Taking out the rubbish

Maximising recycling and minimising residual waste

27th April 2009

This conference was organised by Friends of the Earth in partnership with the community interest company REalliance, which has been established to help build a sustainable economy, www.realliance.org.uk.

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Ray Georgeson - Chair, REalliance community interest company

Welcome from the Chair

REalliance has been set up to support the development of the third sector in waste and resources, it has great ambitions for the movement towards a more sustainable economy, and presently is made up of the representative networks: the Community Recycling Network, Furniture Reuse Network, Community Composting Network and the London Community Recycling Network. Together they work very effectively in a programme that is funded by WRAP and Defra, to continually develop and improve the ability of third sector groups and social enterprises to play their full part in the recycling and resource recovery economy that we want to see.

1. Dr Michael Warhurst, Friends of the Earth

Setting the scene - the environmental and economic challenges

View slides at http://www.foe.co.uk/resource/event_presentations/1_michael_warhurst.pdf

We have been doing well, with UK recycling rates increasing substantially in recent years, from 12% in 2000/01 to over 35%. This demonstrates those who thought we would not be able to reach even 25% recycling were wrong.

Also, waste volumes are now decreasing – even before the recession municipal solid waste (MSW) was down around 2% in England in financial year 07/08. We should therefore congratulate ourselves - local councils, the recycling industry, WRAP, the Government, Friends of the Earth local groups - and the Household Waste Recycling Act, which Friends of the Earth helped get through Parliament and created a legal driver for kerbside recycling.

But there is clearly more to do. Others such as Flanders have shown that we can do more and the economic situation is becoming more difficult. The environmental drivers are getting more urgent, with climate the clearest example.

The climate challenge

We all agree that emissions must be cut, and that rich countries such as the UK have increased responsibility for such cuts, due to higher emissions in the past. The UK's targets are now written into the Climate Change Act 2008, that Friends of the Earth led the campaign for.

But it's not just about cutting emissions by 80% of 1990 levels by 2050 and the final % reduction in carbon - it's about the pathway of cuts year on year. CO2 stays in atmosphere for 100 years, so all we emit today adds to what we emitted yesterday.

So the focus on long-term targets is misleading – what matters is what is done in years leading up to it and the cumulative emissions of carbon and other greenhouse gases (GHG) (i.e. the carbon budget) - the area underneath the curve in the Tyndall Centre graph [ref 1] on slide 8.

We have already emitted a big chunk of emissions – the more we use now, the faster we have to reduce emissions later. This is why the Climate Change Act has 5 year budgets, and why we need to start cutting CO2 very fast.

The implications of this urgency for waste management are that we must take advantage of approaches that can be rapidly implemented e.g. prevention, recycling, composting, stabilisation prior to landfill. We have to make big changes, including the Government focussing policies and incentives on the best approaches, not just those that are slightly better than what we're doing at the moment.

Because of the importance of cumulative emissions, sequestering carbon or delaying emissions can be beneficial, for example if you can't recycle it, it can be better to landfill plastic than to burn it inefficiently [2] (not unlike the current debate on 'biochar').

The recession

The recession is changing things and will continue to do so for years to come, with several waves of impacts:

The prices of recyclables collapsed, as demand plummeted, about 6 months ago, but this may have bottomed out. Quality could be winning out, as there is more of a market for quality materials.

There are increasingly problems getting finance for large waste infrastructure, particularly for PFI where the Government is providing lending for schemes, rather than private sector. There are also concerns whether these are always the right projects to be funding.

Another impact is unemployment; however there could be an opportunity to create jobs in waste, e.g. recycling, reprocessing, that you get real economic value from.

The prospect of public spending cuts in the future raises many questions - how to optimise spending on waste management, how to avoid expensive white elephants and how will climate targets affect future incentives from government?

The next challenge - resource use

Global consumption of resources has been increasing rapidly, fuelled by increasing levels of consumption per capita in rich countries, and by a rapid rise in consumption in some very large poorer countries, such as China and India. The recession is creating a temporary slowdown in this growth

The UK and Europe use more than their fair share of the world's resources - whether biomass, minerals, land or water. Our over-use adds to the massive environmental pressures that humanity is putting on the planet - and restricts availability of these resources to the poor. We have no UK or EU targets on resource use, unlike on climate, e.g. the benefits of resource efficiency were counted as zero in the impact assessment for the England waste strategy.

In the future there will be a greater focus on resource use - the issue was highlighted in Nov 2008's EU 'Raw materials initiative' [3]. However this was criticised by Friends of the Earth Europe for being too focussed on exploiting the developing world rather than using resources more efficiently [4]. Improving resource efficiency is about benefits, not just costs - making our industry more efficient and reducing the impact of future price shocks.

Friends of the Earth is developing new work on resource use, focussing on how the EU can measure and reduce its use of resources [5].

The significance of residual waste

Residual waste is important for all these challenges. Prevention of residual waste is the best climate option. Residual waste has an economic cost, whereas keeping material out of the residual often has economic value. Avoiding residual waste increases our resource efficiency.

Everyone claims they want to minimise residual waste and we started a project more than two years ago to research the issue. We commissioned research from EnviroCentre to discover:

What is in residual municipal waste? (Phase 1)

http://www.foe.co.uk/resource/reports/residual_waste.pdf

What policy measures could get this waste out of the residual and up the hierarchy? (Phase 2)

http://www.foe.co.uk/resource/reports/residual_waste_stagetwo.pdf

It was clear that local authorities were key to this, so we wrote a briefing:
http://www.foe.co.uk/resource/briefings/residual_waste.pdf

We organised this event, including speakers relevant to many key elements of residual waste.

One scenario in the study says lets accept there are going to be lots of people aren't participating, what do you find when you do the analysis?

What you see in the largest amount of residual waste is a lot of different things that could be addressed – one surprise was how high up furniture came – why are we landfilling so much? Also there is lots of kitchen waste and plastic packaging.

What also came out is how poor data is – Defra funded lots of councils to look at their waste arisings, but they hadn't first standardised how to do it, so ended up with lots of incompatible data coming in.

[1] "*Reframing the climate change challenge in light of post-2000 emission trends*", Kevin Anderson and Alice Bows, Phil. Trans. R. Soc. A, doi:10.1098/rsta.2008.0138

[2] "*A changing climate for energy from waste?*", Eunomia Consulting, May 2006, http://www.foe.co.uk/resource/reports/changing_climate.pdf

[3] "*The raw materials initiative -meeting our critical needs for growth and jobs in Europe*", European Commission, 4th Nov 2008, http://ec.europa.eu/enterprise/non_energy_extractive_industries/docs/communication/com699en.pdf

[4] "*EU Raw Materials Initiative: Commentary from Friends of the Earth Europe*", February 2009, http://www.foeeurope.org/trade/publications/2009/FoEE_commentary_RawMaterialsInitiative_feb09.pdf

[5] "*Measuring Natural Resource Use: Context, Indicators and EU Policy Processes*", Sustainable Europe Research Institute, Nov 2008, http://www.seri.at/index.php?option=com_docman&task=doc_download&gid=251&Itemid=39

Session A - Achieving more than 70% recycling

2. Lore Mariën - OVAM, the Flemish Public Waste Agency

How does Flanders achieve over 70% household recycling?

View slides at http://www.foe.co.uk/resource/event_presentations/2_lore_marien.pdf

Since the early 90s, the Flemish region has developed a waste management policy aimed at reducing waste generation and reducing the damaging effects of waste treatment on public health and on the environment. Belgium is divided in to the Walloon region, Flemish region and the Brussels capital region.

Waste management has been assigned to regions, and OVAM is the regional authority responsible for making policy on waste in Flanders. But the development of policies always requires co-operation between the federal and all the regional levels, which isn't always that easy. OVAM sets out the general waste strategy in Flanders, gives subsidies to local authorities for taking prevention measures or setting up infrastructure for selective collection. They set up communication campaigns on waste prevention and recycling, do the negotiations with the private sector on producer responsibility obligations and supervise whether the private sector fulfils their obligations. Ovam itself does not have any collection or treatment facilities.

Flanders has about 6 million inhabitants who live in 308 municipalities. These municipalities are responsible for the collection and treatment of household waste. The municipalities have organised themselves into 25 public associations for waste management. Municipalities can in turn hire private companies to help them fulfil their waste collection and treatment targets.

As can be seen from the graph (on slide 5), in the past 15 years the management of household waste in Flanders has changed drastically. The amount of waste generated has risen from about 400kg per inhabitant per year in the early 90s to more than 550kg per inhabitant per year in 2000. Since then waste production has stabilised.

The amount of waste collected separately for reuse and recycling has increased from less than 20% in 1992 to 72% in 2007 – among the best in the EU. The amount of residual waste to incineration has been stable over past 15 years, at about 25%.

The most remarkable change has been the decrease in residual waste to landfill - in 1992 more than 50% of household waste was landfilled, and now it is 1.2%. This diversion has been accomplished by increasing recycling, not more incineration. Flemish waste is managed according to the 3 Rs principle – reduce, reuse and recycle, with disposal the last option.

Prevention and re-use: Flemish initiatives

Various measures have been taken to prevent the generation of waste.

Re-use shops help to promote reuse, considered the preferable form of waste management. Since 1995 they've given financial support to help set up a network of reuse shops in the Flemish region. There are now 100 shops. People provide discarded goods for free and sometimes staff collect large goods from homes. The shops sell around 7.19 kg/inhabitant per year. Discarded goods are sorted, inspected, cleaned and repaired if necessary. They are then resold at very cheap prices. Some have developed into department stores – with sections for furniture, EEE, toys, clothes, etc.

Another prevention measure is home composting, 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. Mixed household waste has become quite expensive to dispose of. Vegetable, fruit and garden waste are cheaper to throw away but still 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.

The municipalities can also create cooperation agreements with the government, for provision of waste management and prevention measures between local authorities and the OVAM. Financial support may be received from the authority, depending on the level of ambition of the agreement.

Although many of the objectives laid down in the Flemish waste regulation relate to more traditional waste management issues, there is a movement towards taking a life-cycle perspective. Initiatives taken by OVAM to promote sustainable consumption and production fit within this broader approach.

Examples include the promotion of ecodesign. The 'ecolizer' is a tool for designers to create environmentally friendly products, and ecodesign awards are given to students and professionals that incorporate environmental criteria into their designs. 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. There is also a target to collect 10 kg/inhabitant for re-use shops. A new priority is to increase the number of companies participating in selective collection.

Selective collection and recycling

Selective collection schemes have been set up to allow for very easy separation at the source: kerbside collection, municipal recycling yards and collection via retailers. The polluter pays principle takes the form of variable household waste charging based on volume or weight discarded, via recycling fees on products purchased and extended producer responsibility. The charges for waste collection are differentiated to stimulate people to sort out their wastes. Mixed household waste is more expensive to discard than selectively collected recyclable waste, separated waste has a lower price or can even be free to discard.

Kerbside collection

Waste streams collected for a charge at the kerbside include mixed waste, and mixed plastic bottles, metal packaging and drinking cartons (€ 0.125 per 60 l bag). Materials collected for free typically include paper and cardboard, glass bottles, vegetable, fruit and garden waste. Bulky waste can be free or charged. Collections are sometimes complemented by free bottle banks and textile containers.

