

most IBA is likely to be non-hazardous waste. IBA is classified on the List of Wastes as a 'mirror entry'. This means that IBA must be assessed, and if found to possess any one of the fourteen hazardous properties it would then be classified as a hazardous waste.

Published international studies show that EA's 'non-hazardous' designation does not and did not reflect the true state of knowledge of bottom ash. For example, Lapa et al.²⁶ found that MSW incineration bottom ashes collected in five countries (Belgium, France, Germany, Italy and the United Kingdom) are ecotoxic. Their study within the EC Valomat project concluded:

“all bottom ashes should be classified as ecotoxic materials.”

Both the solid phase and the leachate of MSWI bottom ash were considered as toxic from bioassays²⁷. These are just two of many studies in the peer-reviewed literature that reached similar conclusions.

The Dutch Government recently developed tighter standards - the ‘Dutch Building Materials Decree’ regards bottom ash as a special category that requires isolation precautions before use to avoid the leaching of heavy metals from construction materials²⁸.

Treatment by Maturation

The Waste Incineration BREF (European Commission 2006)(p 398) says:

The bottom ash pH may decrease after the combustion phase by ageing (see Section 4.6.6). The pH increase may be critical; in particular, as lead is amphoteric it can be dissolved at pH 11 – 12 and then be leached.

Vehlow described how under the German LAGA memorandum

bottom ashes have to be stored for 12 weeks prior to utilisation in road construction. During this time the uptake of CO₂ from the air converts the earth-alkali oxides into carbonates and neutralises part of the alkalinity. Hence aged bottom ashes establish a pH of about 10–11 in the DEV S4 test.

UK incinerator operators generally ‘carbonate’ their bottom ash to reduce the pH, by leaving it exposed to air to mature, partially by reaction with carbon dioxide in the air and partially by flushing with rainwater. Whilst the high pH of the ash can be reduced in this way, it takes time and generates leachate with high levels of contamination.

Presence of zinc in IBA as an oxide or chloride

The Environment Agency claims on its website (Note 5) that zinc in IBA is “*likely to be in the form of a benign complex mineral rather than as ecotoxic zinc oxide*”²⁹. They give no supporting references and conceded at a recent meeting that the claim cannot be sustained.

There is direct evidence that zinc in incinerator bottom ash is largely in the form of oxides and chlorides. The “*International Ash Working Group*” said of zinc³⁰:

“In the combustion chamber, zinc can either be transformed into an oxide or a chloride (Borchers, 1989). Due to the oxidative nature of the burn, the first reaction will be an almost complete oxidation. The second step, chlorination, is a relatively slow process. Since a substantial amount of zinc is already present in the waste in the oxide form, the conversion to ZnCl₂ will be limited.”

The Environment Agency “*Guidance for waste destined for disposal in landfills*” confirms³¹:

Parameters which vary in a waste stream, so that the waste is sometimes suitable for one class of landfill, and sometimes for another. For example, calcium oxide content may sometimes be below 10%, and sometimes above: so the waste must sometimes be consigned to a non-hazardous site and sometimes to a hazardous one.

¹ www.nationalgrid.com/NR/rdonlyres/9122AEBA-5E50-43CA-81E5-8FD98C2CA4EC/32182/renewablegasWPfinal1.pdf

² WAG Approval of the business case and subsidy for Prosiect Gwyrdd, 27 Jan. 2009:

New funding boost for next generation energy-from-waste plant in south Wales
http://newydd.cymru.gov.uk/location/south_east_wales/latestnews/2900946/?lang=en&ts=1

The Minister depicted Prosiect Gwyrdd as "producing much needed energy" that would "use waste in the best possible way", despite the consortium claiming their Business case for procuring a 'solution' for residual waste is technology-neutral (www.prosiectgwyrdd.gov.uk)

³ SEA (Wales) Regs 2004, The Environmental Assessment of Plans and Programmes (Wales) Regulations 2004, SI 2004/1656 (W.170)

⁴ Llais Cymru 2009, *Citizen Engagement for Wales: A Practical Proposal*, Evidence For the All Wales Convention (allwalesconvention.org/), January 2009, www.cynefynywerin.org.uk

⁵ WRAP's specialist review of international studies "*Environmental Benefits of Recycling*" 2008 found

- *In the vast majority of cases, the recycling of materials has greater environmental benefits than incineration or landfill.*
- *The UK's current recycling of these materials saves 18 million tonnes of CO₂ equivalent greenhouse gases per year, compared to applying the current mix of landfill and incineration with energy recovery to the same materials.*

The Waste Strategy 2007 for England similarly found recycling makes a strong positive contribution to reducing climate change impacts, while energy from waste incineration is, at best, slightly positive.

⁶ This is clearly shown for waste wood which WRATE says can be incinerated with no CO₂, while in fact the bio-CO₂ all goes immediately into the atmosphere, whereas alternative use on land has slow release, some delayed for decades or recycled into biology, and alternative burying in landfill sequesters the ~30% lignin-carbon indefinitely.

