



**Friends of
the Earth**

Response to the Waste Review Call for Evidence

Friends of the Earth

October 2010

For more information on Friends of the Earth's work on waste:

www.foe.co.uk/waste

**Friends of the Earth inspires solutions to environmental problems,
which make life better for people**

Friends of the Earth is:

- the UK's most influential national environmental campaigning organisation
- the most extensive environmental network in the world, with around 1 million supporters across five continents, and more than 70 national organisations worldwide
- a unique network of campaigning local groups, working in more than 200 communities throughout England, Wales and Northern Ireland
- dependent on individuals for over 90 per cent of its income.

Friends of the Earth

26-28 Underwood Street, London N1 7JQ

Tel: 020 7490 1555 Fax: 020 7490 0881

Website: www.foe.co.uk

Friends of the Earth Limited, company number 1012357

Written by: Julian Kirby and Becky Slater

October 2010

Waste Review - Call to Evidence

Friends of the Earth submission

Friends of the Earth welcomes this opportunity to contribute to the Waste Review Call for Evidence. Improving the way we deal with waste is a vital part of making this country more sustainable, reducing our impacts on climate change and maximising the efficiency with which we use resources.

It is therefore essential that we maximise waste prevention, reuse, recycling and composting whilst phasing out residual waste.

Whilst recycling rates have improved considerably over the last decade, and waste arisings have stabilised and even declined, there is still much further to go before England matches the best in Europe, let alone achieves a genuinely sustainable, “zero waste” society.

We therefore also welcome the Secretary of State’s pledge that the Coalition Government will go “further and faster” than the last Government managed on waste, and look forward to a clear demonstration of what that will mean in practice and how it is proposed to make it happen.

Executive Summary

In the context of the climate and biodiversity crises, rising resource prices and competition for scarce resources, and rising population coupled with growing disparity in consumption of natural resources, it would seem a no-brainer that we must put an end to wastefulness and the unsustainable treatment of waste.

It is with this in mind that Friends of the Earth advocates an approach to waste management that is broadly in line with the Waste Hierarchy but which is fundamentally dictated by the science of life cycles analyses (LCAs).

It is clear that the best approach to dealing with waste is to prevent it, and what is not prevented must be reused or recycled, in that order.

Where controversy arises is in determining what should be done with the waste that cannot be reused and recycled, and indeed in defining what waste “cannot” be reuse and recycled.

It is Friends of the Earth’s view that the vast majority of waste generated in the UK is recyclable if not reusable, and that far too much of that is currently disposed of to landfill or incineration – at least £650m worth per year from the municipal waste stream.ⁱⁱ

We outline below what we believe are the surest ways to maximise divergence of that waste away from the disposal streams and into reuse and recycling, at great benefit not just to the environment but also to the economy, not least in the nearly 70,000 jobs at least that would be created by recycling 70% of the UK’s municipal and business waste.ⁱ

We also define the need for quality in recycling, since the UK’s current recycling produces far too much low grade recyclate that is simply of too poor quality for the UK reprocessor market and must as a result be dumped on poorly regulated markets in developing countries, whilst UK reprocessors import from abroad.

Key to quality and quantity is the type of recycling service offered. Kerbside separated recycling coupled with weekly food waste collection and alternate weekly collection of residual waste boosts both quality and quantity, and has proved perfectly acceptable to most of the public, despite efforts of certain commentators to prove otherwise.

That small fraction of waste that cannot be recycled must be made smaller still if we are to create a genuinely zero waste society, rather than just a ‘zero waste to landfill’ society.

To that end the Government must complement setting clear ambition for reuse and recycling – Friends of the Earth advocates 75% recycling of municipal waste by 2025 – with a requirement for high quality, a ban on the landfilling and incineration of recyclable waste, and tax and incentives to promote durability and recyclability of goods whilst penalising disposal.

Food waste must be collected separately in order to provide, through the anaerobic digestion plants that the Coalition has shown welcome enthusiasm for, genuinely 100% renewable energy.

Decisions as to how to process the remaining residual waste, as indeed all waste, must be made in light of full life cycle analysis of the options available.

With overall municipal waste volumes stabilising or beginning to fall, ongoing increases in recycling rates and the opportunities for further reducing residual waste through policy changes, it is vital that local authorities plan for reducing amounts of residual waste, and for flexible technologies that can adjust to changes in volume and composition of this waste.

Some technologies are inherently inflexible (eg incineration) whilst others can be flexible and modular, with modules that can be converted to composting and general recycling (eg, some MBT technologies) allowing capacity to be adjusted to meet demand.

Despite the evidence on stabilising growth rates and the potential to increase recycling, many new large waste treatment facilities including incinerators are being built based on unambitious projections of future recycling rates and waste growth. We need to avoid costly new waste infrastructure with long contracts constraining our future flexibility in dealing with waste.

It is Friends of the Earth's view that the current optimum treatment for residual waste is via high quality mechanical biological treatment, maximising the removal of recyclables before composting or anaerobically digesting the remaining residual to remove biological activity ahead of landfilling or use as a low grade soil.

There is no doubt that this is preferable to incineration which destroys precious resources at minimal energy recovery, produces toxic ash, and locks councils into decades long expensive waste contracts that suppress efforts to reuse and recycle.

There is still less doubt that much of what is sent for disposal in energy from waste incinerators would easily be reusable or recyclable. The evidence is clear and overwhelming that whatever energy is converted through combustion to electricity and – rarely – heat is a fraction of what recycling those materials saves in preventing the extraction and processing of raw materials.

Nevertheless incineration is touted as a quick fix to the challenge of getting waste out of landfill, and despite its deleterious impact on the climate it is portrayed as a benevolent source of renewable energy.

It is not acceptable for the UK to claim it is boosting renewable energy and reducing climate changing emissions when it does so through incinerating or otherwise destroying materials that would have saved much more emissions had they been recycled.

It is unlikely that placing a floor price on carbon, or placing a carbon tax on energy generators including incinerators, will do anything to prevent high embedded carbon recyclables being incinerated as long as the embedded carbon of those recyclables is not explicitly considered.

Instead the Government must regulate to ensure that there is no more disposal to incineration or landfill of recyclable material.

The public are increasingly committed reusers and recyclers, with this being a popular and easy 'way in' to sustainable behaviour change for most people and only a vocal minority opposed.

As such they are increasingly seeing themselves as stakeholders wanting both quantity and quality of outcome. It is imperative for the reputation of the "greenest government ever" to do the right thing by waste, and not the easy thing.

This must include setting up systems to guarantee reuse and recycling rather than simply writing cheques to multinationals to burn our waste.

It must include commitments to work with business to maximising reuse and recycling and phase out products incompatible with that aim.

And it must include a commitment to the public to guarantee transparency of access to contractual details and waste strategies agreed between councils and waste companies so that people can see for themselves whether their tax payers' money is being used sustainably.

Waste Review - Call to Evidence - Friends of the Earth submission

Government's stated commitments

Tackling the fiscal deficit – maximising the economic potential of the waste management industry, the potential benefits of resource efficiency to businesses and households, and looking carefully at the cost of services

There is a huge potential to tackle the fiscal deficit through treating waste more sustainably.

Recycling provides more jobs and comes at a lower cost than large, inflexible and expensive 'big kit' approaches such as mass-burn incineration.

There is also a large opportunity for job creation - ten times as many jobs are created per tonne of waste recycled than landfilled or incinerated. For example, research from Friends of the Earth shows that an increase in the UK recycling target to 70 per cent would create over 50,000 jobs across the country.ⁱ

In the current economic climate especially there is a strong argument to direct funding to economically efficient and jobs-rich approaches to waste management.

The UK landfills and incinerates at least £650m recyclable resources in the municipal and commercial & industrial waste streams every year.ⁱⁱ

It is important to focus on maximising the economic potential of the sectors of the waste industry focussing on the top of the waste hierarchy, for example the UK materials reprocessing industry, rather the waste management industry in general.

A true zero waste strategy will lead to reduced imports, improved security of supply and cost savings through the more effective use of resources.

Our low recycling rate means that we have to import more expensive resources like aluminium, when they could be recycled here and sold for profit instead.

At present insufficient quality recyclate required by UK reprocessors is produced due to comingled recycling collections. Greater use of source-separated recycling collections would increase the quality of recyclates collected, meaning more are of a high enough standard for UK reprocessors to purchase. This would reduce the reliance on overseas reprocessing and increase the success of UK based reprocessors and the value added to the UK economy.

There is potential for increasing the efficiency and reducing costs of waste management, for example source separated collection systems and AWCs.

A number of local authorities which collect a wide range of materials separated from each other make more financial sense of their recycling collections than many which comingle the materials. As evidence of this we cite the *Survey of Funding of Municipal Waste Management Kerbside Collection in Wales*,ⁱⁱⁱ as well as the direct experience of local authorities and collectors in England and in Northern Ireland.

This is not only a matter of experience and data. A similar report by WRAP^{iv} modelled thirteen different domestic recycling collection scenarios occurring in the UK and concluded that kerbside-sorted systems make greater financial sense.

Put simply, material value achieved by keeping the materials apart outweighs any saving in collection costs by comingling them to seemingly simplify collection. Hence we argue that, according to evidence commissioned by Defra, keeping materials separate from each other and thus maintaining quality is a defining factor in achieving best possible value for the service and of materials and therefore the greatest economic benefit.

Stopping all subsidies for incineration would free up money to help reduce the fiscal deficit.

Incineration tax

We call for the introduction of an incineration tax (starting at a minimum of £40 per tonne) to ensure economic benefits reward resource efficiency, reduction, reuse, repair, recycling (precycling, freecycling, upcycling, etc.), composting and AD, and to add to the financial resources available to tackle the fiscal deficit.

Friends of the Earth would welcome the introduction of an incineration tax to ensure that the relative cost of recycling reflects its environmental desirability and so discourage the diversion of waste from landfill to incineration. Work carried out for the Treasury in the past has shown that the environmental damage from incineration is higher than for landfill, and that an incineration tax is justified in environmental and social terms.^v

Such a tax is used in other parts of Europe, including Denmark, Austria, Netherlands, Norway, Sweden and Flanders, Belgium. A tax on incineration would provide a crucial driver for commercial & industrial (C&I) and other non-municipal waste, by affecting the behaviour of the private sector. With the landfill tax escalator, C&I waste is going to be increasingly diverted from landfill to incineration, rather than to recycling. Many proposals for incinerators are relying on C&I waste to meet any shortfall in MSW available, so are likely to be setting a price per tonne that is competitive with recycling. An incineration tax is required to prevent this diversion from recycling to incineration.

Other tax options that would raise money include increasing the rate charged for the landfill of IBA.

The cost of incineration is far greater than other forms of waste treatment, such as recycling. Incinerators also require long expensive contracts, tying councils into high payments for decades.

Huge amounts of public money have been committed wastefully to incineration through PFI schemes. These should be scrapped immediately where possible.

Environmental protection – protecting the environment and preserving natural resources at home and abroad

The UK is throwing away over £650 million every year by dumping and incinerating waste which, if recycled, could save 19 million tonnes of greenhouse gases annually - equivalent to taking around six million cars off the roads.ⁱⁱ

This is at the same time as Europe – and the UK – continue to consume more than its fair share of the world's resources, at a rate unsustainable not just in environmental terms but also in terms of economic security.^{vi}

This is particularly illustrated by the statements from China that she intends to restrict the export of 'rare earth metals', vital for electronic and renewables technology and frequently disposed of in unrecycled WEEE.

Environmental protection is at risk if we continue to rely on low grade export of recyclables. Campaign for Real Recycling have estimated that over ½ million tonnes per annum, mostly mixed paper but contaminated with otherwise valuable materials is being lost to UK reprocessing industry.

A precautionary approach to planning applications should be adopted by decision-makers, especially to applications for waste incinerators.

Sites for waste facilities must be appropriate, i.e. not greenfield, nor close to vulnerable populations and other sensitive receptors.

In line with the 2007 Persistent Organic Pollutants (POPs) regulations and the Stockholm Convention, priority consideration should be given to alternatives to incineration that do not give rise to persistent organic pollutants (POPs). Such consideration should include waste minimisation, enhanced recycling provision, and changes to collection methodologies, e.g.

separate collection of food waste.

Incineration energy-from-waste contracts are typified by both great expense and significant inflexibility. The latter is a function of the large and constant demand for waste feedstock that incinerators place on their suppliers - waste collection authorities.

They also are long lived -the contracts are often in excess of 25-30 years - and so provide not just a constant demand for waste but also a constant source of competition to more sustainable rival processes such as recycling. This could be a particular issue for recycling etc companies finding themselves in competition for commercial and industrial waste with large merchant incinerators.

Local authorities are entering long term contracts which are inhibiting the move towards sustainable waste management. Large facilities such as waste incinerators are being built on the back of these contracts, meaning that the flexibility for authorities to continually improve waste minimisation, reuse and recycling is removed.

Friends of the Earth believes that no waste contract needs to be more than 10 years long to allow local authorities the flexibility in responding to new legislation and changes in the waste stream.

Also waste procurement by local authorities is not an open and transparent process. As much of the information is classed as commercially confidential, it is very hard for local stakeholders to engage and participate in any decisions the council makes regarding waste procurement. The review of waste policy must look at ways to ensure that democratic accountability is enshrined in the waste procurement process.

Waste facilities should be small, modular and local, and waste contracts should be flexible, i.e. responsive to changes in waste composition and new technological developments, in order to derive the environmental benefits of future innovation.