Differentiated tariffs – the fact that mixed household waste is more expensive to discard has been one of the drivers contribution to the increase in recycling. Most mixed waste is discarded in specially labelled plastic bags, bought from shops. The charge for a 60 litre bag of mixed waste collection is between € 0.75 and € 2.5, depending on the municipality and also depending on the extra municipal charges. In urban areas the waste is collected in plastic containers (120 l), which are charged by volume or by weight. They are marked with chips for identification. Taxation by volume is € 2.5 - € 3.76 per 120l container, taxation by weight is € 0.15 - € 0.2/kg, and taxation per offer is € 0.25 - € 1.

Other solutions used in urban areas are placement of collective containers at flats, for free of charge waste, and the development of subterranean containers. They also try to finance higher frequency of kerbside collection in cities – weekly or even daily. There is a strong correlation between the price charged for mixed waste and the amount of waste generated. Weight charging has better results than volume charging.

Charging doesn't increase waste dumping – studies have shown that only 5 to10 % of the population is responsible for illegal behaviour – dumping, burning, littering or disposal in other municipalities. In fact, 75% of the illegally disposed waste consists of waste not subject to municipal taxation, so illegal behaviour is not necessarily a result of household waste charging, rather it is an attitude problem. Municipalities need to punish illegal behaviour - by refusing to collect waste that is in the wrong bag, or by giving penalties. 'Waste tourism' can be avoided by using the same tariffs in neighbouring municipalities

Recycling yards

There are 337 container parks (308 municipalities) which collect 50% of the household waste. A wide range of waste streams are separately collected in those parks: construction and demolition waste, cooking oils, batteries and accumulators, polystyrene, WEEE, paper and cardboard, PE foils, metals, textiles, fluorescent tubes, light bulbs, wood, green waste, car tyres, bicycle tyres and non-recyclable combustible wastes. Asbestos, gypsum, bitumen and hazardous waste are collected separately for special treatment.

Collection at retailers

Expired pharmaceuticals are returned to pharmacies. There are lots of boxes for used batteries and ink cartridges. There is one battery box for each 500 inhabitants. Shops selling electrical appliances / tyres are obliged to take back WEEE / used car tyres even if new items are not purchased.

Extended producer responsibility

Producers are financially responsible for the collection and treatment of their products once they have become waste ('acceptance obligation'). Rather than setting up their own collection scheme, in Flanders most producers fulfil their obligations collectively, via associations that have been set up for the various waste streams. OVAM makes the environmental policy agreement with these associations. The waste streams for which extended producer responsibility is provided include printed paper, batteries and accumulators, waste pharmaceuticals, end-of-life vehicles, waste tyres, waste electrical and electronic appliances, lighting equipment, waste industrial and cooking oils.

The composition of the average Flemish mixed waste bag has changed drastically over the past 10 years (see graph on slide 20). The amount of biowaste has more than halved thanks to home composting, and separate collection of this waste. The amount of paper, cardboard, glass and metal has dropped drastically. The amount of plastic and mixed waste has stabilised, even though there are more plastic bottle collections. This can be explained by the fact that the use of other plastics has increased.

The future objectives are a target that out of 560kg / inhabitant, they try to limit residual household waste that cannot be recycled to 150 kg/inhabitant/year. Another target is for each individual municipality to have less than 180 kg residual waste per year per inhabitant (higher as includes street sweepings etc). Subsidies are received if municipalities meet their goals. However, a correction factor may be applied in the case of big cities as it is not so easy to meet targets there (due to flats, tourism, etc).

The aim for 2010 is for 75% of the household waste to be collected selectively for the purpose of re-use and recycling – it is 72% at the moment.

Example of waste collection in big cities

Antwerp has about 470 000 inhabitants. It has lots of nationalities, lots of poverty, some districts with 30% migration/year, lots of tourism and students. Since 1998 they have had selective collection of waste, with the several systems explained above and 9 container parks for one city. The priority was to push back illegal dumping and street litter and refuse to collect waste disposed of in the wrong bag. The results are good – 61,5% of the waste was recycled in 2007 (~72% in global for Flanders).

Experiments were run with kerbside collection in Antwerp to compare containers/ bags on the street, containers in special areas and subterranean containers.

Containers in special areas are enclosed, only accessible for those that live there. They take a lot of free space, are not aesthetic and it is difficult to charge the right people as you don't know which residents are putting waste in bins.

For the subterranean containers, a prepaid badge allows access and registers lots of information - who has taken waste there, when, how much. Visible above ground are little boxes, for mixed waste, garden waste, paper, drinking cartons, plastic bottles and metal and bottles sorted by colour.

It is aesthetic and there is more social control as it is in the centre of the square, avoiding dumping. It is space saving: the square can still maintain its function. It is also cost-saving once the containers are in place. The placing of the container is expensive (10.000 euro), but they are very cheap in the use: in 1 move the truck can quickly pick up the weight of 120 sacks of waste.

Residual waste treatment: incinerating

Incineration is used for wastes that cannot be prevented or recycled. There is an incineration ban for some waste streams - it is prohibited to incinerate selectively collected wastes that can be recycled, with the exception of some high calorific wastes for renewable energy purposes. There is also an incineration ban for unsorted household waste and unsorted industrial waste. Motivated derogation (exemption from ban) is possible, for example on the basis of a lack of recycling capacity due to planning problem (more incineration is then possible).

Residual waste treatment: landfilling

There is also a landfill ban. It is prohibited to landfill unsorted household and industrial waste, wastes that were selectively collected for the purpose of recovery, combustible residues from the sorting of household waste or comparable industrial waste and waste pharmaceuticals. Again, motivated derogations are possible – for example if there is lack of incineration capacity, but less derogations are given every year.

'Smart' taxes have been used since 1990, in order to make landfilling more expensive than incineration and to make (co)incineration more expensive than recycling. The idea is to steer the market towards the treatment option with the lowest environmental impact. The taxes are paid by the operators which in turn internalise them in their gate fees.

A restrictive permitting policy for landfills has to avoid an overcapacity for the treatment of mixed wastes, which would lead to lower landfilling costs and take away the drive toward more prevention, reuse and recycling.

As the table on slide 47 indicates, without the introduction of smart taxes, landfilling would be cheaper than incineration, by taxing it the final cost of landfilling is higher than incineration. The taxes are used for the government to pay municipalities.

Conclusions – a large amount of Flemish waste is separately collected, but the generation of waste has slightly increased, so in 2007 4% more waste was produced compared to 2006 - prevention of waste is the main challenge for the coming years.

The lessons from the Flemish experience are that it is important to work on all levels of the waste hierarchy. Don't only focus on measures that are aimed at reducing the disposal of waste, for example by increasing the cost of landfilling, but also take specific measures aimed at increasing recycling, reusing and prevention of waste.

Source separation via separate collection is of crucial importance in obtaining higher recycling rates. Source separation makes it possible to obtain higher quality recycled materials with a higher market value. To make people sort their waste at the source, it is important to organise communication campaigns, so people know why it is important to do.

Please set up extensive selective collection schemes to make it as easy as possible for people to sort their wastes. Introduce the polluter pays principle via differentiated tariffs. Finally, it is important to limit residual waste treatment capacity to the minimum, to maintain an incentive to prevent, reuse and recycle. Make landfilling more expensive and ban it for as many wastes as possible.

For more information, see the English summary of OVAM's household waste management plan: http://www.ovam.be/jahia/Jahia/cache/offonce/pid/176?actionReq=actionPubDetail&fileItem=1591

Lore Mariën, OVAM

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Question and answer session with Lore Mariën

- **What is the business case for the people who run the incinerators so they have an interest in reducing residual waste? Also, regarding glass recycling – is there separate collection of colours?** (Maike Windhorst – Mid Essex Friends of the Earth)

Lore – There are 10 incinerators in Flanders, built with government money years ago. They're owned by a private company now, but they still have to listen to government and reduce waste if they are told to. Glass is a problem, people told to sort glass by colour. If wrong colour is put in, the whole stream is unrecyclable. Lots of communication campaigns are used to tackle this issue.

- **What are the current participation rates? A common argument is that you can't get people to participate if they are asked to separate, so commingled recycling is said to be easier.** (Phil Hurst – Campaign for Real Recycling)

Lore – We don't have figure for those in Flanders – the very rich may not bother. It is not so much of an issue as it is in UK. 305 municipalities are in the system, they are not obliged to collect waste selectively, and 3 do not collect waste selectively.

- **You mentioned that generation of waste is up by 4%, and Michael earlier said that recycling rates are up, and waste generation down. Is the data set sufficiently good on the generation of waste that you are able to confidently say it is up by 4%?** (Paddy Walker – J Leon)

Lore - All 305 municipalities that get money have to report waste collected, street litter etc is all reported. There is a good system for collecting figures, for example people have to buy badges to gather data on waste production.

- **In the UK we have a high dependence on disposable nappies - have you been able to persuade people away from disposable nappies to reusable?** (Kathy Smyth – Guildford and Waverley Friends of the Earth)

Lore – We did a lot of communication campaigns but it is not very easy to persuade people - more are now being used. Experiments were carried out in 3 cities to separately collect nappies for recycling by a company in the Netherlands, however it failed as daily collections were needed.

- **The Graph showed no real change between 2003 & 2007 in the relationship between recycling, incineration and landfill. When you reach 75% recycling, are you going to aim for 80%? Does Flanders have long term contracts and what will happen to incinerators?** (Mary Newton – Gloucestershire Friends of the Earth)

Lore – In 2006 we did a household waste analysis and saw 40% vegetable waste was still in mixed waste. If we could reduce that there would only be 65kg residual waste per inhabitant per year. There is still 6kg paper in mixed waste stream. We could sort this out but will be difficult and expensive to go over 80%. Flanders gives 20 year licenses for incinerators. They are old incinerators so could require them to be renovated or new one to be built. Maybe we could have 8 instead of 10 plants in the future.

- **In UK there are 150 000 people to 1 re-use shop. It is even worse in London, with 233 000 people to one re-use facility. How many reuse facilities are there per head of population in Flanders?** (Richard Featherstone)

Lore – In Flanders there are 6 million people, with 100 reuse shops. Subsidies are granted and can open a new shop when they can prove people are bringing more goods to the shop, or see an area where not as many shops per person.

- **Is there any commercial waste from private companies in the arisings you mentioned? Do recycling figures include rejected materials or home composting?** (Ashley Chaplain – Hampshire County Council)

Lore - Yes, we would like to increase companies dealing with the system described – they have municipal-like waste as well, from offices etc. in the figures. Recycling figures don't include rejected materials that are incinerated. Plastic bottles, metals and drinking cartons are put in one bag, and 5% of the bag may be reject fraction. The municipality is punished on that so they have to do better communication when there is contamination. Incinerator bottom ash and metals don't contribute to recycling rates – 1.2% landfilled materials includes incineration ash. Home composting is considered prevention, so is not included in recycling rates.