⁷ www.letsrecycle.com/do/ecco.py/view_item?listid=37&listcatid=5292&listitemid=52037

⁸ Friends of the Earth Cymru put this argument in their Feb. 2009 response to WAG's consultation on *Climate change strategy – High level Policy Statement*

⁹ Fossil CO₂ should be included in national emissions under Energy Sector while biogenic CO₂ should be reported as an information item also in the Energy Sector: *IPCC Guidelines for National Greenhouse Gas Inventories - Volume 5 Waste*. 2006.

¹⁰ Rabl, A., et al., *Editorial - How to Account for CO₂ Emissions from Biomass in an LCA*. International Journal of Life Cycle Assessment, 2007. **12**(5): p. 281.

¹¹ BEAT2 - available free at www.biomassenergycentre.org.uk/BEAT

¹² Greenstar, 2008 *Meeting Ireland's Waste Targets - the Role of MBT*, Final report, Eunomia Research & Consulting and TOBIN Consulting Engineers, http://www.greenstar.ie/docs/Eunomia_MBT.pdf

¹³ AEAT 2001, *Waste Management Options and Climate Change: Final Report for DG Environment* <http://ec.europa.eu/environment/waste/studies/pdf/climate_change.pdf>

¹⁴ DECC 2009 *The potential and costs of district heating networks*, report by Pöyry Energy Consulting and Faber Maunsell, April 2009 <www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/distributed_en_heat/district_heat/district_heat.aspx>

¹⁵ UNEP 2005, Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases Edition 2.1. 05, United National Environment Programme: Geneva.

¹⁶ "*the Future Directions paper includes concessions on ...inclusion of incinerator bottom ash towards recycling targets...*" (letter from Jane Davidson to Cllr Aled Roberts WLGA, 15 Dec.2008)

See also WLGA (2008). Minutes for the meeting of the Welsh Local Government Association Council – Friday 28th November 2008 *Waste: Targets Procurement and Finance* (Item 5)

¹⁷ *Why are incinerator residues not counted in the recycling/composting indicator?*

"Government has considered this issue very carefully and has decided to maintain its position on incinerator bottom ash, that is, incinerator residues and its components such as glass and metals are excluded for the purposes of calculating waste performance indicators. Government's aim is to encourage a movement up the waste hierarchy with a view to achieving a more sustainable approach to waste management, including encouraging the segregation and collection of the various components of household waste for recovery. The recovery of materials from incinerator residues is not consistent with these aims." <www.defra.gov.uk/environment/localgovindicators/documents/laa/laa-qanda.Pdf>

¹⁸ <http://www.scotland.gov.uk/Topics/Environment/waste-and-pollution/Waste-1>

¹⁹ UNEP and Calrecovery Inc, 2005 www.unep.or.jp/letc/Publications/spc/Solid_Waste_Management

²⁰ ENDS 2009: Confusion over status of incinerator bottom ash ENDS Report 410, Mar '09, pp 23-24

²¹ "*Future Directions...*" proposes the Landfill Allowances Scheme (Wales) Regulations 2004 be amended to reflect maximum municipal waste landfill limits of: 10% of total municipal waste in 2019-20; and 5% of total municipal waste in 2024-25. It says these targets will apply to each individual local authority and that "*it is important that all fractions of municipal waste landfilled are counted against these targets – for example, the following fractions must be included if landfilled: material recycling facility (MRF) rejects, reprocessor rejects, rejected loads, hazardous incinerator fly ash*".

²² WLGA 2008, Response to WAG Paper 'Future Directions for Municipal Waste Management in Wales' March 2008, s.73

²³ ENDS Report 2008, *Spreading MBT output on farmland goes on trial*. Environmental Data Services, 2008(406): p. 20-21

²⁴ Not all Regional Officers were aware of this in March 2008: *Classification of Incinerator Bottom Ash* (updated 29 Nov. 2008) <http://www.environment-agency.gov.uk/research/library/position/41219.aspx>
Environment Agency "*Technical Guidance WM2 Hazardous Waste: Interpretation of the definition and*

classification of hazardous waste" (2nd edition v2.2) First Published June 2003, Second edition November 2005, Updated October 2006 and May 2008.

²⁵ Vehlow, J. (2002). Bottom ash and APC residue management. Power production from waste and biomass IV Advanced concepts and technologies Espoo, Finland, 8–10 April, 2002 Organised by VTT, EC DG TREN, IEA Bioenergy, Novem, Tekes, KTM. K. Sipilä and M. Rossi.

²⁶ Lapa, N., R. Barbosa, et al. (2002) *Ecotoxicological assessment of leachates from MSWI bottom ashes*, Waste Management **22**(6): 583-593.

²⁷ Ferrari, Radetski et al. 1999, Environmental Toxicology and Chemistry 18(6): 1195-1202.

²⁸ Xiao, Y., M. Oorsprong, et al. (2008) *Vitrification of bottom ash from a municipal solid waste incinerator*, Waste Manag **28**(6): 1020-6.

²⁹ Note that both Zinc Oxide and Zinc Chloride are listed as ecotoxic forms of zinc.

³⁰ Chandler, A. J. (1997). Municipal solid waste incinerator residues. Amsterdam ; Oxford, Elsevier, p.307

³¹ Environment Agency (2006). Guidance for waste destined for disposal in landfills Version 2 June 2006 - Interpretation of the Waste Acceptance Requirements of the Landfill (England and Wales) Regulations 2002 (as amended), Environment Agency.