The Environment Agency's Head of Waste has echoed this^{vii} "...Defra's advice on the Waste Strategy is very clear, that local authorities need to avoid being locked into long term contracts or plant that is too big. They need to be responsive to future, technological changes."

Existing waste incinerators must be subject to greater scrutiny, including ending the self-regulation of incinerator bottom ash toxicity classification, increase the frequency of emissions monitoring and extend the number of emissions that are monitored – making greater use of continuous emissions monitoring systems, and impose tighter restrictions on emissions than is required by the Waste Incineration Directive (WID), and take more forceful action in response to exceedances.

Regulation of hazardous incinerator ash that is sent to landfill needs to be more stringent, to avoid further occurrences such as that at Bishop's Cleeve^{viii}.

Adopt strategies that recognise:

- The benefits from recovering energy efficiently and cleanly from separately collected food waste using AD.
- That burning recyclables through incineration is damaging to the environment.
- The shorter term and strategic benefits of turning green wastes into compost so as to displace artificial fertiliser and improve soil quality.

Maximise the use of AD digestate as fertiliser, locking in carbon and cutting back on artificial nitrates and phosphates.

Localism - decentralising decision making powers on matters that affect local communities to local authorities and to communities themselves

We are disappointed that several announcements by the Coalition Government do not seem to reflect their aspirations to support localism, for example removing the provision in the Climate Change Act giving the potential for pilot schemes for household waste charging.

The statements against AWC are another area of concern, interfering with local authorities'

ability to make decisions on how to best spend tax payers' money.

And directions to remove the well evidenced advice of the Audit Commission as to the value and efficacy of alternate weekly collections (AWCs) appear to demonstrate more a dogmatic opposition to weekly to AWCs than any commitment to localism, the environment or value for the tax payer.

Local authorities should be obliged to engage their residents at every stage of waste planning and implementation, including procurement.

Communities should have the automatic right to appeal all incineration-related planning decisions, and local opposition to waste incinerator proposals should be treated as a material planning consideration, alongside the public perception of health dangers associated with waste incineration.

To assist local authorities make the best decisions about how to deal with waste, there is a need for proper guidance to ensure best practice. This must be balanced with the freedom to innovate. For example, we welcome WRAP's guidance in support of source-separated recycling collections.

The cost of waste services should be made more transparent, e.g. by putting all public waste contracts and waste invoices on the Internet without redaction, so that householders can assess whether or not they are receiving value for money.

Big society – developing and delivering policy in a way that involves and engages voluntary organisations, social enterprises and community groups while reducing unnecessary state activity

We believe that large waste management companies are not best suited for delivering all aspects of waste management – including waste minimisation. The Community sector is often better able to deliver best practice kerbside (i.e. source segregation of recycle rather than comingled), community composting and re-use and minimisation projects. There is a great potential for further involvement of community groups in sustainable waste management.

The emergence of local waste collecting, sorting and reselling cooperatives should be promoted and supported.

Tax breaks should be provided for charity shops, community groups and social enterprises working to reduce, repair, reuse, recycle, compost, etc.

Contracts that prevent profitable elements of the waste stream being used by charities should be outlawed, e.g. waste contracts that oblige local authorities to deliver all waste collected to specified contractors and their sub-contractors.

The community sector has pioneered work on reuse schemes, and this work should be further funded and best practice should be promoted.

Much improved transparency of local authority dealings and contracts with waste companies, including and especially so that the public can test value for money themselves by inspecting accounts.

Addressing climate change - avoiding dangerous green house gas emissions from landfill and contributing to our statutory carbon budget targets and UK renewable targets through energy recovery

As mentioned above, if the UK recycled the waste it landfills and incinerates each year, we could save 19 million tonnes of greenhouse gases annually - equivalent to taking around six million cars off the roads.ⁱⁱ

Recycling saves energy, prevents greenhouse gas (GHG) emissions, and preserves natural resources. Energy recovery by incineration, by virtue of GHG emissions (that kWh for kWh far exceeds those of a gas fired powered station) is counter-productive and polluting^{ix}.

It is important to note that plastics do not release GHGs when landfilled, but they do when incinerated. This represents a departure from the waste hierarchy.

When comparing technologies in relation to climate change impacts, short-cycle (biogenic) carbon should be included in the assessment, and not discounted as if incineration of biogenic material is somehow carbon neutral.

Whilst it is true that electricity from incineration offsets carbon emissions from substituted generation, the future electricity mix has to be modelled. Current policy requires a progressive reduction in the carbon intensity of the future fuel mix, which substantially reduces the benefits of electricity produced via incineration as future electricity comes with much lower carbon emissions.

It should be noted that kerbside sort makes greater environmental sense than comingling^x.

All waste processing options should be subject to ISO compliant LCAs. In so doing the 'consumption' or embedded emissions of the product or material will be considered rather than the narrower 'territorial emissions', as above. In other words, we must ensure that the global climate impact is considered, rather than limiting our assessment to the Kyoto-style system for national emissions measurement.

There should also be a more sophisticated measure of climate impacts including through:

- Assessment of the varying impact of emissions over time e.g. comparing the impact of emissions of methane from landfilled waste to the CO₂ 'spike' of incineration. See Eunomia's "A changing climate for energy from waste"^{ix} report for Friends of the Earth for more details on this;
- Including biogenic CO₂ output of power stations - this is often, unjustifiably, disregarded.
- The efficiency of energy conversion and in particular the carbon efficiency of energy from waste facilities should be considered in identifying whether they are sustainable. Electricity-only incineration energy from waste is typically one third less carbon efficient than a modern gas-fired power station even when biogenic emissions are disregarded. These would fail the emissions performance standards due to be applied to future coal power stations.

These should be considered at local, national and supra-national level in decisions as to waste processing and policy.

Questions

General

It should be noted at the outset that waste arisings in UK have not been rising, as many claim, and in fact have been falling since around 2004. Evidence of such is clearly available in the Waste Data Flow and other data sets available on the Defra website.^{xi}

Friends of the Earth supports and agrees with the analyses of these data in the UKWIN submission to this review.^{xi}

From that it is also clear that C&I waste is neither as large as predicted nor increasing, and that since recycling rates are increasing and are likely to continue to do so we are not therefore 'running out' of landfill as many commentators like to argue when making the case for incineration.

Indeed the recession has demonstrated that not only must our waste infrastructure and systems be designed for less waste than many, particularly incineration advocates, argue, but that it must also be modular so that it is flexible to respond to rapid changes in the volume of waste arisings.

When using the term "zero waste economy" it should be clear that what is being described here is 'zero waste to landfill', which is not the same. A genuinely zero waste economy would see zero waste to disposal. The huge and currently growing volume of waste sent for disposal in incineration cannot be considered a part of a "zero waste economy"

What should the nation's ambition for waste management be? What do we need to do to achieve a 'zero waste economy'?

The nation's ambition for waste management should be for as little waste to be created as possible, with as much as possible of what is created either reused or recycled.

The remaining residual should be reduced as far as possible, and treated in such a way as to maximise recovery of recyclables, energy through AD (or whatever other technology may arise that creates genuinely 100% renewable energy at equivalent or better climate impact performance) with the biologically-stabilised residual being used as a low quality soil or landfilled.

Rather than creating waste disposal infrastructure and systems that rely on and create a need for residual waste – in the way that long-lived incineration plants do – we must ensure that residual waste is treated in small and modular plants and that genuine efforts are made to phase out residual waste through regulation and technological improvement.

In other words the ambition must be for minimised waste arisings, with close to 100% recycling, reuse and composting or AD.

Policies to help achieve this ambition include banning the disposal – including landfill and incineration – of recyclables, and improving the quality of recyclables collected, thereby ending the current need to export of contaminated and poor quality recyclables for sorting in developing countries.

We need to prevent over-provision of incineration capacity at both regional and national levels for social, economic and environmental reasons. We do not need any new incineration capacity to achieve a zero waste economy, and building new incinerators would be counter-productive.

We should also aim to move away from a consumption based society and towards one in which resource and material efficiency is highly valued and in which there is much more hiring and shared ownership of goods.

How could the contribution waste management in England makes to the economy and our environmental and energy goals be maximised?

Europe, including and especially the UK, already uses more than its fair share of the world's resources. Not only is this unsustainable environmentally and morally unsound, it also presents us with questions of economic uncertainty including over access to raw materials.^{vi}

Massive efforts to boost reuse and recycling, and prevent waste arising in the first place, are required to move us towards the closed-loop "zero waste" recycling economy that will contribute to reducing the UK's consumption of natural resources.

As mentioned above, hitting 70% recycling of municipal solid waste (MSW) would create at least 50,000 jobs in the UK, with another 18,000 further at similar rates for C&I waste.ⁱ

It would also contribute enormously to the economy by saving at least £650m/year of recyclable materials sent to disposal in the UK, with the associated carbon and resource savings too.ⁱⁱ

These will be achieved through efforts to promote durability, reusability and recyclability of goods (see below), as well as rolling out expansive reuse and recycling programmes (see below).

Extended producer responsibility, especially for products such as toys, tough targets for recycling and reduction of waste streams such as packaging, a tax on incineration and the banning of the disposal of recyclable and reusable goods will all play a part, as laid out below.

How can Government make the best use of the skills and knowledge of the private sector, civil society and local communities in delivering a zero waste economy?

Government must respect and engage the public through committing to transparency of waste contracts and other dealings between local authorities and waste contractors so that they can discern for themselves whether best value is being attained for their tax money.

Government must acknowledge that where there are repeated refusals by a community against planning applications the problem may lie less with the planning system and the people using it and more with the nature of the application, particularly where that is for an unsustainable facility that represents poor value for money and violates the proximity principle.

Government must encourage schemes such as community owned anaerobic digestion plants that see funds and energy returned to the community.

The public must be able to see what happens to their waste and to that of businesses, and to benefit from its reuse where possible.

It should be much easier for people to reuse and recycle, including through better collections, more bring sites and optimisation for reuse and recycling of both products placed on the market and systems designed to remove them once they are no longer desired.

Government must ensure that best practice is shared, including and especially for types of recycling collection schemes, as below.

Funding for large and long lived PFI schemes must cease as must the incidence of contracts that bar communities from setting up their own sustainable alternatives to centralised collection and disposal

Do local authorities have the right responsibilities for waste services? Are there further services that could be devolved to local authorities or directly to local communities?

This question could perhaps be better rephrased to ask if local authorities have the right priorities for waste. The pursuit of quantity with too little regard for quality would indicate that they do not.

The end market for recycling must be at the forefront of planning, so local authorities must engage reprocessors in planning.

This requires a re-evaluation of the local authority role, particularly the collection and disposal division, so that we see treatment and processing emphasized. The shift to 'zero waste' policy must address this, and be at the heart of the waste review.

Clearly local authorities also need to demonstrate responsibility for ensuring that the public benefit from the value of quality recycle, that there is adequate transparency of accounts, of contracts and waste strategies as well as opportunity to participate in developing these, and for wider consideration of the environment, especially with regard to the 'embedded' carbon and resource footprints of waste.

How can illegal waste activity be minimised, including reducing levels of fly-tipping? Are sanctions for breaches of waste regulation fair and proportionate?

Sufficient collection services should be offered, including and especially broad ranges of materials collection for recycling.

The Environment Agency and/or other bodies must be adequately resourced to police and prevent or prosecute waste crime. It is not evident that it is at the moment.

Sanctions may need to be raised if there is a genuine fly-tipping etc problem, but Friends of the Earth calls on the Coalition to conduct a thorough and impartial assessment of the incidence and pattern of waste crime and how it compares across the UK and abroad.

Currently the performance of incinerators, including with regard to permitted capacity and emissions, is limited at often considerable effort and/or cost to disclosure upon request to the Environment Agency. Greater ease of access, including free of charge and with much faster

turn-around, is required for the public to assess for themselves when and where there are breaches.

Friends of the Earth welcome Mr Pickles' commitment at a Conservative Party Fringe event to much greater transparency in local authority contracts etc with waste companies.

How can we balance regulation to ensure that we protect health and the environment without unnecessarily burdening businesses and local authorities? What are the opportunities to reduce or remove the burdens of regulations?

Environmentally-friendly processes require less regulation and monitoring than unfriendly ones. Cessation of incineration would reduce the need for regulation and thereby reduce costs.

The role of the regulator should be complemented by active citizens; therefore information gathered by industry regulators, e.g. the Environment Agency, should be made readily available to citizens, e.g. the whole of the Environment Agency's public register should be accessible via the Internet. It is currently very difficult for local communities to access relevant information, e.g. citizens are currently hampered by exorbitant charges for access to environmental permits and permit applications, annual incinerator performance reports and associated monitoring forms, etc.

Regulation plays an important role in protecting health and public interest. Regulation and the enforcement of quality standards, within the context of the framework, will benefit green businesses as it will mean more recyclables and more opportunities.

Waste Prevention

The Government needs to set an ambitious waste prevention target and adopt policies to ensure that it is met. There is considerable scope to reduce waste production through reuse and avoidance measures.