- **Do you charge for all residents, even in densely populated city centres? How does the mechanism work in flats?** (Jan Jonker - Brighton and Hove City Council)

Lore - A prepaid sack or badge for subterranean systems is used. If you don't use a prepaid bag, it is not collected and it stays on the street, neighbours will see who is repeatedly using the wrong bags.

Michael - I lived in Brussels for a while, in the poorest commune in Belgium, with a very big Turkish population. At one point a transition was made from everyone using black waste sacks to white paid sacks. It was amazing that this change happened in few weeks. Even in a poor area, this transfer

effectively happened over night. There was also a fine if you put one of these paid white sacks in a bin in street.

- **What extra compliance and enforcement is needed at the incineration and landfill facilities, to ensure the landfill and incineration bans are complied with, or is the source separation enough?** (Hannah Hislop, Green Alliance)

Lore - When the truck arrives at the plant, it goes on a weighbridge, and they have to show on paper what they're taking in and show a sample of the waste. Statistic are published to report what was burnt on which day, and inspectors can come daily. They also have info panels on streets with dioxin etc emissions, so when something not allowed is burnt everyone can see it. This info is also on a website for the public to see emissions at that moment in time. There was once a dioxin crisis so now people are keen to check emissions from incinerators.

3. Steve Read - Managing Director, Somerset Waste Partnership

High capture rates for quality recyclables and organics – The Somerset Experience.

View slides at http://www.foe.co.uk/resource/event_presentations/3_steve_read.pdf

Somerset is a largely rural county of 345,000 hectares, with some larger towns. There are 500,000 residents in 228,000 households, producing 300,000 tonnes MSW each year. It still has a 2 tier local government, with a county and 5 District/Borough councils underneath that. In 2007/08 the recycling rate was 50.9%.

Somerset Waste Partnership (SWP) is a joint committee ("The Board") of all 6 local authorities. Those 6 local authorities have decided to form a single client team to look after all aspects of collection and disposal. So SWP behaves as if they were a unitary authority, even though they are still under 2 tiers. SWP are one of the first to do this in the UK (Shropshire were the first), and the first to do this with all the potential candidate local authorities involved. On the board of elected members are 2 from each of the 6 councils, all waste functions are delegated to them to make key decisions in consultation with the authority they represent. SWP has its own brand and identity and authorities share the costs according to a cost sharing formula, which is all set out in inter-authority agreement.

At almost the same time that SWP was formed, in Oct 2007, they signed a single collection contract covering the whole of the county. The disposal contractor for the county is Viridor, dealing with landfill, composting, IVC, haulage of material out of county where appropriate, and running the HWRCs. The collection is dealt with by May Gurney, which recently acquired ECT Recycling. ECT Recycling now form a major part of May Gurney's waste activities in the UK. They deal with the kerbside food, recyclables, refuse, charged garden waste and some commercial collection.

The 18 household waste recycling centres (HWRCs) play an important function in the waste management portfolio. All bar one large settlements have a HRWC within a 5 mile radius. It gives a ratio of 1 site per 13,000 households - double the ratio in Hampshire (1.6 million people with 26 HRWCs). A lot of investment has gone into this, each collects up to 30 material types, the average HWRC recycling rate in 2007/08 was 71%, with the best performing site at 81%. Staff are incentivised to recycle more, and advise people about recycling.

See diagram on slide 8 – right hand bar – dark blue and is garden waste and light blue is recyclables taken through HWRC, as % of whole county. This means they contribute 50% of overall recycling and composting rate, so very similar role and statistics as Flanders.

We are handicapped in UK: we don't have extended producer responsibility, which would be a major step forward. We're not able to charge for collection of residual material. The Government did call for volunteers to do that, but no local authorities stepped forward to pilot that. We're also handicapped by low charges for landfill – this is changing, the announcement by the Chancellor last week that there would

carry on being a landfill escalator up to 2013, up to £72/tonne in April 2013, is doing things now to address that.

But a tool we can use in the UK is capacity exchange – explain that instead of your container or sacks of waste being collected weekly, we're now restricting the size of the container or the number of sacks for residual waste, but in exchange we're collecting a much wider range of separated materials. That can work for commingled collection as well as source separated.

In Somerset we have a 'Sort It' source segregated system operating in 3 of districts, covering 70% of the population. This collects food and recycling every week, refuse and garden waste fortnightly. In Week A there is a residual collection in a 180 litre wheeled bin, box for recyclables, and caddy for kitchen organics. In week B there is an optional charged garden waste collection, and a collection of recycling and food waste. This totals about 200 litres capacity per week, comparing favourably to a standard commingled system collecting a 240 litre bin of residual waste one week, 240 litre wheeled bin of commingled recycling the next.

It is possible to get another recycling box on request if needed, and also to upscale your bin size if you have a large family– people are not penalised if they have a genuine reason for creating more waste. By doing this capacity exchange you get a waste reduction effect. Also in Somerset we are doing many of educational campaigns, promoting home composting, etc.

Though West Somerset is a similar size to other districts it contains Exmoor National Park, is very sparce and only has 18 000 households, whereas there are 50 000 households in Taunton Deane, Mendip and Sedgemoor, and 77 000 in South Somerset.

It is important to lay down some rules when exchanging capacity - we ask for no recycling to be put in the residual waste. We don't take excess waste ('lids down' policy), and also say no garden waste, no DIY rubble, bulky, hazardous, etc in with residual waste. It is important to enforce that.

May Gurney use a stillage vehicle with lot of boxes and compartments and the material is sorted into those at the kerbside. We ask people to be as ordered as they can when putting material in recycling box for collection. Food waste goes onto the same truck (all types including meat, fish and bones), you can wrap food in newspaper or compostable bags. Also collected are paper, glass (colour sorted into 3 colours), cans, clothes, shoes and car batteries. No plastic bottles or card are collected on the truck. At the point of delivery the stillage is unloaded by a forklift, which is tipped into a larger container and is taken to one of several facilities.

In Somerset under Defra's innovations programme a few years ago, we developed an in vessel composter at the edge of an active landfill site. This is aerobic digestion – material is put into a tent like structure. The lids of those are removable - they are sealed up and air is blown through it aerobically, the product is then treated in open windrows alongside the garden waste composting. This is really not very good technology because you put a lot of energy into the system to get a product out, and you have to blend garden waste in to get the right structure to allow air to pass through it.

We're now interested in AD and Viridor have planning permission on our behalf for a 30 000 tpa AD plant on another landfill site. At the moment we're also exporting material to Greenfinch Biogen's facility in Ludlow, Shropshire. Despite the haulage, we are in the short term the biggest contributor to that demo project. We want to scale that up and build one in Somerset.

For garden waste, people can buy into a bin for a year (preferred route), or buy biodegradable sacks separately. It is composted in open windrows locally, and is chargeable – an important policy. Free collection attracts material that otherwise would have been home composted, so charging is used as a demand management technique. This year charges are £30 / year for bin, £15 for 10 bags.

The graph on slide 25 shows the three authorities with highest recycling are Taunton Deane, South Somerset and Mendip – those on the 'Sort it' system. The lowest three authorities are on a weekly residual collection and a fortnightly recycling collection. So you can see the real benefits of moving over to a capacity exchange system. Street sweepings are composted.

There is also an interesting contrast between Mendip, and South Somerset and Taunton Dean (see slide 26). The recycling rates for South Somerset and Taunton Deane are 49%, in Mendip it is only 45%. The

difference in waste produced per house per year is the residual fraction, which is slightly higher in Mendip. We think the reason is that Mendip hasn't exchanged as much capacity and the default is a 240 litre bin, and in the other 2 areas a 180 litre bin is used. Taunton Deane and South Somerset are among the highest performing districts in the UK.

There has been a waste reduction effect from 'Sort it'. Before we introduced that system we were seeing about 900 kg /hh/ annum collected from the kerbside, after it was 750kg. We went from 18% recycling up to 48%, plus there was a 16% reduction in overall waste arisings collected. There was a corresponding slight increase at HWRCs but not nearly enough to account for the full 16%. So there are genuinely other effects from restricting capacity. There are lots of possible reasons why this may be the case - it could be driving out people bringing commercial waste home. But as in Flanders we haven't seen a major increase in fly tipping or waste tourism or illegal waste disposal.

Unfortunately at present we have no option for the residual fraction other than landfill, but landfill has reduced drastically up to 2007/08, down to 50%. The 'Sort it' system was phased in over time so there is a smooth curve.

It is interesting to look at the top line, to see the aggregate of landfill and recycling. We peaked around 2001 /02, and we've been on a very steady decline since then. There certainly has been an impact in the last financial year, the last 6 months in particular, like many authorities we've seen quite a drop in overall arisings. For 2008/09 we'll report about 3.5% drop in waste arisings, lots of that happened in past 6 months.

At the moment, we are the highest county at 50.9% recycling, and we've also got 2 districts of the lowest 10 for residual waste per hh, at 360-375 kg / hh / year. Mendip is higher but is still twelfth in the UK for lowest waste arisings.

Where we are going next is called 'Sort it Plus' - the addition of plastic bottles and cardboard to the range of materials picked up weekly at kerbside. We also want to roll this out to the 2 other districts not on 'Sort it'. This is proving a financial challenge in the current climate, but we're hoping that a least the larger one of those 2 districts is in a position to proceed with that.

We've been doing trials over the last 18 months using different vehicle configurations and different frequency of collection (eg standard stillage vehicle, 3 way split vehicle which has a compartment for food waste at the front and 2 split compaction compartments at the rear for cardboard and plastic bottles).

We've also been working with May Gurney to trial one vehicle that would collect all of these materials at kerbside, collecting plastic and cardboard (more light-weight materials) on the same vehicle, prohibited by space on the current set up. This design is currently working in London Borough of Barnet.

We also trial various configurations of frequency of collection. In all cases food was collected weekly. In one version we reverted to collecting standard recyclables fortnightly, in the other 2 versions weekly. With new materials, trialled weekly and fortnightly, and same for garden refuse. We saw real gradient in performance where we were collected everything weekly, in the Taunton Dean trial areas we had 58% recycling rate (that is just the kerbside District Council waste collection authority recycling rate, without HRWCs). Based on that finding, we estimate we would have 54-55% kerbside recycling rate with that system in place throughout Somerset.

It is all about quality – our material is regarded as highest quality, 92% is reprocessed in UK, all glass is sent to remelt rather than aggregate and we've had no problems with market placement or stock piling over last 6 months, because of our policy on quality. Very open about what doing, we've recently published an end use register. This is a 12 page doc available on our website. It shows how much of each material is collected and where it has gone.

Questions to panel

Participants discussed questions with others on their table beforehand, and one representative from each table asked their chosen question.

- **What is the cost per household of the scheme in Flanders and Somerset?**

Lore – It costs more to collect and treat the waste than people directly pay – it is subsidised. It costs about €220 per household (2.4 people) – €36 of that is paid through producer responsibility, and €184 of that is paid at municipality level.

Steve – Rural Somerset costs more than less rural parts. The existing Sort It system costs about £48 per household per year. The enhanced Sort It plus system will cost about £6/7 more per household. Disposal costs have been going up rapidly due to landfill - about £60-70 per household per year.

- **Is a house disposal system used in Flanders for food waste, linked into sewerage system?**

Lore – No, food waste is separately collected.

- **In Flanders it costs more to landfill a tonne of waste than to incinerate it, and more to incinerate than to recycle a tonne of waste. Does Friends of the Earth have relative figures for the UK?**

Michael - Friends of the Earth doesn't have those figures at moment. Obviously we have the increasing landfill tax, we would like to see an incineration tax to achieve what they have in Flanders. I've heard the argument from Defra that recycling is cheaper than incineration, therefore we don't need an incineration tax. Our worry is that if we get a lot more incineration then there will be a demand and a need for waste for those incinerators so the prices for incineration will go down, I think it is a debate to be continued. WRAP has done data gathering around the pricing of recycling and materials recovery facilities, but getting details of prices is always complex. WRAP manages to get relationships to get that sort of information, whereas you might find that some of the waste industry would be less eager to provide comprehensive answers to Friends of Earth.

- **In Flanders, of your 72% recycling, does that include DIY and demolition waste? Can you give us an idea of what percentage is dry recycling, garden and food waste, etc?**

Lore – It does not include DIY and demolition waste, as that is not included in the mixed waste bags. There are figures on the website for demolition waste.

- **We're all keen to increase opportunities for recycling – including the number of items. Please advise us on what needs to be tackled to increase that opportunity.**

Steve – We need more producer responsibility in UK – at the moment we've picked the low hanging fruit and all additional costs are picking further up the tree. The public have a demand to get more materials recycled, and the majority of that is falling on local authorities to bear cost. We need to be looking to retailers and producers to take more responsibility for the stuff they sell us in the first place – packaging, batteries, WEEE etc. There is producer responsibility legislation in place but in many cases that is not going far enough at moment.

Michael – food waste is a significant tonnage for us to deal with – need to get food waste collections incentivised and get proper development of anaerobic digestion (AD). There are discussions going on in government and an AD task group been set up, which I'm attending. That is a key material and can't be dealt with by prod responsibility. We can get more money into the recycling system by increasing targets in packaging recycling system. At the moment less than a third of plastic packaging needs to be recycled in order to achieve the targets in those regulations. The Government has been due to publish a packaging strategy, since last October. It keeps getting delayed, but could be an opportunity to put those

targets up, and get industry to pay for more recycling. The other area that most of the country is very poor on is household waste recycling centres (HWRCs) – in Somerset and Flanders they're getting half their recycling through there. London Borough of Hackney has a population of 200 000 and doesn't have one HWRC. There is a long way to go and that is a key area to move on.

- **The biggest driver for high recycling rate in Flanders seems to be the economic driver and incentives. What would it take to do this in the UK, given failure of Defra incentive – what measures do we need to create a proper economic market with recycled and waste materials.**

Michael – there are a lot of different aspects to this. Somerset has shown what can be achieved within the current confines of what is allowed. In general people do want to recycle. Our position was that charging could be a good tool if people had very good recycling systems and you put something in place to avoid penalties on the poorest parts of society, and that you had a good level of public support. The government then made the mistake, in response to the opposition coming from certain section of the media, to create a system that was revenue neutral, where councils would only be able to move money around between people. This wouldn't actually pay in any way for any of the service, the hope was that councils might adopt it because it might result in reduced amounts of residual waste and save them money. However the political risk was quite high. The idea was that it couldn't be stealth tax, but nobody quite understood that. We think they should have just faced it and said this is about paying here, rather than paying in your council tax here. In the way you pay for other services such as electricity. Because they went for this halfway house no one is happy, councils didn't want to have that fight as there was little benefit to them, and it still looked like a stealth tax to those who opposed it.

Steve – Two other factors are; firstly the political will do to it among local politicians. It can be done if people want to prioritise it, among the many other pressures to deal with. Secondly, proper partnership working between the local authorities involved. There are economies of scale to be had through the kind of approach that we've had in Somerset, and there is scope for innovative thinking about how money is transferred between disposal authorities (who stand to avoid costs if more is recycled), to incentivise waste collection authorities to collect more.

Lore – We now have a system where you can put a sticker on your letter box to say you don't want junk mail. If you report a company ignoring this via a freephone number they will get punished.

- **Derby and Derbyshire are reaching a 30% recycling rate, but they're planning a 300 000 tpa incinerator and another commercial plant, even though waste growth is going down. There are around 50 incinerators planned for the UK - isn't that a breach of the waste hierarchy?**

Michael – We run conferences and produce briefings to make it clear to councils how much more they can be doing and how much more recycling is possible, and also there is a real issue at the moment that there is a very strong driver coming from government measures, especially landfill allowance trading scheme (LATS), which is trying to divert biodegradable waste from landfill. There is a lot of fear that councils will be charged £150 / tonne for going over their allowance. But when you look at the reality with reducing waste growth and the extent to which we are recycling, those scenarios seem very unlikely, so one of the key problems we have at the moment is trying to make sure that councils are aware of what is happening and what can happen in the future on the positive side. We are very concerned about the growth in proposed incinerators and we are hoping that we can try to persuade Defra to invest our public money in other things.

Steve – Defra's Waste Strategy included an aspirational rate for energy recovery of 27%, just above the rate in Flanders. I've been doing the maths as we'll be making important decisions in Somerset. The landfill tax will be £72 tax/tonne in 2013, plus the local gate fee cost for disposal, will total about £100/tonne. You can buy a lot of recycling and composting capacity for those figures, as an alternative to landfill. There are various figures for incineration, it depends on size of plant and if you are just dealing with MSW, but as a guideline you'd also expect to pay about £100 / tonne for incineration gate fees.

Some gate fees are up to £120/tonne for incineration. You need to really explore all the recycling and composting options before looking at alternatives like EfW.

- **How do we get to people who are refusing to engage with systems, for example enforcement around side waste, when education fails what is the next stage, how do you make it palatable and how stop it being public relations disaster?**

Lore – We have a freephone number to report people burning waste in their gardens. People receive leaflets that include encouragement to report on others they see doing the wrong thing. Leaflets also include info about dangers of burning waste such as dioxins. There are also financial penalties, or individuals and companies can even be imprisoned if they don't deal with waste in the correct way.

Steve – how far should we go with that sort of enforcement approach here in UK? I don't think we should aim toward that, there is a point you get to where there is no other option, but most local authorities are starting a long way from that approach. There has been a real change in people's behaviour over the past 10 years, we've changed our mindset. 10 years ago it was the exception to recycle, now it is a social norm and it can be frowned on if you don't recycle. That kind of community peer pressure is far more likely to drive behaviour. I know there are different issues in inner city areas but we are changing and we need to continue to go gently to apply that kind of social pressure on people that this is now the norm.

Michael – the focus at first must be trying to encourage people and explain to people what doing wrong, as many people don't understand recycling systems, there may not be information available. Barnet did the first compulsory recycling system – they focused on the households that weren't recycling, gave them more information, called round and hardly made any prosecutions. Most people just needed explaining what to do. On other side, the Daily Mail has a particular agenda, sometimes ends up in a position of being too influential so need to be careful not to believe that they represent the people of Britain.

- **Was there a difference between the estimated amount food collected and the actual waste and whether you thought this difference was caused by the changing of peoples' habits, when they realised how much food they actually waste. What was the annual cost of the food waste collection?**

Steve – We have very high participation rates (more than 90%) in the Sort It areas with fortnightly residual waste collections, but interestingly we have lower participation for food waste collection (nearer 50%). Work WRAP have done on the Love Hate Waste campaign seemed to suggest that there was a yuck factor when dealing with food waste, so there is some work to be done there. We are only pulling out about 50% of the food waste material that we could be taking out of residual stream at the moment, but we've not really pushed it and put PR into it due to a lack of capacity in the county to process it, but we're hoping to improve this. Concerning costs, we got a total price to collect a range of materials from kerbside so can't pull out cost of food waste collection. Our overall kerbside costs are not significantly higher than an average local authority in the UK.

- **In Flanders, what resources and evidence did you use to develop your waste management strategy, and did you use a life cycle assessment (LCA) approach to identify wider impacts for environment to inform strategy? WRAP has 250 staff covering the whole UK - how big is your agency?**

Lore – 200 people work at Ovam. We use LCA and try to set standards and indicators. Some were only started in 2008. We've tried to introduce a prevention indicator, but it is very difficult.

- **What can we do with non-bottle plastics, what are implications for collection systems of trying to collect plastics?**

Lore – In the Flemish region we have some projects running for non-bottle plastics. It is working well, but difficult to explain which types we do and don't want. We would like to collect all plastics, to avoid confusion for people, then sort them out later in the sorting centre - we are just beginning that work.

- **Assuming the UK can achieve 70% recycling, would it be a commingled Hampshire or a source separate Somerset that will get there first?**

Steve – Source separate would be the system that gets there first, but commingled could get there – both require people to really put their mind to it. Possibly, we'd be looking to meet in the middle somewhere anyway – there is an argument for maybe collecting paper and card together, and metal and plastic containers together? Some key materials you would want to keep segregated as far as possible, such as paper. You can separate them out from everything else but that is costly and there are contamination implications of doing it. I'm not knocking source separated systems, they often work well but in some cases source separated doesn't work well. There needs to be an emphasis on quality in those situations.

Lore – Metals and cartons and plastic bottles are collected in one bag, because these are not too dirty. Glass, paper or cardboard aren't included.

- **Is there a minimum amount needed to be spent per household on communications?**

Steve – Communication is so vital in all of this, whatever system you have, especially if going through changes, which requires even more money. But even routinely we're all finding you've got to keep the effort up on communications. It is important to counter negative press, keep telling people the point of recycling, say its not stockpiled or sent to China. But the budget is a very small fraction of overall cost, probably 1-2%, I would like it to be more, about £1 per household / yr.

Ray – A while ago in Canada £1 per household / yr was spent on social marketing approach, whilst the UK was spending 13p. So we've done quite well on relatively modest budgets so far, but we're missing something in terms of the proper consistent resourcing of that element of the whole package. It isn't just about the system.

Lore – the cost of communication campaigns was very high at the beginning of the 90s but it is now decreasing.

- **What was happening in Somerset before the introduction of the Sort It scheme, and what were the issues around the residual waste frequencies changing?**

Steve – I wasn't in Somerset when that happened but I did experience that in Hampshire and my colleagues tell me that it was similar to what happened in Hampshire. There was more objection to banning garden waste from residual bins, than there was to the idea of changing to fortnightly waste collection, versus the previous weekly unrestricted system. You sell it to the public as part of a package – don't say 'we're going to stop doing this', say 'we're going to change your system but you'll be able to have these additional features – kerbside food, more frequent, so sell a positive message, not that they'll be worse off. You have to tell people why you're doing it at every step. Both in Somerset and Hampshire the level of objection was not that substantial, it was surprisingly low.

- **Can the panel suggest 3 practical waste prevention measures that can be undertaken in the context of local authorities?**

Lore - Stimulating home composting deals with a very big fraction; and increasing reuse centres is good social for the poor, providing employment etc.