Friends of the Earth endorses the vision laid out in WRAP's 2009 report "*Meeting the UK climate change challenge*".^{xii}

In particular we wish to highlight waste-related savings as laid out in the following excerpts of text and tables from that report:

The two strategies that achieve by far the greatest reduction in GHG emissions related to "Lean Production" and "Waste Reduction". The assumption taken with waste reduction related to less material input into manufacturing through better material management. Therefore, it is not about dealing with waste in a more efficient manner, i.e. recycling, but about waste prevention throughout the supply chain. The benefits are clear when compared to the waste recycling strategy. Ensuring almost zero waste by manufacturing sectors by 2050 could guarantee 137 million tonnes less GHG emissions in the atmosphere by 2050. A reduction of 98 million tonnes from domestic products consumed in the UK and 39 million tonnes from domestic products consumed in other countries. Even more effective is the strategy of Lean Production. Lean production refers to the re-designing of products to reduce material weight, i.e. producing lighter products. This strategy was relevant to a wide range of goods sectors thus creating large scale change in emissions. This strategy could contribute to GHG emission reduction of almost 280 million tonnes by 2050 (200 million tonnes from UK consumption and 80 million tonnes from UK exports) and in the short term (by 2020), reduce cumulative GHG emissions by nearer 20 million tonnes including exports (approximately 6 million tonnes).

Figure 13: Resource efficient supply strategies

Lean Production	Reduced material inputs into production processes through the design of lighter and leaner products
Material Substitution	Substitution of highly carbon intensive materials for low carbon intensive materials
Waste Reduction	A reduction in waste at the production stage that directly leads to a reduction in material requirements
Re-direction of Landfill Materials	Diversion of waste from landfill to recycling
Dematerialisation of the service sectors	Improving the efficiency of product use in the service sector through extending the lifetime of products, reducing edible food waste and eradicating junk mail
Strategies for Sustainable Building	Improving efficiency by introducing modern methods of construction such as modular design and off-site construction
Efficient Use of Existing Infrastructure	Reduce material inputs into construction through replacing new build with retrofit

Table 5: Product discard rates and money saved by service sectors using products to their full technological lifespan

<i>Product Group</i>	<i>Discard Rate (Disposed of while still working)</i>	<i>Monetary Saving if technological obsolescence is reached in all service sectors (£m)</i>
Carpets and rugs	50%	65
Clothes and uniforms	50%	202
Domestic appliances n.e.c	33%	174
Office machinery and computers	59%	126
Electrical equipment	33%	274
Electronic components	33%	62
Transmitters for TV, radio and phone	33%	1,400
Receivers for TV and radio	44%	392
Total		2,695

Resource Efficiency Strategy	Scenarios		
	Quick Win	Best Practice	Beyond Best Practice
Lean Production	Material requirement to produce the same good is 15% less in 2020	By 2050, the material requirement is reduced by 50%	By 2050 the material requirement is reduced by 75%
Material Substitution	10% of carbon-intensive materials used to make goods are replaced with the least carbon-intensive material by 2020	This increases to 20% by 2030	Further efforts are made to reduce this to 40% by 2050
Waste Reduction	15% of the raw materials from industry and commerce ending up in the waste stream are taken out of the economy by 2020	This increases to 50% by 2050	Except for 10% unavoidable waste, there is no additional industrial and commercial waste in the economy by 2050
Re-direction of Landfill Materials	15% of the raw materials from industry and commerce ending up in landfill are recycled and put back into production by 2020	This increases to 50% by 2050	Accounting for 10% unavoidable waste, all waste destined for landfill is recycled by 2050
Dematerialisation of the service sectors	A third of discard rate is reduced for the different product groups, edible food waste is halved and junk mail is eradicated by 2020	By 2050, 90% of goods reach technological obsolescence and edible food waste is eliminated	The goals of the best practice scenario are achieved earlier, by 2030
Strategies for Sustainable Building	2% of the construction market is met by modular building design by 2020	5% of the construction market is met by modular building design by 2050	10% of the construction market is met by modular building design by 2050
Efficient Use of Existing Infrastructure	Retrofitting 20% of housing deemed for demolition and vacant properties offsets the need for rebuilding by 2020	This continues to 50% by 2030	By 2050, we assume that 90% of these properties are brought back into use, reducing the need for new builds.

Figure 14: Resource efficient demand strategies

Lifetime Optimisation	Ensuring that products are used by households for their full useful life
Shift from Goods to Services	Reduction in ownership of goods, delivered instead by the service sectors
Reducing Food Waste	Reduction in edible food waste within households
Dietary Changes	Reduction in animal-based food products through the introduction of more healthy diets
Restorative Economy	Extending the life of products by improving product durability
Public Sector Procurement Efficiency	Government lead the way in sustainable procurement

Table 6: Product discard rates and money saved by households using products to their full technological lifespan

Product Group	Discard Rate (Disposed of while still working)	Monetary Saving if technological obsolescence is reached by all households (£m)
Clothing	33%	12,247
Glassware, tableware & household utensils	33%	1,530
Tools and equipment for house & garden	21%	980
Purchase of vehicles	33%	12,801
Telephone & telefax equipment	44%	378
Audio-visual, photo & info. processing equipment	49%	10,692
Other major durables for recreation & culture	41%	2,226
Other recreational equipment etc.	21%	5,259
Household appliances	22%	1,224
Total		47,387

Resource Efficiency Strategy	Scenarios		
	Quick Win	Best Practice	Beyond Best Practice
Lifetime Optimisation	The discard rate for different product groups is reduced by a third by 2020	From 2020 onwards, this trend continues and by 2050, 90% of reach their technological obsolescence	The goals of the best practice scenario is achieved earlier, reaching 90% by 2030
Goods to Services	A shift in the market to service provision, varies for selected goods of between five and 20 percent	A shift in the market to service provision, varies for selected goods of between 30 and 70 percent	A shift in the market to service provision, varies for selected goods of between 50 and 90 percent
Reducing Food Waste	Household halve edible food waste between 2010 and 2020	From 2020 onwards, continue this trend to achieve a 100% reduction by 2050 in edible food waste	Achieve best practice goal set out in best practice scenario by 2030
Dietary Changes	Meat and dairy consumption is reduced by 25% by 2020	From 2020 onwards, continue this trend to achieve a 50% reduction by 2050	From 2020 onwards there is a more substantial shift that ends up as 75% by 2050
Restorative Economy	10% reduction in expenditure on selected products by 2020	Following on from the Quick Win scenario, an incremental reduction in expenditure in selected product groups to 30% by 2050	This increases to 75%
Public Sector Procurement Efficiency	The public sector reduces the impact of the goods they purchase by 5% per year by 2020	By 2050, 90% the impact of government procured goods will have 90% less the impact	The best practice scenario is achieved by 2030

What roles should (i) national and local government; (ii) businesses; (iii) voluntary organisations; and (iv) individuals take in order to prevent waste from arising, and to reduce the hazardousness or environmental impact of waste?

(i) National and local government

We currently generate a phenomenal amount of waste across all sectors, approximately half of the 680Mt of materials the UK consumes every year.^{xiii} However, the commonly stated assumption that waste arisings will continue to rise is not supported by recent experience. UK municipal solid waste (MSW) arisings appear to have peaked in 2004 and arguably were declining even before the significant falls attributable to the recession.

We should aim and plan for significant reductions in waste arisings. Friends of the Earth supports the ambition described in WRAP's report "*Meeting the UK climate change challenge*".^{xii}

This includes the following estimates and aspirations:

- 15% of raw materials from industry and commerce are currently wasted, of which 15% could be saved by 2020, and up to 90% by 2050.
- Food waste in the service sector could be halved by 2020 and possibly cut altogether by 2030 or else by 2050.
- A third of the Service Sector goods thrown away before obsolescence are instead used to their full lifetime by 2020, and 90% by 2030 or else by 2050.

- Junk mail is largely eradicated by 2020, saving 550,000 tonnes paper use (4.4% UK total paper and card)
- Products are better designed so as to ensure full lifetime use, leading to a one third drop in the discard rate for consumables by 2020, with 90% by 2030 or else by 2050.
- There is a significant shift away from the purchase culture towards a hiring culture, across the range of consumables from clothing and domestic items to vehicles and electronic equipment. Whilst this may be challenging in some areas particularly we are already seeing encouraging signs, such as with the rapid growth of car clubs.
- We currently throw away about a third of our food. Households halve their edible food waste by 2020, and eliminate it by 2030 or else by 2050.

We therefore support the facilitation of the 'Restorative Economy' (e.g. reuse and refurbishment) through laws and incentives to promote durability, 'Lifetime optimisation' (e.g. using goods for their technical lifetime) and a move to service economy in which goods are hired and serviced and shared.

It is essential to ensure greater public procurement of resource efficient goods, to move to more service contracts, and to ensure reuse and recycling are paramount considerations in procurement.

We are disappointed that the Coalition Government has ruled out the option for councils to pilot variable charging schemes. This is a wasted opportunity, as charging householders for the amount of waste they put out for disposal has the potential to dramatically change the way individuals perceive their waste production and how they manage it. Variable charging schemes have been implemented in many European countries including Austria, Belgium, Denmark, France, Germany, Ireland, Italy, Luxembourg and Sweden, and have had a significant impact, increasing recycling by 30-40 per cent, with no adverse impact of increased fly-tipping.^{xiv} For further information, please see Appendix 1 and 2 (pages 39 & 40).

We urge the Government to consider the introduction of landfill and incineration bans. The reasons we support such bans are detailed in our response to the consultation earlier this year,^{xv} for example the Eunomia data cited in the consultation report^{xvi} make the case clearly for paper/card, food, textiles, metals, wood, green (garden) waste and glass and this is supported by evidence elsewhere.^{xvii}

The government should also review the potential for new product or material taxes to complement waste taxes. Products or materials which create specific environmental problems not dealt with effectively by existing regulation or waste taxation have been tackled by targeted taxes in some other countries. Denmark taxes disposable items such as batteries, electric bulbs and also tyres and pesticides. Ireland's new plastic bag tax is the latest example. The Chancellor should review which products warrant further consideration for this type of measure and how these should be designed.

The product design phase is the most important for maximising the efficiency of resources use. This has been known for decades, yet few manufacturers have really taken environmental issues on board in their design process. This is mainly because of a lack of any financial or regulatory incentive to do this, given that in general the producer is not involved in disposal.

The most effective method of overcoming this problem is creating a system of producer responsibility to ensure that the producer has a financial incentive to make products more recyclable or compostable.

In addition, companies should be informed that non-recyclable materials may be subject to future measures, given a Government commitment to phase out residual waste. They should also be encouraged to use recycled materials in their products.

Another important issue is durability, i.e. how long products last. There are strong market pressures against durability, not least the fact that a long-lasting product means fewer replacement purchases. It is clear that manufacturers can make products more durable if they

wish to, yet there is little advantage to doing this. A range of methods could change this situation, for example:

- Compulsory guarantees of a certain number of years
- A “Long Life” mark, guaranteeing the number of the years that the product will last.
- Producer responsibility schemes designed to reward long-lived products (e.g. with charges based on return share rather than market share).

The Government should also implement an advertising campaign asking people to think how they can avoid buying the materials that end up in their bin. Through WRAP good practice waste prevention schemes should be identified and disseminated to local authorities, including information on real nappy washing subsidies, and the various ways that councils or the community sector have encouraged reuse to name a few.

Measure and target reductions in consumption and waste

Friends of the Earth is advocating the adoption of indicators to measure the consumption of natural resources as a step towards reducing that consumption. We have proposed four indicators for adoption into EU policy making: climate, materials (which can be broken down into biotic and abiotic materials), land area and water.^{xviii} Taken at the product or the national or supranational level these should lead to decisions that favour greater resource efficiency across the board.

Other measures that we believe should be taken in order to prevent waste from arising include:

- A greater focus on packaging reduction and the introduction of ambitious packaging recycling targets, as proposed in our response to the Consultation on Implementing the Packaging Strategy at www.foe.co.uk/resource/consultation_responses/packaging_response.pdf^{xix}
- Tax across all forms of disposal, including the introduction of an incineration tax, as proposed in our response to the Consultation on Modernising landfill tax legislation at www.foe.co.uk/resource/consultation_responses/landfill_tax.pdf^{xx}
- Develop a strategy for waste prevention, with a focus on the greatest impacts (rather than on weight).

In order to promote waste prevention, we believe that the government should adopt waste prevention targets. We recommend matching the ambition of Flanders: *‘the aim is for a far-reaching decoupling between economic growth and waste production i.e. stabilisation of waste generation compared to 2000 at 560 kg/inhabitant. There is also a target for 2% prevention (dry fraction) per year (like packaging, nappies and paper), which has almost been reached, to compensate for economic growth.’* (see Appendix 3, page 41).

As noted above, waste arisings have been decreasing over recent years, even without policies aimed at reducing growth. Waste levels have recently dropped further due to the recession and we believe that the government should set targets below this rate of reduction, and help create a ‘zero waste recovery’.

It is essential that the valuable work of WRAP is sufficiently funded in order to allow continued support for businesses, public and local authorities.

Please also refer to the comments made in the ‘Preparing for reuse’ section below.

Local Government

The most frequent waste minimisation activity by local authorities is the distribution of home composting bins, leaflet distribution and the promotion of real nappies. These activities should be universally continued on an ongoing basis to maximise their effect.

Results of a study by Resource Futures ^{xxi} *The introduction of collection methods that combine a 'carrot' (effective communication and householder engagement, provision of greater capacity in dry recycling systems) and 'stick' (the imposition of AWCs for refuse, charged collections for garden / bulky waste collections, HWRC trade waste and side waste policy enforcement) approach appear to result in a 'constraining' effect on household waste arisings.'*

The report also found *'pre- versus post- comparisons around AWC roll-out in the case study authorities suggested reductions in household waste arisings (wastes collected at the kerbside from householders and wastes at bring sites) of 120 kg per household per year in areas with charged garden waste collections; the same assessment for AWC roll-out in areas with free garden waste collections was an order of magnitude less (13- 30 kg per household per year)'*

And *'where there has been noticeable reduction in household waste arisings, there appears to have been a relatively large investment and belief in widespread householder waste awareness raising activities.'*

Therefore, we support the methods described in this quote, including the use of AWCs as a tool contribute to lower waste generation, as well as higher recycling and greater efficiency (on the proviso that weekly food collections are in place).

We believe local authorities must invest in ongoing communications programmes to raise awareness of waste prevention, as well as reuse and recycling.

Local government should provide increased support to community reuse and recycling schemes, including AD. For example, Local Government should be given a role in supporting and overseeing the creation of community based cooperative franchises, whose responsibilities could cover the collection and sale of recyclables, green material for composting and food waste for AD. Local Government should be expected to provide the necessary collection infrastructure, work with partners to promote waste reduction and recycling practices to businesses and individuals, and actively support voluntary organisations in the reuse of discarded items.

Food waste collections have been found to lead to a reduction in overall waste generated by households. ^{xxii} Therefore we believe all households should be provided with a weekly separate collection of food waste. We commend the Love Food Hate Waste campaign for starting to tackle the problem of food waste.

The use of smaller waste receptacles for residual waste leads to a reduction in waste arisings. ^{xxiii}

There is an essential role for local authorities in communicating the need for and the methods and systems of reducing waste. The role of the communications officer in this regard is essential and must not be underestimated.

Please see Appendix 3 - Waste prevention in Flanders, for details of Flanders' policies in this area, which we urge the Government to adopt in the England.

(ii) Businesses

Businesses, like organisations and individuals, tend to carry on working in the same sort of way until something comes along to disrupt what they are doing – e.g. a big change in price, or a regulatory restriction. In the waste field the most effective tools are likely to include:

- Increases in the price of waste disposal
- Restrictions on waste disposal (e.g. no recyclable or compostable materials to landfill or incineration)
- Producer responsibility (see response to question part (i) National and local government above)
- Increases in prices of virgin resources, as a result of market changes or taxes.

- Measures to increase the durability of products and to phase-out non-recyclables (see response to question part (i) National and local government above)

Businesses have an important role to play in providing resource efficiency advice – for example, see write-up of presentation on “Business benefits of understanding resource use” by Stephen Evans CEng, Professor of Life Cycle Engineering, Cranfield University at www.foeeurope.org/activities/waste_management/Resource_use_conference_writeup_1June10_final.pdf (powerpoint presentation at www.foeeurope.org/activities/waste_management/SIS%20June%202010%20foeE.pdf)

Other factors promoting reduced waste arisings will include the end of ‘bogof’ and other wasteful marketing promotions. The recent improvement in this area needs building on.

(iii) Voluntary organisations

We are very supportive of the work of the voluntary and community sector - this is the sector which has been innovating and developing new recycling, composting and reuse approaches, whilst the waste industry has been stuck in the past. It is important that this sector receives support, and that it continues to be an important part of the provision of local recycling etc, and is not crowded out by the tendency of local authorities to want all their waste management operations run by one company.

(iv) individuals

Instead of just a decoupling of waste growth from GDP we need to ensure that resource use in England actually decreases. The level of our consumption is already having a significant impact on the environment and communities across the world, and it's getting worse.

The Government needs to address this issue firstly by openly acknowledging that reducing material consumption by consumers is an aim of the Government. Therefore the Government need to implement a plan for communicating to consumers about reduced consumption as significant attitude and behaviour change is needed. An advertising campaign should be run addressing the issue of material consumption and the environmental impacts that it has.

There also needs to be a clear, easy and well publicised way for consumers to obtain environmental information on products such as which products have longer durability, use less resources in production and are fully repairable, re-useable and recyclable. This may take the form of a website or a phone helpline.

To ensure that consumers can make choices, products also need to be labelled for durability, recyclability and compostability. This would mean that consumers can make choices between products at the point of sale.

There also needs to be promotion of hire and re-fill services. These businesses should be supported and advertised by local authorities to consumers.

Deposit refund schemes also need to be implemented to encourage reuse of materials. They have been successful in a number of countries including Sweden, where a system operates for glass and plastic bottles and aluminium cans. A number of schemes have achieved return levels in excess of 90 per cent.

As mentioned elsewhere in our response Friends of the Earth would also like to see variable charging introduced. This would encourage householders to think about their own waste consumption, which could then lead to increased pressure from consumers on retailers and producers to address the durability, reparability and recyclability of products.

What can be done to encourage businesses to design and manufacture products which produce less waste – such as those which last longer, can be upgraded and/or repaired, and don't have hazardous components? How might Responsibility Deals contribute to this?

Targets should be created for businesses to reduce their resource consumption and increase their resource efficiency.

We support obligations for durability, for example the introduction of consumer protection legislation to extend requirements for manufacturers and retailers to replace or repair faulty electrical goods to encourage manufacturers to make products that last longer and retailers to only stock more long-lasting products.

We also support obligations to phase out of difficult-to-recycle and composite materials.

As mentioned above, we support the work of WRAP and the ambition described in their "Resource Efficiency" report.^{xii}

We also support:

- Extended producer responsibilities
- Development of product hiring services, rental (especially of white goods), and goods that are seldom used yet have high resource and energy footprints. For example, the provision of white and similar goods on a rental contract with service support basis could be encouraged.

Producers, and distributors, will have to work within the proposed framework and accept and comply with the principles of Extended Producer Responsibility. A key issue here is recyclability and reusability of component parts, as well as product duration. Some hazardous components are inevitable but that does not in itself preclude recycling or reuse.

The principles of the Producer Responsibility Obligations (Packaging Waste) Regulations and Producer Responsibility Notes (PRNs) represent an example of Extended Producer Responsibility. Within this context incineration should not be treated as recovery.

Sending recyclable and reusable material for incineration should be seen as irresponsible within the context of producer responsibility.

Which waste streams or materials should be a priority for waste prevention?

Materials that cannot readily be reused, recycled or composted should be phased out of use. Priority for waste prevention should be given to those materials with greatest environmental impacts.

We support prioritising the following waste streams:

- Building/ construction waste
- Food waste - commercial and household (see our briefing on food waste collections at www.foe.co.uk/resource/briefings/food_waste.pdf), including through promotion of home composting.
- WEEE
- Composites

How should waste prevention be measured?

We recommend the Government measures total waste arisings collected and also the amount of residual waste collected.

In keeping with the Government's stated aim of Zero Waste, we should be aiming towards zero residual waste, as well as aiming at no longer requiring residual waste treatment facilities. Reducing residual waste is a measure of successful waste prevention.

We must ensure there is better data collection, including much data collection of business waste though – this should be part of harmonisation of waste policy for business and household waste.

Preparing for Reuse

General observations:

Far too little effort has been expended on boosting the reuse of goods and materials as opposed to sending them to recycling or, more usually, disposal. This is despite the fact that, after prevention, reuse is at the top of the waste hierarchy.

Reuse has many advantages. Most obvious of these may be the environmental savings in both reduced resource extraction and energy and thus emissions avoided. Further though, reuse has the advantage of creating jobs in reconditioning, resale and so on, in supplying cheap goods such as furniture to low income communities, and avoiding landfill and other disposal costs. Moreover reuse has the potential to appeal to the broad cross-section of society - from the bargain hunter to the green consumer, from the 'retro' enthusiast to those searching out specific tastes or specifications.

Nonetheless huge sums of money, resources and emissions are needlessly wasted annually in the UK. One housing association reportedly spends £100,000 a year landfilling furniture taken out of its properties. Recent figures for London indicate that out of 1.7 million tonnes of furniture discarded in London, only collecting 170 000 items – 10% - were being sent for reuse. About 10,800 tonnes of carbon are saved by this landfill avoidance.^{xxiv}

However there is further scope still for reuse to become a corner stone of the modern economy, with high quality products marketed on a hire and service basis rather than mass produced and sold, often to spend most of their usable life in storage.

Flanders has developed a thriving network of reuse stores,^{xxv} with one per 60,000 people, compared with one per 155,000 people across the UK and one per 233,000 people in London. Discarded goods are sorted, inspected, cleaned and repaired if necessary. They are then resold at very cheap prices. Some have even developed into department stores – with sections for furniture, EEE, toys, clothes, etc.

London recently announced its own plan to create “the world’s largest ‘reuse network’”,^{xxvi} a move welcomed by Friends of the Earth and one which we hope soon to see replicated across the UK.

What more do you think Government, businesses and civil society could do to increase activities that prepare waste for reuse?

Government must work with businesses and civil society to ensure a rapid rollout of the sorts of reuse networks found in Flanders and proposed for London, as described above.

This will require the appropriate mix of funding, tax breaks, training and incentives, but will reward all such effort well through disposal cost savings, job creation, quality of life improvement particularly to poorer communities and much reduced pressure on the environment.

Thus Friends of the Earth calls on the Coalition to conduct a thorough investigation into how, directly or through facilitation of broader ‘Big Society’ type public and private engagement, the benefits of ‘reuse’ can be maximised.

Such networks will prove still more transformative if government sets in train targets, regulations, incentives and clear communication of ambition towards ensuring that goods placed on the market adhere to strict durability, reusability (including ease of repair) and recyclability. The age of the throw-away society must be put permanently behind us, and in its place we should see commonplace appropriately modular design, availability of spare parts and long enough guarantees such that products are no longer disposed of when they could otherwise be reused or upgraded.

Business and civil society should think laterally about reuse, developing new and building on old techniques to promote reuse such the once commonplace bring and buy sales, using community centres, church halls and so on.

Government should explore extending 'producer responsibility' so that incentive exists to enable reuse of goods ahead of recycling and disposal.

Government should work at national and EU level to ensure that regulations and enforcement exist to prevent goods being exported 'for reuse' that in fact are intended for dumping on poorly regulated recycling markets.

Government should use the power lever effect of public procurement by specifying preference for reused and reusable, durable and recyclable goods, whilst ensuring that where possible goods no longer required are sent for reconditioning and reuse.

Business must play its part in ensuring only reusable, durable and recyclable products are placed on the market, that consumers can be confident that products will be long-lasting, and reuse shops and individuals will easily be able to repair faulty goods.

Business - in particular the retail sector - should follow the example of some outlets in providing goods for purchase by weight or volume according to the desires of the customer and in 'packaging' - such as "Tupperware" containers - reused ad infinitum by the consumer. Such 'reusable packaging' will cut packaging waste and so reduce council waste collection costs, goods transport costs, the resource impact of packaging and the unnecessary and unpopular burden of excess packaging on shoppers.

Civil society should consider adopting and encouraging, and business and government must set about facilitating and enabling, more of a 'hire society' and less of a 'consume and throw-away' society.

As per WRAP's 2009 "*Meeting the Climate Change Challenge*" report ^{xii} on the potential role for resource efficiency, Government should aim and plan for a significant shift away from the purchase culture towards a hiring culture, across the range of consumables from clothing and domestic items to vehicles and electronic equipment. Whilst this may be challenging in some areas we are already seeing encouraging signs, such as with the rapid growth of car clubs.

Which waste streams or products are priorities for reuse?

Considerations when prioritising waste streams for reuse (and recycling) should move beyond weight and bulk - for which furniture is an obvious contender - and include embedded resources and energy/carbon, as well as financial value and scarcity of resources.

Thus furniture should be prioritised as its reuse saves bulky and weighty burden on disposal operatives, and reportedly 500,000 tonnes of furniture ends up in residual waste. But WEEE must also be prioritised, in particular for its rare earth metals content and relative difficulty in recycling.

Toys are also currently difficult to recycle, but demand for toys sits at odds with the huge volumes sent for disposal. There is a much greater role available for schemes such as *Freecycle* and businesses such as *EBay* in facilitating exchange of these goods, and for government and civil society in promoting such exchange.

Goods which pose risks to health or the environment, and goods which are otherwise difficult to recycle, should be prioritised.

What are the existing barriers to preparing more waste for reuse from both the household waste stream and the 'Commercial and Industrial' and 'Construction and Demolition' waste streams?

Data on quantity and quality of C&I waste is notoriously poor and efforts should be made to remedy this in order to enable better planning for reuse by the public, private and third sectors.

Nonetheless it is clear that much of what could be reused and recycled is currently landfilled and incinerated. Friends of the Earth calls on the Government to introduce an obligation on business waste collectors to offer collections for reuse and recycling in addition to disposal.

Without such obligation there is not adequate pressure to ensure that waste is treated in line with the waste hierarchy. The result is that disposal to incineration is able to compete with and impede more sustainable alternatives such as reuse and recycling.

Reuse networks, whichever sector runs them, require funds to enable communication of the service, storage and sale space, collections, repair and so on. The Government should consider how best to ensure such funds are available given the greater economic, environmental and social paybacks of reuse schemes.

Collection for reuse should ideally be free to maximise participation.

On the other hand the Government must remove or otherwise appropriately balance subsidies to incineration that compete with reuse. It makes no sense for energy-from-waste incinerator to receive ROCs for burning furniture which could and should have been sold or given on for reuse.

Government must ensure that goods placed on the market meet tough and improving quality standards for durability, reparability, recyclability and so on.

Who is best placed to deliver an increase in reuse? How could civil society take a role?

Government - local and national - will need to provide at least initial support in start loans and grants, in supporting communication of new services, and ensuring - through enforcement if necessary - that waste that can be is prioritised for reuse, in accordance with the waste hierarchy.

Local authorities, or business, could also provide or partner with third sectors organisations to provide large scale retail warehouses, such as the "SuperSheds" and "Trash Palaces" found in New Zealand or those supported by OVAM in Belgium.^{xxv} One of these could be particularly useful for a county council, where items could be sent from all district bulky collections and civic amenity sites.