Michael – There is evidence that food waste collection reduces the amount of food waste, and we've seen in Somerset that increasing your overall collection of recyclables reduces the amount of waste

produced. Its cheating to say this, but also the recession.

Steve – Providing services for commercial small medium size enterprises (SMEs), so you don't get leakage of the material into domestic waste stream, that we certainly are getting at the moment. We've done quite a lot of work on that, but rather than just drive it out so its got nowhere better to go, we have to do more in terms of helping to provide cost effective solutions for SMEs.

Session B - Practical UK solutions

4. Dr Richard Swannell - Director of Retail and Organics Programmes, WRAP

Recycling in the current economic situation, new recycling streams and food waste prevention

View slides at http://www.foe.co.uk/resource/event_presentations/4_richard_swannell.pdf

I'm going to talk about how recycling has developed, recycling in a recession, challenges for the future and conclusions. WRAP are about trying to develop the resource efficient loop (see presentation). Waste prevention brings the most carbon benefits, then collecting and sorting those materials is also critical, recycling and reprocessing them into high quality materials, and then making sure there is a market for those materials. The benefits of that are less waste to landfill, less cost to the economy, and less carbon emissions.

We've come along way in driving recycling rate up – graph showing household waste recycling in England on slide 5 shows lots of material and lots more materials have been collected. We're at 35% recycling, nothing like Flanders and we all know the scale of the challenges there, but we're moving forward, especially in terms of the people taking time and effort every week to put that material out. - committed recycling levels have also gone up.

Have we got a resource economy in the UK? It is beginning to come: the total UK Recycling in 2007 was 110 m tonnes. The vast bulk of that was aggregates, construction and demolition waste, but it is worth saying that it is increasingly an economy that is driven by a large amount of materials going round this loop. We've got to go a long way further but it certainly is there.

Are there markets there? The example of glass shows the 1.6 million tonnes recycled from the household waste stream is going to decent end uses – recycling into containers uses 665 000tpa, glass wool is taking 145 00t, both of those bring really good carbon emission benefits. Most of the 340 000 tpa exported is going to go back into containers. The 450 000 tpa of aggregate is replacing raw materials but doesn't bring the same carbon benefits, so it would be good to see more collected glass going to other markets. In many cases the markets are there if the appropriate quality of material is produced.

What about the environmental impact? One of the things we've heard about in the last quarter is 'does it really matter – do we get any benefits from recycling?' The answer is unequivocally yes.

There is a report Ray pioneered and put through while working at WRAP on the environmental benefits of recycling (www.wrap.org.uk/document.rm?id=2839). The research looked across the world at all the LCAs of benefits of recycling and concluded that the benefits were significant for most materials. Then Julian Parfitt did the analysis as to how much the UK benefited from recycling. He found it reduced emissions by 18 million tonnes of CO2 eq per year, equal to 5 million cars off the road, or closing 3 coal-fired power stations. This is significant – it does make a difference.

The latest economic situation - in the recession there have been some tough headlines and it has been difficult. There have been substantial falls in prices of some (not all) recovered materials. Why? Global economic and financial conditions were really difficult, weaker demand for products across the world, cut backs in supply, fewer raw materials were needed, including recovered materials. That affected the prices not only of recovered materials but also of primary commodities.

What has happened – see graph of paper and card prices on slide 12. November was really tough. Starting in September the fall off was quite large. What you can see is the prices for quality stayed up higher. Recovered plastic bottles showed a similar picture, a big drop in prices correlated with drop in virgin plastic costs. Now prices are making progress back up. Aluminium and steel cans dropped substantially, steel being quoted at zero, prices now going back up. Glass saw hardly any impact over that period, and the same with compost.

Markets appear to have stabilised after excessive volatility, prices for most recovered materials picking up from lowest points, materials are moving, overseas buyers are returning. The key thing is that high quality materials are experiencing fewer difficulties, achieving value and finding markets. Reinforcing message that it is all about quality. Local Authorities survey indicates no significant stockpiles and Environment Agency data also suggests no significant increase in storage.

Targets and trends for recycling in the future include the Landfill Tax escalator rising to 2013, which will be a big price driver. The Landfill Directive targets, plus England has a 50% target by 2020, Scotland has 70% by 2025 and Wales' targets are similarly ambitious. There is increasing interest in trying to do more with C&I waste, particularly commercial. Industrial recycling rates aren't too bad, there is a lot of work there because you've got economies of scale, but getting good infrastructure in for SMEs is a particular challenge.

England's household kerbside infrastructure – see graph on slide 19. Infrastructure for collection of some materials is significant – paper at 100%, card over 60%, glass, garden waste and plastic bottles over 70%, metal over 90%. There are areas that are not quite so good - foil, mixed plastics, batteries, textiles, food. If you were looking to see how to hit 50% target for England by 2020, as WRAP have done, one way you might be able to do it is to drive more material through existing infrastructure – we're not currently capturing all of it. We can increase capture, by increasing the number of material streams - driving food waste and mixed (non-bottle) plastics collections up is particularly worthwhile doing.

Don't forget waste minimisation - already our statistics suggest waste is going down, no longer growing in line with economy. Critically we've got to make sure we have high quality end markets, that bring real benefits, not only in carbon terms but in resource terms.

Food production counts for 20% of UK GHG emissions. We've got to get 80% CO2 reduction by 2050 – if we change nothing all we can do is eat. So we've got to tackle food and take that way forward, and waste minimisation is one way and recycling is another.

At WRAP we are trying to reduce the amount of food we all throw away, encourage collection and recycling, and markets for the end materials. We produce 6.7 mt/y household food waste - this could fill Wembley stadium 8 times over, costs consumers £10bn/y and wastes 18 mt/y CO2 eq, equivalent to all the recycling we're currently doing. The Love Food Hate Waste campaign aims to reduce our food waste - see www.lovefoodhatewaste.com. This is beginning to make progress, it is early days but since its launch at end of 2007, 1.8 million more UK households are reducing food waste, with a saving of £300 M/y, a reduction of 137,000 t in food waste and a reduction of 600kt CO2 eq. The target for food collection is 2 Mt/y collected by 2020.

We've done trials on the two options for collecting food waste. Weekly separate collection in a bag – trials show that this gives you about 130kg/ hh/ yr, with low contamination and significantly reducing your residual waste disposal. Co-collecting with garden waste gets about 40kg /hh/ yr, higher contamination particularly in plastic and more residual waste.

There are also two treatment options. Anaerobic digestion (AD) produces renewable energy and a biofertiliser - nitrogen phosphorous, that then means that you don't have to buy as much organic fertiliser that we have to burn oil to generate. The gate fees for that are £35-55 tonne. Or you can use in-vessel composting, that produces a compost bringing carbon savings, probably with a slightly lower gate fee than AD. WRAP are putting capital support into both treatments.

Costs of food waste collection – see graph on slide 29. If you do weekly food collections, with no change to residual, the cost savings in terms of what you put into landfill is quite significant. That helps offset the costs of putting the food collection in. If you go for co-collection, you get much less diversion therefore you don't get the same amount of benefits.

The difficulty is each LA has different systems, so exactly the cost benefit ratios will be dependent on individual situations. The bottom line is, given the landfill tax escalator, this will be a sensible thing to do.

To draw conclusions - recycling rates are increasing, collection infrastructure is improving but there is scope for improvement, the recession has posed problems for the sector, there are signs of improvement and WRAP is monitoring the situation and publishing online reports. Recycling does bring significant environmental benefits.

In the future we need to maintain and grow confidence in recycling, don't want people to be put off recycling. We need capture more material, and keep the emphasis on quality – because quality sells. We've got to further develop infrastructure for new material streams, including food waste (AD) and mixed plastics.

5. Richard Featherstone - President, Furniture Reuse Network

Taking f out of refuse – the environmental and social benefits of community re-use schemes

View slides at http://www.foe.co.uk/resource/event_presentations/5_richard_featherstone.pdf

We need to change the mindset of people providing bulky waste to collections. They're happy to pay the collection fee if there is one, but often don't mind it being landfilled. We should change the name from 'bulky waste collection' to 'reuse'.

Reuse is now on the agenda - the Waste Framework Directive (WFD) states we should be taking measures to promote the reuse of products, and preparing for reuse activities. FRN and LCRN will take the opportunity to respond to Defra's consultation on implementing WFD.

A 2007 FRN survey into the objectives of UK re-use projects showed that the reuse sector's main priority is relief of poverty. The third priority in the sample was waste prevention. This is a golden opportunity for the waste sector to reclaim reuse for its own. Every project will tell you that it has a problem with getting the right quantity of quality unwanted furniture and appliances for the people they are trying to help.

Child poverty continues to be a major issue in this country. The target is to eradicate child poverty by 2020, and some measures have been put in place, but as we reach the half way stage those measures at stand still. Poverty is a complex issue and though not the whole answer, reuse has part to play in that. The risk of poverty increases in the recession – the demand for reusable products is expected to increase in year ahead.

A furniture project costs £150,000 per year to run, and an average sized project will collect 250 tonnes pa for reuse, so will make a difference to the reuse from an LA. We shouldn't go forward with grant making application processes – I would like to see some standard models for reuse, thought through and agreed by all the principal parties, and then being places as part of a London or national strategy to put it in a particular model where it is needed most.

If you only collect 250 tonnes, and spend £150 000, that works out at £600 / tonne. However you need to look at the cost benefit analysis and social return on investment – values more prominent in a recession. There is an enormous difference with our neighbours – 150 000 people per one reuse project in the UK, compared to one project to 60 000 people in Flanders. One housing association is spending £100 000 a year landfilling furniture taken out of their properties.

As they are for poor people, reuse services tend to become poor services. We need to develop reuse beyond being a last resort for those on lowest rung of social ladder. It should be opened up to a wider range – green customer, those looking for something retro and quirky, bargain hunters. We need to market reuse in this country with more complexity to make sure all sections of society are reached – need to make it attractive.

Quality is a key issue – often thrown out furniture is perfectly usable, just unwanted. About 500 000 tonnes of furniture ends up as residual waste – a significant proportion is good quality, there just are not the facilities in the reuse sector to pick it up.

As well as the traditional warehouse and van doing collections and deliveries, we should think laterally about reuse. It should involve all household items and new ideas like give and take days, where you don't need a warehouse, and third sector organisations can organise rather than council, can make use of community centre, church hall etc, people can bring items they no longer need and find a treasure.

We've just done a survey about the effect of the recession on London projects - volunteer recruitment is up in 50% of projects and 40% say they don't need more volunteers at the moment. 60% have found no difference in the volume of collections and 40% seen decrease so far. The supply is so big, reuse projects can take as much as they are able to.

There has been a big impact on demand - more referrals from social services, the housing sector, off-street demand for low budget furniture. One project has seen a 40% increase in sales since November. People want to get involved in reuse and feel they're doing their bit for the environment.

See slide 12– In essence the sector isn't big enough to collect everything offered to them. Out of 1.7 million tonnes of furniture discarded in London, we're only collecting 170 000 items – 10%. About 10,800 tonnes of carbon are saved by this landfill avoidance. We should think about getting the f out or refuse and changing the name of service to bulky reuse collection service.