Local authorities can facilitate communication between reuse organisations, housing departments and registered social landlords.

Local authority bulky waste collection services, and bring sites, should be re-cast to aim for reuse of items collected as the highest priority option.

There is potential for a much greater role for third sector organisations in reuse.

For further information please see:

- *Bulky waste collections: maximising re-use and recycling – a step-by-step guide:*
www.frn.org.uk/pdfs/New%20Toolkit%20Jan%202006.pdf
- *Sorting Residual waste: a guide for councils to save money and help the environment by cutting back on residual waste*
www.foe.co.uk/resource/briefings/residual_waste.pdf

Recycling

Role of national government

Friends of the Earth finds it odd that no role for national government has been suggested here. Roles include but are not limited to:

- Harmonising regulations and obligations between MSW and C&I waste collections, including such that there is an obligation on C&I waste collectors to offer services that treat waste in respect to the waste hierarchy. Thus reuse and recycling should be prioritised over disposal to incineration and landfill, with enforcement if necessary;
- Guidance to local authorities as to best practice in terms both of achieving the best of both the quality and quantity of recycling;
- Guidance to local authorities to ensure the public are aware of the benefits of recycling, and are easily able to recycle both at the kerbside and at bring-sites, and to reduce inconsistency of service between and even within local authorities.
- Legislation and facilitation to ensure that products are designed for recycling (reuse etc) and non/hard-to recyclables are phased out;
- Set high targets and clearly express high ambitions for specific waste streams and for specific sectors, including and in particular packaging, the results of which consultation we continue to anticipate.

In Friends of the Earth's view the one way to achieve synthesis of quality output and public convenience is kerbside-sorted collections in which collection truck operators sort the recycling into compartments in the collection vehicle.

The value of and the need for ambition is clear, not least for the certainty it provides to business and local authorities in looking to determine which technologies to invest in. Scotland and Wales have both set 70% recycling targets for 2025, and the Flanders region of Belgium already recycles nearly 75% of municipal waste.

The Coalition risks greatly embarrassing itself and England as a whole if it fails to set out at least an equivalent level of ambition. In Friends of the Earth's view England should aim for MSW recycling rates of at least 70% by 2020 and 75% by 2025, and take action now to start phasing out non-recyclable waste.

Friends of the Earth researchⁱ shows that by moving to a 70% recycling rate for MSW across the UK we would create more than 50,000 new jobs, directly in recycling as well as indirectly in supporting roles and induced in the wider economy. That's 25,000 more jobs than would be created if the UK only went to 50% recycling - the current English target and the minimum required under the rWFD.

Further, at least another 18,000 jobs would be created if we recycled C&I waste streams at the same rate.

At any time, but especially in the midst of an economic downturn and whilst the Government is committed to creating green jobs, it must therefore be a cross-departmental priority for recycling to be significantly increased - in both quantity and quality - in order to maximise economic as well as environmental gains.

The Government must take steps to correct the pressure provided by PFI grants and the accountancy preference for large one-off capacity expenditure that leads to investment in energy-from-waste plant instead of longer term operational expense on recycling services despite the greater costs and poorer performance of the former relative to the latter.

It is essential to ensure that recycling does not suffer from overcapacity in residual waste treatment, including and especially incineration. Please see the UKWIN submission to the Waste Review, which Friends of the Earth supports, for numerous such examples.^{xi}

Friends of the Earth would also draw the reader's attention to the experience of Denmark, where regions with high incineration show low recycling and vice versa^{xxvii}. The UKWIN submission^{xi} uses Defra data to demonstrate the same effect is at play in the UK. Estimates for recyclability (including composting) of MSW range from 70%^{xxviii} to 93.3%.^{xxix} Nonetheless

some Local Authorities, including for example Birmingham, Coventry, Westminster and Middlesbrough City Councils currently incinerate over 60% of their MSW, recycling less than 30%.

These and other examples of a preference for incineration over recycling indicate the Waste Hierarchy is not being adhered to in the UK, leaving the UK in breach of the rWFD.

The Government should support and develop markets for recyclate, invest in sorting, separation and reprocessing technologies, particularly for plastics and WEEE, and for obligating the quality of recycling necessary to support the UK's reprocessing industry.

Ensuring that comprehensive, ISO compliant LCA is carried out in decision making as to the environmentally as well as economically best way of dealing with waste streams. Such should include the embedded carbon and other resource (including land, water and material) footprints of materials.

It is not acceptable for the UK to claim it is boosting renewable energy and reducing climate changing emissions when it does so through incinerating or otherwise destroying materials that would have saved much more emissions had they been recycled.

It is unlikely that placing a floor price on carbon, or placing a carbon tax on energy generators including incinerators, will do anything to prevent high embedded carbon recyclables being incinerated as long as the embedded carbon of those recyclables is not explicitly considered.

Quality

Efforts to maximise collection quantity have not been paralleled with efforts to guarantee quality of recyclate. As a result UK reprocessors are unable to source sufficient quality recyclate on the UK market and have to look abroad for it.

Meanwhile unacceptably high volumes of UK produced recyclate are sent abroad for recycling in poorly regulated environments including in China, India, and Africa.

The notion that it is morally sound for the UK to dump low grade recyclate in this manner when we could just as well sort it at source is questionable enough in its own right. But we must also question the sustainability of these markets, especially given warnings from China that UK recyclate is amongst the lowest in quality.

The concerns of recycling reprocessors must therefore be given much greater weight in decisions as to the quality of waste and recycling collection services.

Friends of the Earth would like a requirement introduced for all local authorities to publish a register of the end use of all recycled materials, as is currently done by the Somerset Waste Partnership. We believe that such a move will increase public confidence in recycling and therefore help to increase the amount of materials recycled.

Environmental and economic benefits of recycling

Recycling is, as the Waste Review document points out, higher in the Waste Hierarchy than 'recovery' and disposal. Nonetheless unfounded claims are often made as to the better environmental performance of incineration energy-from-waste.

The evidence supporting prioritising recycling over incineration on both environmental and economic grounds is emphatic, including

- a. Ökopol's Climate protection potentials of EU recycling targets^{xxx};
- b. WRAP's "Environmental benefits of recycling - 2010 update"^{xvii}
- c. Friends of the Earth's "More jobs, less waste" report, confirming 10 times as many jobs in recycling as incineration, and vast potential for new jobs under increased recycling rates.
- d. Friends of the Earth's "Gone to Waste" report, showing that the UK buries or burns *at least* £650m per year of recyclable materials.

Even where incineration is deemed to be of similar performance to recycling - such as in contaminated waste streams - the cheaper and more sustainable remedy is not to choose incineration but rather to improve the quality of collection systems (see below), and use MBT to maximise recovery of recyclables (see below under 'Disposal').

The UK is by far the largest EU exporter of recyclable materials to the Far East. UK reprocessors are short of feedstock of sufficient quality due to so much UK paper and plastics being exported as low grade material.

This export masks serious quality and economic issues. Highly contaminated material can be further sorted more economically in the Far East due to lower labour and landfill costs. For most exports of material to the Far East, the exact destination and proportions recycled or disposed of remain unknown. We do not believe this is an acceptable market solution

What should the role and nature of local authority waste management collection and disposal services be?

To maximise both the quality and the quantity - including breadth of waste streams - of recycling whilst working to keep down inconvenience and costs to the tax payer.

To provide for adequate amenity site recycling and on-the-go recycling.

To work together to provide for improved consistency of collection service, communication and outreach, and to create and maintain markets.

To minimise the environmental, social and economic costs of waste and recycling whilst maximising the benefits, including through jobs creation.

To demonstrate value for tax payers' money, including and especially through vastly improved transparency and access to information on contracts with waste and recycling companies. This way the public can judge for themselves whether the council is entering into sustainable, flexible and fair contracts.

To publish an end use register of all recycled materials, as is currently done by the Somerset Waste Partnership. We believe that such a move will increase public confidence in recycling and therefore help to increase the amount of materials recycled.

How can individuals, businesses and communities best be motivated to recycle more?

The most important driver is commitment from Government, which must set a target or at least commit to ambition and policies to realise the ambition of a 70% MSW recycling target by 2020 and 75% by 2025, with similar effort and ambition for business waste too.

This should include a requirement for business waste collectors to prioritise reuse and recycling.

These would help business, local authorities and communities recycle more by allowing them to plan in light of the stated direction of travel.

Stated ambition should be matched with clear communication as to the need to achieve it, including the economic, energy and resource efficiency, environmental and social benefits of increased recycling.

Compulsory recycling has shown success in Barnet, though such schemes should be implemented with care, and should focus initially on education and visits rather than enforcement.

Very high rates of recycling have also been achieved through deposit schemes, as recorded in the CPRE report on deposits schemes "*Have we got the bottle?*"^{xxx1} We call on the Coalition Government to further explore the potential described in this report for deposit schemes in the UK.

Some progress has also been shown from schemes that reward individuals/streets etc who are particularly good at recycling.

Environmental psychology suggest that these sorts of incentive schemes are only the most effective motivator for the small minority of the population who will not be motivated by any other means - such as normative effects, information and education, appealing to different value sets and linking the behaviour to overarching goals.

We would further caution that the evidence from environmental psychology is clear that 'rewards' for behaviours such as recycling 'externalise' motivation for the behaviour such that subsequent removal of the reward is likely to see an overall decline in that behaviour. This has obvious cost as well as performance implications for schemes such as Recyclebank.

Incentive schemes that reward the householder for increased recycling risk unfair exclusion of those living in, for example, high rise accommodation that such schemes are not suited for, and those who cannot afford nor have any desire to pay the required sum in participating businesses that allows for redemption of the voucher.

Friends of the Earth calls on the Government to publish in full the thinking behind its preference for incentive 'reward' schemes, including in full the data used to back up claims for their success, and other policies such as are intended to incentivise higher recycling. Such policy must be clearly rooted in the body of environmental psychology research and demonstrate the involvement of environmental psychologists in designing national and local schemes.

Good quality recycling schemes – for example kerbside separation – can be used to boost recycling rates, as they give people confidence that recycling is really taking place. Conversely, it is essential that every effort is made to ensure that all recyclables are recycled under good conditions – scandals regarding recycling being processed in poor conditions in the developing world are not going to improve confidence or participation.

The public will be motivated by feeling their contribution counts and by being able to see tangible rewards in the form of more green jobs and lower collection costs. They will be demotivated if they know that 10% of their recyclables are rejected to disposal - as is the case in comingling collections - or if they see their junk mail or copies of the local paper being pulled from tips in developing countries after export from a MRF.

Easily storable containers such as bags and boxes promote recycling, though should be agreed with communities affected and depending on the materials being recycled.

Providing householders with financial incentives can increase participation and recycling rates and we support the concept of people paying less if they recycle more. These should be designed to not have a disproportionate impact on any particular sectors of society. They should only be introduced when good doorstep recycling and composting services have been in place for two years and there must be effective consultation and communication with local people.

Reducing the size of the refuse container and charging more for a larger bin or extra bin bags can help to encourage people to take part in the recycling scheme. It can be easier to reduce the amount of waste that people set out if the collection scheme is not tied into using large containers, i.e. 240litre wheelie bins.

How does the choice, including frequency, of collection service impact on the quantity and quality of waste fit for recycling?

The best quality recycling is achieved through kerbside separation, and 87% householders say they do not mind separating recyclables into different containers.^{xxxii} Nonetheless it is up to local authorities to negotiate with communities what option should be adopted.

A reliable approach for collections that aim to safeguard quality whilst maximising quantity collected is to collect dry recyclables including plastic bottles to a 30% diversion level and then begin collecting food waste. The residual waste stream is thereby reduced by well over 50% and the residual portion is unlikely to smell. Following these investments the authority should be able realise savings in its refuse collection provision. The usual way to do this is to reduce collection frequency to alternative weekly collections (AWCs).

AWCs usually means that recycling is collected from households in one week and rubbish is

collected the next, although some councils collect recycling on a weekly basis.

AWC has been found to encourage residents to recycle more of their rubbish. Reducing the frequency of the residual waste collection to fortnightly can also encourage more people to recycle and helps to prevent waste as long as the container size is not increased.

However, in Friends of the Earth's view the frequency of refuse collections should only be reduced to fortnightly where a comprehensive recycling and composting scheme, including the collection of kitchen waste, has been established and the system has been well communicated. AWC can work well when local communities are involved in the decision and understand the environmental benefits.

It is best for local councils to decide whether AWC will be suitable for their area, after consultation with residents and a well-designed education programme. Before fortnightly rubbish collections are introduced, it is important to have weekly food waste collections, which help avoid problems with odour and vermin.

Given that weekly food waste collections are a common, and in our view essential, correlate of AWCs, the Government should stop misleading the public with claims as to the poor hygiene of AWCs.

Just under half of English Waste Authorities carry out AWCs, citing both economic and environmental benefits.

Friends of the Earth is concerned at the pressure the Coalition is placing on local authorities to revert to weekly collections. These could reduce recycling in England from 38% to 32%, cost councils an extra £530m over the next four years and place, as a result, rollout of food waste collections at risk.^{xxxiii} The latter are essential not just to reduce landfill methane but also for the Government's ambitions for anaerobic digestion.

Kerbside separation of recyclables has been shown to consistently and significantly outperform comingled collections in terms of quality, and to perform equally well in terms of quantity of final recyclables sent for reprocessing.

WRAP's report^{xxxiv} demonstrating the above includes the following advice:

"It is well known that the UK has become very dependent on export markets for its collected recyclates. It is less well known that in key areas e.g. paper, aluminium and certain types of glass, UK reproducers are importing materials because sufficient material of the required quality is not available on the UK market"

"Whilst it is true that considerable success is being achieved by some newer MRFs, even they are unable to deliver the levels of quality achieved by kerbside sort systems."