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www.lcrn.org.uk, www.frn.org.uk

6. Peter Mills - Commercial Director, New Earth Solutions

Separating and utilising residual waste

View slides at http://www.foe.co.uk/resource/event_presentations/6_peter_mills.pdf

In 2002 New Earth Solutions formed as specialist waste treatment company for source segregated and residual waste streams. Quite a few of the team came from major waste companies, we've developed and trialled the technology over a number of years. It is based on technology references from Austria, Germany, the Far East and North America. We've put in place significant amounts of funding. Even within the current climate we're still seeing a great appetite for the investment community to invest in sound environmental waste technologies and operators.

We are a technology owner and operator. We design, build finance and operate our own facilities, establishing long term relationships with our client authorities, and bringing in the benefits of hindsight and lessons learnt with subsequent facilities. We've got 3 plants in operation and 2 more being built, some source separated organic waste facilities and some MBT residual waste treatment facilities.

Waste sector dynamics – this is how we pitch it into the investment community, because without funding, projects and contracts that stand up to scrutiny, there is no money to put into place some of the larger elements of infrastructure that are needed.

Waste is part of the larger environmental picture – these are not, as the media eg Mail says, petty measures being put in place about bin capacity transfer, not petty moves fortnightly collections as a cost saving measure, its to support fundamental overarching environmental objectives.

Financial dynamics include Landfill Tax – we're pleased to get some sort of clarity on that from the Chancellor, and that should focus local authorities on the burden of landfill tax. The Landfill Allowance Trading Scheme is a bit hazy. We're doing some work in Scotland and Wales where they have a landfill allowance scheme and they don't complicate it with trading mechanisms and that is a much clearer, more honest route forward. But all these factors are there playing on it, and in the middle are the waste producers.

Industry's approach to residual waste is generally going from landfill - not sustainable – to incineration - a blunt instrument for dealing with residual waste. Generally the major waste sector in this country will seek to dictate waste policy on residual waste treatment by what it make available, rather than engaging in more bespoke, more modular and more appropriate scale technologies.

Our business model is a bit more complicated. What I've found with the big waste companies is having landfilled for many years, they only see waste as a one way transaction. Waste is collected from somewhere, it goes somewhere – we deal with outputs, especially if energy is involved as it make a nice bit of money for people, but we don't worry about the efficiencies or the ability to recover material or have some sort of hierarchy introduced to residual waste.

Our business model involves far more involvement but allows far more flexibility going forward. This is both flexibility on the changing nature of inputs, both composition and volume, but also on the outputs – whether we go to the energy, reuse or recycling markets, but keeping our options going forwards is very important.

We're all aware of the pace of change in waste sector in last 5 years – why should we think that is not going to continue for the next 5 years? It is ludicrous to predicate that by having a fixed technology that does only one thing for 25 years.

We have a reference facility in Dorset that is processing 75 000 tpa of residual waste. We manage waste for Bournemouth Unitary Authority, they have a good 40% recycling rate, but we're still finding the opportunity to capture another 15-18% recycled material in the residual waste stream, and probably more than that when the markets pick up again. We don't see the point in destroying that through one form of technology so by employing non-destructive techniques it gives us the option to recover that material.

We're involved with recycling materials up-stream as well as residual waste. If the recycling successes in Bournemouth increases and we push up to 50% recycling, then our facility is scalable and we've been taking it up in 20-25 000 tonne treatment chunks, as the authority need to divert more waste away from landfill. We will deal with what is left as truly residual.

Energy from residual waste is always contentious but we're looking a lot at paper and card and our business has a principle on energy production, and we are only extracting biomass material, paper card and textiles, that is not of a suitable quality to meet the end use markets.

This is all coming from the residual waste stream. We started our business in order to develop a technology that wasn't a white elephant, and we firmly believed that technology should not cut across or influence waste minimisation or recycling initiatives the authority may want to introduce.

As a demonstration, we are signing up for contracts as short as 5 years, we will develop infrastructure on a 5 year contract, but that doesn't restrict an authority from developing and refining its own waste management strategies.

As a précis of what the MBT technology will do, and its outputs, the technology will last 25 years, its built on a 25 year contract, but we only need 5 years to deliver that infrastructure and raise the funding.

At the front end is a dry recyclables materials recovery facility (MRF) – a flexible facility that can process source separated dry recyclables, sort them out and send them for recycling, or can take commingled and sort that by type and send them to reprocessing, or can take residual waste.

Optical sort recognition systems are employed, magnetic, eddy current separator, ballistics, particle size. Then the biological phase - enhanced aerobic digestion, that can be flexed to offer the option of bio-stabilisation – proven to help local authorities meet their landfill diversion targets - or bio-drying. That means that if at some point in the future the market moves towards a biomass fuel / SRF take-off element, then that can be encompassed from the same facility without any significant need to change the technology.

We still think there is a basket of technologies to be employed at the back end – thermal and Advanced Thermal Treatments. We're seeing increasing interest from industrial fuel users, people that want to buy themselves immunity – fossil fuel displacement. Looking at taking some of the low grade plastics and films from us, that are proving a problem to get into the recycling market. That's still some way off and the dip in the oil prices may be taking some of the impetus out of that market place.

Inputs are residual MSW, dry recyclables, both co-mingled and segregated at the kerbside, source segregated organics (green, food & card) and increasingly also Commercial and Industrial wastes, due to the landfill tax escalator.

We offer local authorities mass diversion – biowaste to meet LATS and landfill tax mitigation. The process produces composts ranging from high grade, to low grade from residual waste that we're finding beneficial applications for. We also offer recovery of recyclables and biomass and industrial Solid Recovered Fuel (SRF) fractions, and very comprehensive emissions control and management systems – important in terms of public acceptance.

To assess technology performance, we've been formally independently assessed by Organic Resource Agency, along with their German sister consultancy IGW. They've done a huge amount assessing the biological treatment plants in Europe, so we've bought their expertise from 2002 when we established our first plant. We've had engineering consultancies working on behalf of our main funding bank, who have undertaken a due diligence assessment on us, which we passed and obtained funding.

LCA – we've done a lot of work with Eunomia on this, unfortunately they and we have been forced to embrace the WRATE model now. We're using WRATE to assess our process, it's a challenge but as a business our principle is to challenge by producing evidence rather than argue on principles. We're working with the Environment Agency (EA) and hopefully informing them as we go. It is heavily skewed towards certain technologies – not ours.

We're only a small business but we've invested about £200 000 just proving the level of biodegradable waste diversion our facility delivers going through the EA's regulatory and guidance regime. But we do have in place for our site a formal Environment Agency LATs monitoring plan. We are presenting diversion data to Bournemouth Borough Council, who are banking that through Waste Data Flow, and that is a step change in our business development.

Performance data shows that within the process time for our facility we're looking at 4-5 weeks in the biological treatment phase, we're achieving between the high 70s and 80% plus biodegradable municipal waste (BMW) diversion. This is more about compliance for an authority, and after 8 weeks residence time it is up in high 90s.

Even in the worst case scenario, if we don't recover any recyclables from the front end, and we put all that waste into out process, we're still helping an authority achieve about 80% BMW diversion, which is all you need to meet your landfill diversion targets through to 2020.

Slide 11 shows our plant in Dorset, the red box in the middle is an old landfill gas power station that we are converting to run from syngas from the residual waste treatment. Slide 12 shows a 50 000 tpa plant in Kent, co-located in a quarry and occupying about 5.5 acres. The plant was delivered in 9 months, building started in Jan 2008 and it was commissioned Sept 1st 2008. Procurement took about 18 months to the financial close, planning was determined in 3 months. Major infrastructure doesn't have to suffer delays.

We do have permission for another 50 000 tpa next to that – we're looking at an AD solution but waiting for surety from LA in terms of tonnage and waste commitment on that, and waiting to see what impact the incinerator up the road has and what initiatives there are to introduce food waste collections.

Key elements – proven technology in terms of residual waste treatment, deliverability, we can get them through planning and construct them very quickly, and start delivering significant landfill diversion in a very short space of time. Public acceptance wherever we've gone and the plants we're pursuing now in Leicestershire and Bristol have gone through with no public objections. We've taken the time to engage in dialogue and explain the utility nature of the facility.

Reduced risk profile, performance guarantees – the sites are very flexible and we can sit down and work with an authority and if they want to move into food waste collections we can divert a chunk of the residual waste treatment capacity into food waste collections. If they don't get the participation and get the yield rates, we can revert to residual waste without any additional infrastructure requirements, and without the authority being held to any sort of contractual penalties.

It is a modular capacity in terms of delivery, and that means incremental capex, spreading cost to the client authorities. If they want to see how strategies are developing now, they can contract something now

for a 5 year period, then review it subsequently to that. So it is very much letting the client have his cake and eat it, if he has the bravery and foresight to work with us in a modular delivery. Authorities still only have incremental diversions from landfill – so why not procure your treatment in same way?

We can stand alone or integrate with other facilities. Triple duty – within one facility there is an MBT facility, an IVC element and a MRF element. You can flex either way, whether its separated or residual waste coming in. If we deliver to the right scale and the right processes we shouldn't cut across future minimisation and recycling initiatives.

Modular capacity can go down as well as up. In planning these buildings are under B2 industrial use. If part of that building is not required for waste anymore, because minimisation is successful, it is not a single technology that does one thing – you clean the buildings out, you put some start up businesses in there or warehousing, you're not committed to feed it forever and a day. There is more information and the independent reports are downloadable on the website.

7. Chris White - Commercial Manager, Aylesford Newsprint

The realities of the paper market now and in the future

View slides at http://www.foe.co.uk/resource/event_presentations/7_chris_white.pdf

Paperchain are the six largest paper recyclers in the UK, representing 78% of the UK market for recovered paper, recycling 3.2 million tonnes of recovered paper annually and realising over 4.2 million tonnes of carbon savings against other UK disposal options.

The total paper and board flowing into the UK in 2008 was 13.15m tonnes, down 7%. The recession will mean that recycling percentages will go down, as we're selling 5-600 000 tonnes less, there will be about 5-600 000tpa less paper to collect, even if your plastics and metals hold up.

Paper, one of the heaviest, is going down, just in the last 6 months of 2008. The graph on slide 5 shows the total paper market is 40 million tpa. The red line is the export of paper out of the country once we've recovered it and the black line is the usage by the UK's paper mills – steadily going down.

The paper industry has been very successful in collection – in 2003, 45% of paper and board collected was recycled in the UK, increasing to 67% in 2008. It is now higher than the EU average – probably the only sector that is. UK mills are 80.1% recycled paper, compared to 41% in the whole of Europe. 19% paper and board used is non-recyclable, meaning that 1.9 million tonnes of suitable material is not being collected. The quality squeeze comes from the difference between what is recoverable and what isn't.

UK usage has gone down from 4.5 million tpa to 3.9 million tpa. China over last 5 years has grown from 349 000 tpa to 2.65 million tpa. 4 mills closed in 2008, though only 1 used recovered paper, and a further 3 mill closures expected in 2009. We've lost about 35 paper mills in last 5 years.