Friends of the Earth believes that separate collection of materials for recycling is technically, environmentally and economically practicable throughout the whole of the UK.

As clear evidence that full separation of domestic dry recyclables can be demonstrated technically practicable anywhere in the UK, we point to the fact that around half of the UK's local authorities collect materials separately, one from another. These encompass authorities with a wide range of terrains, demographics, geographies and socio-economic mixes of population.

In terms of environmental practicability, research published by the Welsh Assembly Government^{xxxv} found that kerbside sort makes more carbon sense than comingled collections.

Work submitted by the Campaign for Real Recycling (CRR) to WRAP in 2008 in support of a funding bid for research into the carbon costs of recycling and residual collections suggested that carbon offset value can be more than halved by comingling contamination and direct carbon emissions can be doubled.

A number of local authorities which collect a wide range of materials separated from each other make more financial sense of their recycling collections than many which comingle the materials. As evidence of this we cite the *Survey of Funding of Municipal Waste Management Kerbside Collection in Wales*^{xxxvi} as well as the direct experience of local authorities and collectors in England and in Northern Ireland.

A similar report, *Kerbside Recycling: Indicative Costs and Performance*,^{iv} modelled thirteen different domestic recycling collection scenarios occurring in the UK and concluded that kerbside-sorted systems make greater financial sense. Defra itself has now endorsed (2.99 in the second Waste Framework Directive consultation document) what has been WRAP's position for the last year, namely to indicate a preference for kerbside sort.

Put simply, material value achieved by keeping the materials apart outweighs any saving in collection costs by comingling them to seemingly simplify collection. Hence we argue that, according to evidence commissioned by Defra, keeping materials separate from each other and thus maintaining quality is a defining factor in achieving best possible value for the service and of materials and therefore the greatest economic practicability.

Comingled collection services should therefore be avoided wherever possible, and kerbside separation be the preferred option. Friends of the Earth calls upon the Government to take steps to ensuring that kerbside separation becomes the norm for waste collections, in line with the revised Waste Framework Directive.

Should greater emphasis be placed on using recyclable/recycled materials in manufacturing and production and, if so, how should this be achieved?

Yes it should, for reasons of resource conservation, energy efficiency, reduced environmental impact at the points of extraction and processing of raw materials, economic security and self-sufficiency, and so on.

However Friends of the Earth believes that if sufficient steps are taken to maximise and guarantee the quality of recycle sent to and used by reproducers then we will see much greater use of recycled materials in manufacture and production anyway. The biggest barrier to uptake - certainly so far as UK industry is concerned - is the dearth of good quality, low- or non-contaminated recycle.

To that end then we advocate the kerbside separated collection systems advocated above, as well as investment in and support for technologies that facilitate better sorting and separation.

Energy recovery

Why incineration EfW is not an appropriate method of disposal

Friends of the Earth takes issue with the implication in the above statement that incineration EfW only takes place on waste left over "*once as much as possible has been prevented, reused and recycled.*"

Please see as outlined above, and comprehensively illustrated in the UKWIN submission to the Waste Review^{xi} which Friends of the Earth supports, that the vast majority of waste that is burned in EfW incinerators could and should have been recycled.

Therefore whilst Friends of the Earth welcomes the Coalition's continued rhetoric as to its commitment to a "huge increase in EfW through anaerobic digestion", the clear implication being that it is anaerobic digestion (AD) that will carry the "huge increase", we are concerned that the Coalition nonetheless at best fails to understand the costs of incineration or, worse, intends actively to promote it.

A primary argument used by proponents of incineration is that the energy so derived, being in part of short-cycle or biogenic (i.e. non-fossil) carbon, is therefore at least in part 'renewable', and should qualify for renewables subsidies and count to the UK's renewables target.

Given the paucity of data as to the composition of much waste sent to incineration it is impossible to be certain what proportion of the waste could be determined 'renewable' at any rate. However if indeed waste is only taken "*once as much as possible has been prevented, reused and recycled*" then claims as to the 'renewableness' of incinerator EfW are all the more troublesome because recycling has the effect of increasing the fossil component of the waste by primarily removing the organic content - food waste, paper and card. What tends to be left is complex plastics - fossil originated.

The composition of the waste is also essential for calculating the direct and indirect emissions arising from its incineration (see below). The climate impact of the facility cannot be said to have been properly considered without proper consideration of embedded emissions as well as those arising directly from combustion or other end-of-life processes such as MBT.

Direct emissions

The evidence that incineration is bad for the climate is unequivocal. Efficiency in terms of carbon emissions is very poor, indeed much worse than would be acceptable under proposed emissions performance standards that set “modern gas fired power stations” as the minimum bench mark.

The Eunomia report *A Changing Climate for Energy from Waste*^{ix} shows how poorly incineration performs in terms of efficiency compared to other energy generators. In terms of fossil-derived carbon emissions electricity-only incinerators emit on average 33% more CO₂ than gas fired power stations. This is set to worsen as improvements in recycling rates lead to an increasing fossil portion (complex plastics) in waste.

Many authorities criticise the exclusion of biogenic emissions from efficiency measures; if one were to count biogenic emissions then electricity-only incinerators are more than four times worse than gas fired power stations and twice as bad as coal and oil power stations.

The same report demonstrates the significance of time over which emissions are released in assessing their impact. Put simply, the climate impact of emissions released rapidly upon combustion of waste in an incinerator is greater than that arising from gradual decomposition of residual waste in landfill after that waste has been composted in a mechanical and biological treatment (MBT) facility. Thus it is better for the climate to maximise extraction of recyclables and then compost the remaining residual to remove most of the remaining biological activity before then landfilling the remainder.

Friends of the Earth recommends as an example of sustainable alternative to incineration of residual waste the New Earth Solutions MBT plant described in our *Sorting the Residual* briefing^{xxxvii}, and which may, through AD, or may not generate energy.

Displaced emissions from other energy sources feeding the grid

Assumptions as to the climate benefit of EfW (et al) through displacement of other, fossil, generation is controversial. Such is the inefficiency of incinerators (particularly when generating electricity only - and given past record there is no guarantee that applications claiming readiness to supply heat will do so) that, if one considers for example that they are displacing modern gas fired generators, they have a net negative impact on climate.

Further, a plant is projected to have a lifetime of some decades. The Committee on Climate Change (CCC) has called^{xxxviii} for complete decarbonisation of the grid by 2030, some years before many currently operating plants, let alone those in planning, are likely to close. Given that decarbonisation will happen over time rather than overnight it is inevitable that current and future consented plants will be net displacers of *lower* carbon electricity than they themselves produce before too long.

As per above the fossil content of waste will rise as more of the biogenic fraction is removed for recycling and it is increasingly the complex plastic that is left. A recent Swedish study^{xxxix} demonstrated that unless incinerators are running at treble the current average efficiency it is better for the climate - even in terms of direct emissions alone - to landfill plastic than incinerate it with energy recovery.

Embedded emissions

Energy from waste, as with any waste processing option, must be considered from a total life cycle perspective including the embedded emissions associated with extraction, refining, manufacture and so on of materials that could otherwise be recycled, displacing the need to repeat these processes on raw materials.

See below (Table 1) for data from Friends of the Earth's Gone to Wasteⁱⁱ report which compares the climate impacts of landfilling, incinerating and recycling key materials in the waste stream. The climate benefit of recycling over incineration is clear.

This point has been confirmed in a meta-analysis of ICO-compliant life cycle analyses (LCAs) by WRAP^{xvii}, which shows that it is almost always better to recycle than to incinerate. Indeed even when recycling and incineration are of comparable climate impact that is arguably because of poor quality collection systems - if there were more kerbside separated collections and fewer comingled then the case for recycling would be even stronger.

If the Coalition is serious about tackling climate change then it must ensure that the UK plays its part in ensuring emissions reductions through reuse and recycling, even if those emissions reductions are 'achieved' abroad through export of recycled goods to manufacturers overseas.

The Coalition must not masquerade EfW incineration as climate-benevolent 'renewable' energy when through the destruction of goods and processed materials combustion creates far less 'renewable' energy – not to mention inefficient fossil energy – than is required to produce these goods and processed materials again from scratch.

Unless proposed 'carbon taxes' on power stations, including EfW incinerators, consider embedded emissions they will not suffice to prevent incineration from destroying the embedded carbon in recyclable and reusable materials.

There is therefore, in Friends of the Earth's view, no alternative but to ensure rigorous application of LCA in accordance with the Waste Hierarchy and the Coalition must ensure that this is the approach taken to determining waste policy.

Biogenic emissions

Once biogenic i.e. non-fossil emissions are taken into account - they are usually ignored when calculating emissions from power stations - incinerators perform even worse in comparison to other generators. Their exclusion is unjustifiable and Friends of the Earth calls on the Coalition to ensure biogenic emissions are included when assessment is made as to the climate impact of energy from waste facilities

As above, if one were to count biogenic emissions then electricity-only incinerators are more than four times worse than gas fired power stations and twice as bad as coal and oil power stations.

Displaced emissions from landfill

Another concern is how emissions are calculated for landfill relative to incineration. For much biogenic waste a high percentage of the carbon will be emitted as carbon dioxide at the point of combustion.

For landfill on the other hand 70% is likely to be emitted as either methane (which may be captured) or carbon dioxide, the remaining 30% effectively trapped in landfill and taking much longer to degrade. Yet that 30% is disregarded, which means that it is not counted as it should be towards a climate *benefit* to landfill relative to incineration.^{ix}

If the Coalition is genuinely interested in ensuring the best choice of disposal of waste in carbon terms then Friends of the Earth calls on it to ensure that claims as to emissions savings by diversion from landfill have accounted adequately for the carbon sequestered in landfill over the medium term horizon.

Claims as to the emissions saved from landfill through incineration almost to a rule fail to make the same comparison with reuse and recycling, despite there being no evidence that the waste in question is not suitable for either.

Further, it is clear that incinerator bottom ash consists in not insignificant part of incompletely combusted organic material. Where this ash is landfilled it will release emissions.

Friends of the Earth calls on the Government to subject incinerator bottom ash (IBA) to the higher rate of landfill tax with immediate effect.

Table 1: CO2 emission factors per recyclable fraction Source: Ökopol 2008v (page 11, references page 19), updated by WRAP (2009) xi

Material	CO2eq per tonne of landfilled fraction	CO2eq per tonne of incinerated fraction sent for energy recovery	CO2eq per tonne of recycled fraction	Source
Paper and card	2.20	1.40	1.30	CEPI (2007)xii FEFCO (2006)xiii Ecoinvent (2003)xiv Procarton (2008)xv Environment Agency (2005)xvi
Plastic packaging	3.10	5.00	1.50	WRAP (2006)1 Defra (2009)xvii
Textiles	18.00	9.00	2.002	Allwood <i>et al</i> (2006)xviii ERM (2006)xix Morley <i>et al</i> (2006)xx Wooldridge <i>et al</i> (2006)xxi
Glass packaging	0.84	0.84	0.53	WRAP (2006)
Steel packaging	3.00	1.30	0.70	WRAP (2006)
White goods	3.00	3.00	0.70	WRAP (2006)
Aluminium packaging	11.05	11.05	2.00	WRAP (2006) EAA (2008)xxii
Garden waste	0.2	-0.14	-0.12	Grant (2003)xxiii WRAP calculation (2007)xxiv
Kitchen waste	4.50	4.20	4.08	WRAP calculation (2007)xxiv Lundie and Peters (2005)xxv

Climate impact factors from various sources cited on pg 4, Gone To Waste
www.foe.co.uk/resource/reports/gone_to_waste.pdf

Friends of the Earth also questions the quality of the WRATE tool for comparison of waste management options. Friends of the Earth, in common with a number of organisations and individuals, believes that the WRATE tool as currently designed is flawed to the extent that it is not sufficiently reliable.

Amongst other concerns, it underplays the extent to which stabilisation-type treatments decrease the environmental impact of material that is landfilled after being stabilised, and underestimates the amount of methane emission that results from non-stabilised wastes sent to landfill.

Friends of the Earth supports the criticisms of WRATE described in the UKWIN submission to this review.^{xi}

An additional problem with incineration is the effect on aluminium in the waste stream. Incomplete oxidation can leave small flecks of aluminium that may oxidise later by reducing water so releasing hydrogen.

Incinerator bottom ash (IBA) is frequently used in the construction industry, including for foamed concrete. The Highways Agency has issued guidance^{xi} banning its use after explosions of foam concrete made from IBA in which two men suffered fractured feet.^{xii} The market for IBA has suffered somewhat as a result.

Impacts on recycling and reuse

The impacts of incineration are not limited to the climate. We must also consider the destruction of materials and resources that would otherwise have been reused or recycled or converted more efficiently and sustainably e.g. through anaerobic digestion (AD) into energy.

The UK buries or burns at least £650m per year of recyclable materialsⁱⁱ at a time when global pressure on and competition for resources has never been higher.

As detailed in the section above and in the UKWIN submission,^{xi} EfW incineration clearly impedes recycling and reuse.

Incineration creates a demand for waste that is at odds with efforts to prevent its arising in the first place, the first and most important step in waste management. By trapping councils in often decades-long contracts at huge expense incinerators create a demand for waste that competes with efforts to prevent it and boost reuse and recycling programmes.

Friends of the Earth believes that given the spectre of unsustainable pressure on fragile ecosystems, current and likely resource wars, and inequalities of consumption across the world, developed countries should be reducing their consumption of natural resources.