UK mills are generally owned by Swedish, US, German companies, and they will only put paper mills here when it is to their biggest advantage. As with most manufacturing, so far it hasn't been to their biggest advantage to base it in the UK.

UK environmental and regulatory costs are high. Coming from last place but wanting to be first, as the UK tends to be, means putting on lots of charges very quickly and this is very difficult for industry to adjust to. One of actions of CPI is to ask for no regulatory change for the next 5 years.

UK energy costs have always been high, raw materials prices are generally higher in Europe though. Strong competition in the sector globally and shrinking demand from the domestic market in the recession. However, there is a paper mill coming on stream, being built in Kings Lynn, Norfolk. This will probably take around 400 000tpa. There may also be one in Manchester in 4 years time.

The graph on slide 13 shows since 1997, overall UK prices have been very stable, until the occasional high peak, then the drop brought it back down to a more normal level.

Collections are down as we're not using as much paper, but although prices fell by £40 / tonne but there was only about a 140 000 tonne drop in demand. Despite stories in the press, all that got stored was 120 000 tonnes out of 8.8 million.

The Paper Industry needs your help with quality. When collecting the product, you've got a valuable resource, not a waste. You'll get the best money if you collect it properly and cleanly – glass is a major contaminant, and also you can't get paper wet or it will degrade and soak up contaminants.

Recycled paper has to be white enough to be able to compete with that made from virgin materials, which are of consistent quality and have no contamination issues. Realising full paper recycling environmental and carbon benefits requires high quality raw materials, and customers will not accept poorer quality products just because they are recycled.

Please adopt collection methods that maximise good quality recovery. Make sure you can measure the quality of your material with feedback loops, whatever system you use, whether MRF, 2 stream or commingled. When you get the feedback, check it against your own figures, and then try to improve this in the long run.

Of the different options for collection and sorting, source segregation has been shown by WRAP to be the cheapest cradle to grave solution, it produces the best quality material, and doesn't need a MRF. However, trucks may block streets for longer, and there may be lower productivity for collection workers.

Two stream systems are probably less expensive than commingled, produce better quality material than commingled, material is generally acceptable for reprocessors, system mainly used in Europe. Again, there may be slightly lower productivity for collection workers, and it still needs an expensive MRF.

Commingled systems may fit current waste management kit. Most solutions are driven by waste management companies wanting to do it in the best way for them, and are not driven by us. They want to pick something up, charge somebody for it and put it somewhere. Arguments against commingling are that it produces poor quality material, it is probably the most expensive system, a complex MRF is needed to sort materials, and it is not generally accepted by reprocessors.

With commingled, contamination is built in from start with people throwing everything they believe is recycling in one bin. The high compaction used in UK is another problem. Compaction systems in other countries produce 40% less compaction than ours, our systems mean that it is much more difficult for MRFs, basically mechanical sorting systems, to sort out.

Too many vehicles use their first load of recyclates to clear out last week's waste – this happens all the time in commingled systems. The load is black from the previous week's food waste. Training of crews and the public needs to be improved – budgets are not much more than 12p per household per year now.

MRFs – getting better. They suffer from variable input and though improving, their front end checking is not good. It is basically a case of rubbish in, rubbish out – they can't distinguish between nappies and paper so if nappies are put into the MRF, they are sent to paper reprocessors. They nearly all run over capacity which severely reduces the output quality. In the main they produce a quality that can be at worst defined as poor and best defined as still needs sorting.

WRAP's survey indicated that between 5% and 20% of material going into MRF's was not recycled. That does not include the 4% to 16% of rubbish that is included with the paper that they send for reprocessing. Out of a batch of paper from an approved MRF, 86% is something I can use, the rest has to be landfilled.

In the latest downturn quality collections were unaffected – I would open new warehouse to take a quality collection in. China, India and Indonesia have all introduced import checking to prevent poor quality entering their countries. They all realise UK exports not up to scratch, and don't want to landfill the 18% contamination.

Paperchain supports the Campaign for Real Recycling call for quality for all recyclates. Because when MRFs are used, its not just paper but all materials that suffer – eg aluminium, plastic and steel. Recyclate is a resource, keep it clean. Collection is not enough - it needs to be made into something to be recycled.

Questions from the audience

- **Do you think the Freecycle movement makes worthy contribution to increasing reuse of household items and involve more people and do you think there is anything else we can do?** (Steve Plater – Friends of the Earth and Transition Town Sevenoaks)

Richard F – Freecycle is complimentary to the work of a reuse project – it can bail out a project that doesn't have the time to send a van out in the time scale the householder wants. It is often said to people that call and make enquiries to try Freecycle. The problem is that large items require the people to have transport.

- **The last office grade paper recyclate shut down last year – what do the government or industry need to do to incentivise us to make our own paper?** (Jonathan Essex, Sustainable Redhill)

Chris - One of key elements is we've never collected high grade paper very well. The manufacturing processes will follow where the resource is. If there is enough, good quality resource, at the right price in the UK, so that it can be made to pay, there will be places built. At this moment I don't think we have an office collection scheme in UK, so most A4 paper just isn't collected, there is nowhere for it to go, no reason to collect it. It is this dodgy bit of ground between what is municipal and what is SME, that hasn't been tackled so far and is just starting to be now. As those collections go up to begin with it will be exported and then hopefully as we get enough of it and it is reasonably priced, then someone will build a factory to convert it again.

Richard S – I agree there is a real challenge on commercial waste, we've done a great deal on MSW but we do need to tackle the commercial sector, lots of it is the same as MSW – bottles, cans, paper, we've got a real task to capture that material and make use of it.

- **Can you tell us the full range of papers that Aylesford will accept?**

Chris – I'll usually take anything that tears white. It is on website at www.aylesford-newsprint.co.uk/ - envelopes with windows, newspapers and magazines are preferred and are the cheapest source of fibre we can get. White A4 paper should ideally be reused into something better. We can't take coloured paper as it stays that colour - if it gets to 5% of a colour the dots collect together and you get coloured dots in the newspaper.

- **I know our LA has used the WRATE system for assessing different technologies – I'd be interested to hear what Peter have to say about it, as he was having difficulties with it?** (David Ashton – Hertfordshire Without Waste)

Peter – the problem is it is a piece of software in development. It doesn't accurately represent the diverse range of outputs from an MBT facility. It predisposes that everything from an MBT plant goes to landfill, and doesn't allow you to take account of whether you can beneficially reuse it. It seems to be modelled around a large-scale EfW option, and we've worked our way through it. We have effectively outscored, not just in terms of emissions but also toxins – substances harmful to human health. We're one of the first MBT technologies to go through the MBT model, so we're seeking to run our process through it with our advisors Eunomia. Previously it was used as an options appraisal by authorities, to help decide their technology choices. We're now increasingly seeing it being used as a procurement tool, so we have no option but to try and embrace it, but we seek to influence it from within, principally by providing empirical data.

- **If we see a growth in the number AD plants – what is the market for the product? I'm interested as there is a farm near me interested – it is difficult for them to find guidance. If we end up with very big AD plants, I'm not sure how they are going to distribute product.**

Richard S – Currently we don't have many AD plants so there isn't a problem, but what we've done already is start to look at what the potential land bank would be. The great thing with AD and composting is you tend to preserve a lot of the nutrients. If you have food waste inputs you have high levels of good nutrients like nitrogen, phosphorous and potassium that you have to buy as a farmer for your crops. So we think the principal markets for AD will be agriculture. Defra have done a study using the allowance model, which has looked at entire UK land bank to see where you might be able to put additional nitrogen and phosphorous at the expense of buying additional fertiliser. The answer is a very big area - 4.6 million hectares, all across country. The key thing is to identify for each AD plant where that market is. There is a great Biogen Greenfinch AD plant outside Bedford that takes in 45 000 tpa, inc food waste, pig manure and supermarket back of store waste. They now use the digestate on their own land and don't buy any fertiliser. The other thing to think about is that food waste has water in it, and about 4-5% solids, unless you press them out. In areas like East Anglia where water is at a premium, it is also quite useful as it supplies water as well as nutrients. I do emphasise to think what you're going to do with the outputs– but there are good markets. I've heard people are thinking about treating waste with AD and putting it down the sewer, but this would be a huge waste of nutrients.

Peter – The renewables obligation around AD is interesting and the potential enhancement for the contribution for using the heat derived for AD. The National Grid is talking about the introduction of biogas back into gas grid system – and our infrastructure is highly dependant on gas.

- **Richard Swannell's presentation had data demonstrating beneficial effects of waste prevention and recycling in terms climate change – this is established on the public radar but people are not certain what to do about it, and are not clear there is a direct linkage between dealing with their waste more sustainably and benefitting the environment and climate. There really is a challenge to all of us to get that message across.** (Andrew Harper – Cabinet Member for the Environment in Barnet)

Richard S – I agree, WRAP and the industry try to emphasise the benefits of recycling. The press poses the question is it worth recycling, we've tried to show that the evidence on significant climate change benefits is very clear.

Session C - After recycling, what about the rest?

8. Dr Julian Parfitt - Technical Director, Resource Futures

What can we learn from the latest research on municipal waste trends and composition data and what might the future hold?

View slides at http://www.foe.co.uk/resource/event_presentations/8_julian_parfitt.pdf

Municipal waste composition

Graph on slide 3 shows the trend in 'dust bin' waste – since 1930s. Mr Dawes started analysis of compositional data in 1930s, continued by Mr Higginson in the 60s and 70s. Data was produced from a national household waste analysis campaign in 1990s, with other data produced more recently. Incombustible miscellaneous fines and ash have been replaced with organic waste, about since the Clean Air Act in 1960s. This doesn't tell you about wider picture, eg the proportion of wasted food has probably declined lots since WW1 because of packaging and the way food is sold. There is lots to understand behind data, its difficult to convert it to an understanding of resource efficiency.

There are statistical uncertainties around the estimates. If you get 2 years of compositional data for a country, the difference in arisings between the 2 data points doesn't represent a trend, as there is lots of uncertainty to do with the way the statistics have been put together and factors to do with how the sorting was done.

Holland is only one place with genuine trend data for MSW – they've repeat sampled about a dozen communities over many decades, you get a sense of where the trends are, especially for materials going into household waste.

Slide 5 shows more recent data than 2000 – some fractions appear to move up and down – but beware as often different things are being measured.

The work I did for the Strategy Unit only looked at collected household waste, and MSW is more than the collected element, therefore it makes a lot of difference to assumed overall materials that are in the MSW stream rather than just in the household waste stream.

A big review I've been doing for Defra is soon to be published– pulling together the dataset that represents 2/3 of local authorities that have done some measurement at some point in terms of MSW composition, usually to slightly different specifications.

Resource Futures are about to publish a reappraisal of MSW data for Defra, including some of those non-household elements. Rather than set up a completely new programme to measure compositional data, this programme aims to piece together data sets been paid for locally. Fortunately there are enough consistencies in the data to be able to say something.

Slide 8 shows a data set showing compositional of residual waste – 30% of the residual bin is food waste.