A key part of that must involve moving towards a closed-loop economy that recycles these materials. Incineration is incompatible with such an economy.

Costs to the tax payer and the wider economy

As above, incineration ties local authorities into hugely expensive and decades-long contracts due to the huge capital costs.

They require large capacity to ensure profitability, which in turn creates a demand for waste that can lead to councils being fined or being forced to pay prohibitive 'capacity costs' if they fail to provide enough waste to power the incinerator.

Aside from competing for waste with recycling and reuse this also leads EfW incinerators to require large 'catchment areas', in violation of the 'proximity principle'. Evidence abounds of incinerators seeking and receiving variations in capacity permits from the Environment Agency in order to bring in more waste and from further afield in order to maintain operation. Please see the UKWIN submission for case details.^{xi}

Incineration creates a tenth of the number of jobs that recycling provides, whilst also starving the economy of raw materials.

Incineration is and will remain unpopular with the public such that attempts to force

incinerators through the planning system will result in further waste of time and tax payers' money as the public, quite rightly, oppose them.

Incineration converts non-toxic recyclable materials with a market value to IBA – whose toxicity and polluting effect is at the least a cause for concern – and 'fly ash', which is the highly toxic ash etc captured in the filters. Both require landfilling, at further cost, the latter requiring higher landfill cost and effort to ensure security within the landfill

Further, EfW incinerators require monitoring of emissions, as well as ash output, which in turn requires expenditure through the EA and others.

Incineration tax and subsidy

Friends of the Earth therefore reiterates its call on the Coalition to ban the disposal of recyclable and reusable materials to incineration, to implement an incineration tax of at least £40 per tonne, and to reclassify IBA in the upper band of landfill taxation.

Friends of the Earth also calls on the Coalition to commit publicly to an end to PFI grants and other support for EfW incineration, and for a phase out of incineration altogether, with non-recyclable waste treated in high quality MBT as below.

For other thermal treatments Friends of the Earth reiterates that many of the same concerns apply – such as relative carbon impact and resource efficiency costs relative to recycling – and calls for thorough LCA of all developing technologies for waste treatment before they are consented for mass use.

Incineration and the planning system

Friends of the Earth is concerned at repeated suggestions that the planning system is a barrier to EfW incineration.

That it may be so is because people are expressing their rights to object to unnecessary, expensive and unsustainable waste infrastructure.

Attempts to reform the planning system to remove communities' rights to object, or to force large plant through using the IPC, are likely to meet with increased protest and resistance as communities feel their rights are removed from them.

They would also be totally against the grain of and claims for the Coalition's 'Localism' agenda.

Whilst the planning system retains inefficiencies which could yet be improved upon, the solution to public resistance to incinerators is not to either bribe the public with cash sweeteners or force the applications upon them, but rather to ensure that sustainable alternatives are found which are modular, flexible, cheaper and designed for local and community use in keeping with the proximity principle.

Anaerobic digestion

Friends of the Earth welcomes the Coalition's commitment to anaerobic digestion (AD) and looks forward to a rapid roll-out of this technology.

AD is genuinely renewable energy, and does not result in the loss of valuable energy and resources.

It also creates in the form of the digestate a useful fertilizer for agricultural land.

What role should Government, industry and voluntary groups play in communicating the benefits of EfW to local communities?

As above Friends of the Earth does not consider that there are benefits of EfW incineration to communicate, and remains sceptical about other forms of thermal treatment.

In order to facilitate communication of the benefits of AD the difference between it and EfW incineration must be made clear.

Where the public can be reassured about the lack of odour, and where the plant is small enough that the community need not worry about huge increases in haulage, it is likely that AD plants will be accepted. Recent coverage of AD has tended to be positive, including for example that of AD generated gas from human sewage.

All parties must be honest and transparent about costs to the tax payer, including contracts between councils and waste companies.

The public should be made aware of the range of benefits of AD, from power generation to landfill methane reduction to agricultural fertiliser, and its role in the larger move towards sustainability should be highlighted to emphasise the 'bigger picture' that it forms a part of.

How can Government best support local government in the development of waste management plans that include EfW facilities?

Government must ensure that schemes such as Feed-in Tariffs provide and continue to provide the necessary boost to the fledgling AD industry.

Markets should be encouraged through incentives and support communication etc, particularly for the use of AD derived biogas for injection into the gas grid and use in transport, its two most efficient uses.

What steps can be taken to encourage community ownership of EfW facilities?

Communities must be allowed to benefit, through schemes such as co-operatives, use of Feed-in Tariffs and so on.

Small facilities that are suitable for community ownership should be supported and encouraged at the expense of large facilities that exclude community ownership and tend to result in communities feeling the facilities are thrust upon them.

Disposal

Landfill is vastly cheaper than incineration and does not require constant feedstock, unlike incineration.

Unlike incineration, there is a potential for landfill mining in the future.

Unless incinerator operators can prove that based on a feedstock of non-recyclable and non-compostable residual material, the facility would be deemed efficient in accordance with the Revised Waste Framework Directive, incinerators should be classified as a form of disposal, rather than recovery, within the waste hierarchy. They should also be required to demonstrate that such feedstock would be available for the lifetime of the facility without violating the proximity principle.

With overall municipal waste volumes stabilising or beginning to fall, ongoing increases in recycling rates and the opportunities for further reducing residual waste through policy changes, it is vital that local authorities plan for reducing amounts of residual waste, and for flexible technologies that can adjust to changes in volume and composition of this waste.

This approach is backed by the English Waste Strategy 2007, where the government emphasise the need for "*flexible – eg modular buildings, and also flexible contracts, which do not lock in fixed amounts of waste for treatment which might become obsolete.*"

Some technologies are inherently inflexible (eg incineration) whilst others can be flexible and modular, with modules that can be converted to composting and general recycling (eg, some MBT technologies) allowing capacity to be adjusted to meet demand.

Despite the evidence on stabilising growth rates and the potential to increase recycling, many new large waste treatment facilities including incinerators are being built based on

unambitious projections of future recycling rates and waste growth. We need to avoid costly new waste infrastructure with long contracts constraining our future flexibility in dealing with waste.

How best to further reduce the amount of waste going to landfill?

Mechanical biological treatment (MBT)

The actions required to reduce amount of waste going to landfill have been described in the answers above relating to waste prevention, reuse, recycle, composting/AD.

By implementing these actions, the amount of residual waste collected by councils will reduce significantly. However, there will still be some recyclable materials left in the residual waste that is collected.

A well designed mechanical biological treatment (MBT) technology should be used to maximise the removal of any recyclable materials remaining in the waste stream.

MBT plants should be designed to maximise removal of recyclable materials, including metals, mixed plastics, paper, glass, card and textiles by combining a number of screening and sorting techniques.

An effective MBT technology also removes most of the biological activity of the waste, stabilising it so that it can be landfilled without releasing significant amounts of methane.

The biological activity should be reduced sufficiently to meet Environment Agency requirements, meaning landfilling the MBT residue will not count towards Landfill Allowance Trading Scheme (LATS) targets for landfilled biodegradable municipal waste.

If the residue is clean enough it may also be usable for low-grade soil, eg for land reclamation on brownfield sites, landfill restoration or as a soil additive.

For example, a new facility operated by New Earth Solutions, in partnership with Lafarge Aggregates, has just opened to treat 50,000tpa of Leicestershire County Council's residual household waste. The organic end product being used to restore a landfill site.

Research has clearly shown that, even if the residue is landfilled, this is better for the climate than incineration (including incineration with heat recovery).^{xxxvii}

Friends of the Earth does not support burning the residue either as a Refuse Derived Fuel or Solid Recovered Fuel.

If MBT is not used for the treatment of residual waste, the alternative is to process all waste through a materials recovery facility (MRF) to remove as many recyclables from the waste stream as possible. MRFs typically recover around 10 – 15 per cent of material as recyclables from residual waste.

Further policies

We support the use of laws, regulations, incentives and investment to promote durability and recyclability. Further actions required include the elimination of non-recyclable products and materials, behaviour change, and work across industry, not just household waste, ensuring harmony and obligation to recycle plus efforts to minimise waste in first place.

Incinerator bottom ash (IBA) is being produced in increasing quantities in the UK, as the amount of waste incinerated is increasing. Much of this ash is landfilled, so avoiding incineration will reduce use of landfill. The current lower tax rate on IBA provides incineration with a large effective subsidy. IBA is not an inert waste so should not benefit from a lower rate of taxation. We therefore support including IBA in the higher rate of landfill tax.^{xx}

The landfill tax escalator should be continued, and landfill tax on stabilised MBT residues should be cut.

What are the types of waste where a continuation of landfill might be acceptable?**Plastic**

There is much evidence that it is better to landfill un-recyclable plastics than to incinerate them.^{xxxix}

The Government acknowledges in the 2007 Waste Strategy that “burning plastics has a general net, adverse greenhouse gas impact due to the release of fossil carbon” and that this can “outweigh the returns of energy recovery”.

Recycling, by contrast, shows “significant potential for carbon and energy savings through displacing virgin materials”.

Bio-stabilised residue from MBT (separation and composting) processes

The environmental advantages of landfilling MBT residues over using them as a fuel is supported by the detailed studies produced by Eunomia consultants^{ix}. As explained in the ‘Recovery’ section above, the reason for this is that incinerating the residue releases fossil-fuel derived CO₂, from plastics and other materials, into the atmosphere.

Inert, non recyclable C&D materials are another waste stream that might be acceptable for landfilling.

When should we aim to be as close to zero waste to landfill as possible?

This is the wrong question. We believe that aiming for zero waste to landfill is a misdirected aspiration, as it could result in waste simply being displaced away from landfill to disposal by incineration instead.

Instead, we should be aiming for true Zero Waste. Please see UKWIN's response^{xi} regarding the aims of zero waste, which we support.

Furthermore, zero waste to landfill is not achievable using incineration, as at least some if not all bottom ash and Air Pollution Control residues are landfilled, sometimes in the form of hazardous landfill. Provision for hazardous landfilling is inadequate to handle sustained deliveries of hazardous / eco-toxic incinerator ash.

Appendices

Appendix 1: Friends of the Earth's comments on variable charging in our response to the Government's consultation on the England Waste Strategy in 2006

For the full text of our response, see:

www.foe.co.uk/resource/consultation_responses/waste_strategy.pdf

Question 9: Are there further tradable allowance (or other) schemes that could be developed to help the market deliver environmental outcomes more efficiently?

Friends of the Earth would like councils to be given the powers to implement charging schemes for householders to encourage waste prevention, reuse, recycling and composting. Charging householders for the amount of waste they put out for disposal has the potential to dramatically change the way individuals perceive their waste production and how they manage it. Variable charging schemes have been implemented in many European countries including Austria, Belgium, Denmark, France, Germany, Ireland, Italy, Luxembourg and Sweden, and have had a significant impact, increasing recycling by 30-40 per cent [xiv].

Many reports have shown that variable charging experiences in other European countries have led to both a reduction in residual waste collected and increases in the amount put out for recycling [xiii]. A report carried out for CIWM found that the residual waste collected falls, by about 10-25 per cent. In fact in weight based systems 30 per cent reduction was not uncommon [xiii]. This report also showed that direct charging schemes can help reduce levels of residual waste to less than 150kg per inhabitant. In the UK, currently average is 400kg per inhabitant.

There has been some debate whether we can incentivise householders to reduce waste rather than penalise them. In a recent report carried out by Corus [6] the threat of penalties was found to be more effective than the reward system. Nine authorities had tried introducing the threat of penalties, and all who had introduced this measure found it to be effective. The London Borough of Barnet, the first council to introduce compulsory recycling backed by fines, said it had been contacted by 80 other authorities. The scheme went borough-wide in March 05, after a year's pilot in four wards from 1st April 2004. Over those two years, recycling has risen from nearly 17 per cent to 29 per cent of waste.

A recent survey found that many councils would be keen to set up charging schemes if they had the power to do so [xiv]. A survey of 87 recycling and waste management officers and managers in local authorities found that nearly 40 per cent would introduce separate waste charging schemes for households. The respondents also believed this action would increase householder awareness of the cost of waste collection and disposal, make people responsible for their waste and promote waste prevention and recycling. To ensure that these schemes can be put in place fairly there need to be good doorstep collection schemes in place for recyclable and compostable materials and good alternatives, such as reusable nappies for avoiding non-recyclable waste. Friends of the Earth believes that systems must be designed to avoid a disproportionate impact on low-income families. However, this issue could be addressed through a rebate system similar to the one in operation for the council tax. Initially, there may be an increase in fly-tipping, but research shows this has not been a major problem in other countries. Putting in place high fines for fly-tipping helps to avoid the risk.

Variable charging schemes need to be developed with the support of the public so we are calling on the Government to give local authorities the power, but not a requirement, to develop schemes appropriate to their local situation.

Appendix 2: Relevant comments from the House of Commons Communities and Local Government Committee report on “Refuse Collection”

In their report on “Refuse Collection” [^{xiv}], the House of Commons Communities and Local Government Committee made a number of pertinent comments on the proposed charging scheme, in particular on what will actually be the incentive for local authorities to implement such incentive schemes.

This is the relevant section of their conclusions and recommendations:

17. Revenue-neutral financial incentive schemes aimed at improving local recycling will raise no money for councils and will therefore do nothing to help them manage their waste budgets in the face of rising costs. Indeed, since ‘revenue-neutral’ does not mean ‘cost-neutral’, and since any scheme introduced by a local authority will require substantial administration and enforcement costs, they may in practice, run directly counter to the intentions Sir Michael Lyons expressed in recommended local charging schemes, by adding a further cost to the growing burden local authorities must carry.

18. It is hard to see how a resident faced with a ‘financial incentive scheme’ bill for even the indicative £30 contained in the Government’s consultation will see it as anything other than a charge, or a tax.

19. It is hard to see why any council will want to set up a complicated charging scheme that earns it no money and risks widespread public disapproval.

20. We recommend that the Government clarify how financial incentive schemes for recycling will interact with council tax. We seek a detailed explanation of why the introduction of incentive schemes should not be accompanied by reductions in council tax. In particular, we are concerned by the suggestion that schemes “should not” require additional funding from council tax. Whether a local authority raises or reduces its council tax to fund schemes or incentives to local householders is a matter for individual councils.

21. The Government recognises the risk that new financial incentive schemes to increase recycling and minimise waste may result in more fly-tipping or in people attempting to cut their bills by putting their rubbish in their neighbours’ bins. We are not convinced that enough work has been done or guidance given to local authorities on how to prevent such risks from blighting areas and causing disputes. Nor are we convinced that local authorities already faced with increasing waste costs will be adequately funded to deal with increased administration, clear-up and prosecution costs.

22. We welcome the Government’s recognition that specific groups, such as large families or those on council tax benefit, should not be disadvantaged by the introduction of financial incentive schemes for increased recycling and waste reduction.

23. The Government needs to clarify what will happen to householders who refuse to pay additional charges levied under any new financial incentive scheme. Given the small sums involved, prosecution seems an unlikely answer. Given the impact on other householders, councils cannot be allowed not to collect rubbish left out by non-payers. We are unconvinced that councils possess any adequate sanction against refusal to pay and question whether that might not substantially undermine schemes that local authorities may wish to introduce.

24. The financial incentive schemes proposed by the Government offer individual householders very little reward for good behaviour and offer councils no immediate financial incentive. We cannot believe that giving some households £20 or £30 a year will remotely outweigh the negative psychological impact of making other households pay more for a service they believe they already pay for through taxation. Breaking the link with council tax and establishing refuse collection as a utility, like gas or sewerage, might have the radical impact the Government say they want. The half-hearted tilt in the direction of charging contained in their current proposals will not.

Appendix 3 - Waste prevention in Flanders

From the write-up of Friends of the Earth's conference 'Taking out the Rubbish'
www.foe.co.uk/resource/reports_on_events/taking_out_the_rubbish.pdf

Home composting is used by 25% of the Flemish households (mainly in rural areas). There are 5 compost masters per 10,000 inhabitants – trained volunteers who explain how to compost at home.

Communication campaigns, the training by compost masters and household waste charging are crucial to convince people to start home composting.

Vegetable, fruit and garden waste disposal is charged for, to provide an incentive to home compost. Neighbourhood composting is promoted in urban areas, so people in flats can take waste to a compost space near their flat. A volunteer acts as compost master for green space.

'No junk mail please' stickers are distributed to reduce waste paper. Communication campaigns on waste prevention are targeted on schools, organisers of large events and shops etc. Financial support is provided for local authorities to launch waste prevention initiatives, such as reusable nappies promotion, installation of drinking fountains in schools, promotion of lunchboxes etc.

Ecodesign is promoted by OVAM, the Flemish Public Waste Agency, using a tool for designers to create environmentally friendly products, and ecodesign awards. They also have the eco-efficiency scan, aimed at identifying opportunities for eco-efficiency improvements within small and medium sized enterprises, for instance analysis on whether the amount of waste produced or energy and water consumed can be reduced or whether more materials can be recycled, etc. OVAM covers the cost of a consultant to undertake the scan, so it is free of charge for the enterprise. 1000 enterprises have been scanned so far.

There is a website on green procurement for local authorities, which includes green office supplies, cleaning products and electric/electronic equipment. It also includes ecological criteria that can be integrated into public tenders.

The future waste prevention objectives of the Flemish region are to have more innovative materials and products entering the Flemish market. They aim that by 2015 the retail sector will offer and sell more sustainable products, compared to 2008, and more sustainable products will be consumed. The government should show a central exemplary role in sustainable consumption via green public procurement. There should be an increase in sustainable production and consumption in absolute and relative terms.

By 2010, the aim is for a far-reaching decoupling between economic growth and waste production i.e. stabilisation of waste generation compared to 2000 at 560 kg/inhabitant. There is also a target for 2% prevention (dry fraction) per year (like packaging, nappies and paper), which has almost been reached, to compensate for economic growth. A target for 25% of households to engage in high-quality home composting has already been reached.

- ⁱ Friends of the Earth (2010): *More jobs, less waste*
www.foe.co.uk/resource/reports/jobs_recycling.pdf
- ⁱⁱ Friends of the Earth (2010): *Gone to Waste*
www.foe.co.uk/resource/reports/gone_to_waste.pdf
- ⁱⁱⁱ WAG August07
- ^{iv} WRAP (2008): *Kerbside Recycling: Indicative Costs and Performance*
www.wrap.org.uk/downloads/Kerbside_collection_report_160608.6459f192.5504.pdf
- ^v HM Customs & Excise (2004): *Combining the Government's Two Heath and Environment Studies to Calculate Estimates for the External Costs of Landfill and Incineration*
- ^{vi} Friends of the Earth (2009): *Overconsumption? - new report on Europe's use of the world's natural resources* www.foe.co.uk/resource/reports/overconsumption.pdf
- ^{vii} Oral evidence to the Environment, Food And Rural Affairs Committee - from Transcript of Oral Evidence, EV14, 15th October 2008, published as HC 1100-i.
www.publications.parliament.uk/pa/cm200708/cmselect/cmenvfru/uc1100-i/uc110002.htm
- ^{viii} For evidence of APC residue having been released into the atmosphere see:
www.thisisgloucestershire.co.uk/news/Hazardous-waste-escaping-Bishop-s-Cleevesite/article-2321415-detail/article.html
- ^{ix} Eunomia Research and Consulting (2006): *A changing climate for energy from waste?*
www.foe.co.uk/resource/reports/changing_climate.pdf
- ^x WAG (2009): *Kerbside Recycling in Wales: Environmental Costs*
wales.gov.uk/docs/desh/consultation/090429wastekerbrecyclecostsen.pdf
- ^{xi} UKWIN (2010): *UKWIN's response to Defra's Call for Evidence to inform the UK Government's Review of Waste Policies*
www.ukwin.org.uk/files/pdf/UKWIN_DEFRA_Submission_4_October_2010.pdf
- ^{xii} WRAP (2009): *Meeting the UK climate change challenge: The role of resource efficiency*
www.wrap.org.uk/downloads/Final_Report_EVA128_SEI_1_JB_SC_JB3.8674e8bc.8038.pdf
- ^{xiii} ONS (2009)
- ^{xiv} Resource Recovery Forum (2003): *"High diversion: Is it achievable?"*
- ^{xv} Friends of the Earth (2010): *Consultation on the introduction of restrictions on the landfilling of certain wastes: Response from Friends of the Earth*
www.foe.co.uk/resource/consultation_responses/landfill_response.pdf
- ^{xvi} WRAP/Eunomia (2010): *Landfill Bans: Feasibility Research*
www.wrap.org.uk/wrap_corporate/publications/landfillban.html
- ^{xvii} WRAP (2010): *Environmental benefits of recycling - 2010 update*,
www.wrap.org.uk/wrap_corporate/publications/benefitsrecycling.html
- ^{xviii} Friends of the Earth Europe (2010):, *Measuring our resource use - a vital tool in creating a resource-efficient EU* www.foe.co.uk/resource/briefings/measuring_resource_use.pdf
- SERI & Friends of the Earth Europe (2009): *How to measure Europe's resource use - an analysis for Friends of the Earth Europe*
www.foe.co.uk/resource/reports/measuring_resource_use.pdf
- Friends of the Earth (2009): *Overconsumption? - new report on Europe's use of the world's natural resources* www.foe.co.uk/resource/reports/overconsumption.pdf
- Friends of the Earth Europe (2010): *Measuring Europe's Resource Use conference*
www.foe.co.uk/resource/reports_on_events/resource_use_conference.pdf
- ^{xix} Friends of the Earth (2010): *Consultation on Implementing the Packaging Strategy Response from Friends of the Earth*
www.foe.co.uk/resource/consultation_responses/packaging_response.pdf
- ^{xx} Friends of the Earth (2009): *Modernising landfill tax legislation Response from Friends of*

the Earth, www.foe.co.uk/resource/consultation_responses/landfill_tax.pdf

^{xxi} Resource Futures, 2009, *WR0121 – Understanding Waste Growth at Local Authority Level, FINAL REPORT to Defra*

www.pbmsolutions.co.uk/11%20Knowledge%20Sharing%20Centre/Resouce%20Futures%20Understanding%20Waste%20Growth%20at%20Local%20Authority%20Level.pdf

^{xxii} Friends of the Earth (2007): *Food waste collections*,

www.foe.co.uk/resource/briefings/food_waste.pdf

^{xxiii} www.letsrecycle.com/resources/doc/news/Waste_Management_Quick_Guide.pdf

^{xxiv} Richard Featherstone, Furniture Reuse Network, cited in Friends of the Earth's (2009)

"Taking out the Rubbish" conference notes

www.foe.co.uk/resource/reports_on_events/taking_out_the_rubbish.pdf

^{xxv} Lore Mariën, OVAM, cited in Friends of the Earth's (2009) "Taking out the Rubbish" conference notes. www.foe.co.uk/resource/reports_on_events/taking_out_the_rubbish.pdf

^{xxvi} www.london.gov.uk/media/press_releases_mayoral/%C2%A38m-create-uk%E2%80%99s-first-city-wide-reuse-and-repair-service

^{xxvii} Friends of the Earth (2007): *Up in smoke: Why Friends of the Earth opposes incineration*.

www.foe.co.uk/resource/media_briefing/up_in_smoke.pdf#page=4

^{xxviii} Audit Commission (2008): *Well Disposed: Responding to the waste challenge*. www.audit-commission.gov.uk/SiteCollectionDocuments/AuditCommissionReports/NationalStudies/WellDisposed25Sep08REP.pdf

^{xxix} WAG (2007): *Future directions for municipal waste management in Wales - a paper for discussion*. <http://wales.gov.uk/docs/dsjlg/meetings/090106pc304annex2e.doc>

^{xxx} Ökopol (2008): *Climate protection potentials of EU recycling targets*

www.eeb.org/publication/documents/RecyclingClimateChangePotentials.pdf

^{xxxi} CPRE (2010): *Have We Got the Bottle? Implementing a Deposit Refund Scheme in the UK*. www.cpre.org.uk/filegrab/Havewegotthebottle.pdf?ref=4438

^{xxxii} WRAP (2009): www.wrap.org.uk/media_centre/press_releases/kerbside_or.html

^{xxxiii} "Return to weekly collections would slash recycling, says DEFRA". ENDS Report 428, September 2010, p. 5 www.endsreport.com/25008/return-to-weekly-collections-would-slash-recycling-says-defra

^{xxxiv} WRAP (2009): *Choosing the right recycling collection*.

www.wrap.org.uk/downloads/Choosing_the_right_recycling_collection_system.93ae1144.7179.pdf

^{xxxv} WRAP (2009): *Kerbside Recycling in Wales: Environmental Costs*

wales.gov.uk/docs/desh/consultation/090429wastekerbrecyclecostsen.pdf

^{xxxvi} Welsh Assembly Government (2007): *Survey of Funding of Municipal Waste Management Kerbside Collection in Wales*

[www.realrecycling.org.uk/resources/files/collection_and_sorting/Local%20authority%20collection%20costs%20analysed%20\(Wales\).pdf](http://www.realrecycling.org.uk/resources/files/collection_and_sorting/Local%20authority%20collection%20costs%20analysed%20(Wales).pdf)

^{xxxvii} Friends of the Earth (2008): *Sorting residual waste: a guide for councils to save money and help the environment by cutting back on residual waste*.

www.foe.co.uk/resource/briefings/residual_waste.pdf#page=12

^{xxxviii} The Committee on Climate Change (2008): *Building a low-carbon economy – the UK's contribution to tackling climate change*. www.theccc.org.uk/pdf/7980-TSO%20Book%20Chap%205.pdf

^{xxxix} Ola Eriksson and Goran Finnveden *Plastic waste as a fuel - CO2-neutral or not?*, Energy & Environmental Science, 2009, 2, 907–914

www.rsc.org/publishing/journals/EE/article.asp?doi=b908135f

^{xl} www.standardsforhighways.co.uk/ians/pdfs/ian127.pdf

^{xii} ukwin.org.uk/2010/01/29/iba-banned-from-use-in-highways-projects/

^{xlii} Ernst & Young LLP (2002): “*Analysis of the application of the producer pays principle to producers of household waste as a driver towards sustainability*”.
www.esauk.org/publications/reports/erstandyoung.pdf

Aspinwall, Enviro (2000): “*Local Authority Waste Charging Scheme Best Practice Evaluation Study*” www.sepa.org.uk/pdf/nws/research/sniffer_household_charging.pdf

^{xliii} CIWM (2003): “*Waste collection: to charge or not to charge?*” www.ciwm.co.uk/pma/30

^{xliv} “*State of the Nation report 2005*”, Materials Recycling Week, April 2005.

^{xlv} House of Commons Communities and Local Government Committee. (2007): “*Refuse Collection*”. www.publications.parliament.uk/pa/cm200607/cmselect/cmcomloc/536/536i.pdf