Datasets collected in 2003-5, that have then been integrated with the national waste statistics. This is only one part – it is only looking at the residual stream – but it gradually builds up a picture as you integrate all the materials that have been separately collected into the analysis in order to build up the total composition.

Nappies – as you divert more the proportion of residual stream taken up by nappies tends to rise – now at 4%, but doesn't show the variation between authorities – higher proportion for some. Food is 46% of BMW – about half – so is of great significance when considering landfill diversion. Garden waste faction in the residual bin is down to 10% - it is possible that it is now largely diverted compared to previous data sets.

Municipal waste trends

At time of Waste Not Want Not, 2-3% per annum increases MSW were projected for England. In Waste Strategy 2007 the base case is 0.5% increase per annum. Elsewhere in UK, we're not absolutely certain. The problem is if things are going down, what have we done to make that happen, to break the link between arisings and GDP – what is the role of local and national policy drivers?

The graph on slide 12 shows an early data set from 1983-93 of household arisings. This shows that data sets have been shaped by national level policy changes. You can't construct a trend from waste arisings data from the 1980s because of the influence of the Local Government Act in 1985, as that lead to parts of the country not reporting much in terms of MSW stats. The response rate to survey went down, estimates changed to respond to that. There are so many other factors influencing the tonnages that get reported, it is difficult to look at that link between the economy and how much we're throwing way.

Slide 13 shows 1995 – 2008/9 (provisional estimates based on Quarterly waste data flow stats for 2008/09). The arisings curve up steeply till 2001/02, then starts to flatten off, as found in Somerset. Since then it has been flat, particularly for household waste. It is the non-household element that tends to fluctuate.

I'm just finishing a project for Defra trying to link the local factors that have influenced trends on this time period. Looking at available and published statistics, 2 distinct phases can be seen. The first phase, particularly from 2000 onwards, the HWRC residual started to disappear - that had quite an influence overall. Even though recycling had increased, the amount of residual didn't reduce very much. In the second phase there were reductions in the residual refuse collection, with the overall household tonnages stabilised.

Slide 15 shows the aims and objectives of the 'Understanding Waste Growth at Local Authority Level' project - 28 local authority case studies across the UK, to try to disentangle this relationship between local policies and trend, which is part of the picture because waste statistics isn't all about national drivers,

consumerism, packaging etc. There are a lot of factors to do with collection methods and capacity balance between residual and recycling. We've also been looking into, extent to which it is influenced by demographics, in-migration, household size etc.

Future

We can't say what future will look like – in the 50s no one would have predicted onslaught of plastic elements of waste stream. We're bad at being able to say what is happening next with society and technological change.

Instead, generate scenarios of what the future might look like, what the range of possibilities might be. This isn't predictive, but it enables us to at least look at some of the links in this complex jungle of societal, economic, material and technology factors that all contribute to waste composition and trends.

One study was carried out in 2002/3 by TNO, called 'Scenarios of Household Waste Generation in 2020' – about European waste. We're not very different to Europe in terms of waste composition. This modelling exercise built scenarios and tried to focus on what the factors were that determined what materials were being used and becoming waste. A more recent study by Brook Lyndhurst for Defra has also looked at a similar approach to modelling waste futures.

The influences you need to understand include economy, lifestyles, demographics, in-migration, politics etc, but this kind of scenario work allows you to at least frame what might happen and therefore how policy making might need to respond and how infrastructure might be overwhelmed by particular scenarios.

The basic approach involves looking at the link between arisings, composition and consumer expenditure patterns. Certain patterns of consumer expenditure generate more waste. You can draw links between how much disposable income we have, and how much waste there might be. But there is always the danger that you ignore the low probability but high consequence type changes. There are lots of scenarios that could happen but we're not absolutely sure what might be in the mix.

The TNO European study looked at different clusters of uncertainties and impacts, particularly around lifestyle, how people live, where they live, how much leisure and work time / obsession, the extent to which people are living in rural and urban communities. They tried to put this on a couple of different axis (slide 19), but also to link all of these lifestyle type factors with the function of materials in the home, to supply the goods and services to fulfil needs such as eating, healthcare and infotainment.

The results on slide 21 show that eating causes most waste. It gives you a picture of how these things link together. Then they built different scenarios (slide 22), on 2 main axis – one to do with dematerialization. At the top, we've fully materialised, using 6 planets. As you move down, more dematerialisation happens. Left to right is another axis – the extent to which we're living indoors vs outdoors. This might sound flippant, but it has amazing implications for amount of waste and types of waste.

Each was labelled as a different scenario and for each they did a write up of what might have happened by 2020. One scenario was 'Home sweet home' – .the economic crisis of the beginning of the 21st Century and the scandals within global electronics companies brought people back to reality'. It describes what kind of world people are living on and how they've responded – eg by becoming less materially obsessed and spending more time at home, and the implications of how much waste they produce.

This scenario building exercise was then used to pin consequences on which they hoped would inform policy makers, campaigners, people looking at waste infrastructure. The 'high material intensity media at home' scenario is a nightmare – people living indoors, working from home, more packaging, no home composting as no gardens.

None of the scenarios are likely to come true, but it illustrated the problems faced with trying to predict waste futures. We need to define what sort of society we've become by 2020, to understand what residual waste might be in the future.

To conclude, there have been significant changes in the waste composition, few were predicted. Now see lots of food waste, mostly to do with feeding and eating in the home, but if that changes in the future the waste stream will change with it. Waste in the future is down to what sort of society you want there to be

in the future – as waste is the sum total of human activities.

9. Ann Ballinger - Consultant, Eunomia Research & Consulting

The climate impacts of residual waste technologies

View slides at http://foe.co.uk/resource/event_presentations/9_ann_ballinger.pdf

There are many technologies being promoted, I'll compare three broad waste treatment methods - landfill, incineration and MBT aerobic stabilization (as in Peter Mills' New Earth Solution technology).

Carbon intensity of residual waste - one tonne of residual waste is very difficult to characterize, as so variable, and will vary over time. There are broad trends. In today's residual waste the net calorific value (NCV) is around 9-10 GJ/tonne.

You can broadly split that kind of material into 2 types - materials of non-fossil origin (biogenic, eg garden, food and paper based waste). Some have high moisture content (e.g. food waste) – up to 70%. Of dry matter, only 40-50% is Carbon (rest is O, H, N, S, etc.).

Materials of fossil origin (plastic based) have a much lower moisture content. Of dry matter, high proportion is Carbon (rest is mainly H, some Cl etc.). The total Carbon of residual waste is 25% (250g) – which is heavily concentrated in the fossil materials. The non-fossil carbon materials are less well captured by existing recycling schemes, concentrating the fossil carbon in the waste stream. This is important as it is where GHG emissions come from. The carbon in the waste eventually becomes in some form a global warming impact which we try to measure and identify.

The main output in terms of global warming potential from landfill is going to be methane emissions. It is only the non-fossil carbon that degrades, and some of it degrades over a long period of time – newsprint has been found in landfill after 50 years. This is indicative of the fact that lignin is biogenic carbon that doesn't degrade quickly – landfill sequesters this carbon for some time.

Landfilled plastic won't degrade at all over the time scale these studies look at. When the methane is produced in the landfill, some of it is captured for energy generation, so you get benefit back. There is a low input of energy as not very much energy is required to manage the process.

In contrast, with thermal processes such as incinerators, the majority of the combustible (fossil and non-fossil) carbon in the waste stream is going to be converted in some form to global warming potential GHG. In contrast to landfill, you do get fossil based carbon released, as well as nitrous oxide (a much more potent GHG than CO2). Energy is generated, but has to be balanced against the high GHG emissions from fossil based materials. You don't manage to offset emissions as poor efficiency of generation.

With aerobic stabilization processes, again only non-fossil carbon degrades and again some of it degrades over a long period of time. The non-fossil carbon is degraded in the facility but in a very controlled manner – this is the distinction between an anaerobic and aerobic type process. An anaerobic type process in a landfill is going to produce methane, a much more potent GHG.

In the MBT process with aerobic stabilisation, only CO2, a less potent GHG, is produced in a controlled manner. Once material has been through the process, what goes into landfill is much less environmentally damaging, so the amount of methane released is greatly reduced compared to if it not been thought this type of treatment process. There is no energy recovery but these processes produce recyclable material, which will gain a substantial amount of GHG offset. So there is energy recovery and recycling materials recovery – both deliver different types of GHG benefits.

When comparing these processes, two types of analysis are used – LCA and cost benefit analysis (CBA). WRATE is a LCA tool. LCA produces an inventory of emissions (often considers a wide range of pollutants), pollutants are weighted to calculate variable impacts. CBA again produces an inventory of emissions (may be less broad in scope than LCA), but tries to convert impacts into monetary values attached to pollutants, and weighs these against the cost of treatment options. There are pluses and minuses to using these.

Slide 8 looks at GHG using a LCA approach. The numbers are Kg CO2 equivalent – measures global warming potential. There are weighting factors attributed to this - usually methane multiplied up by 21, nitrous oxide by 300. So you get a picture overall of the climate impact of these different gases.

The table shows the amount of energy required for the process. We look at 2 sets of recoveries, which is what the negative numbers on the tables are. The negative numbers represent avoided emissions, these are emissions for which you effectively get credits back into the system for either recycling materials or recovering energy.

For the recovered materials, incineration processes do usually recycle metals when they can – however the rate of recovery is usually lower than it will be at MBT facilities, so the credit they receive for recovered materials is much less. MBT recovers metals, often paper and plastics as well, so they get more credit for recycling materials. However, they don't get credit back for recovering energy.

Slide 8 shows three different types of energy scenarios, with three outputs. Just generating electricity is the lowest, generating heat as well as electricity is the middle scenario, and heat is the highest.

When generating heat at a facility, you may or may not be able to use heat. We have assumed only 60% heat generated is going to be utilized, as the heat demand is less in the summer, and you have to have something else to do with it. There is no benefit back as it is being wasted. If you generate electricity only that is usually fed straight into the grid so you do get a benefit from it. It also shows that incineration facilities use a lot more input energy than basic stabilization type processes.

Slide 9 shows some results from WRATE. Eunomia have just gone through a process with Peter Mills trying to model his MBT process in WRATE. MBT processes are not modelled well in WRATE, as the model doesn't have any means of dealing with what happens to pretreated waste. It assumes that even though its been though a pre-treatment, it is dealt with in exactly the same way in landfill. The methane emissions will be the same as if it had not been through any pretreatment at all. As a result, MBT processes fare very badly when you're looking at their global warming potential. I believe the compilers of the software are aware of this and looking to address the misrepresentation in the model. As it would be unfair to put MBT processes on this graph, it just shows a comparison between landfill and different types of incinerators in WRATE.

Graph 9 indicates that not all incinerators are the same in terms of their global warming potential, and some are worse than landfill, according to WRATE.

We've assumed the displaced energy source is combined cycle gas turbine, a relatively low carbon intensive energy. This could be a reason these results look different to others you might have seen. What you're comparing it to is something that is relatively quite good in carbon intensity terms. As we're looking at gradually decarbonising our energy overall, then incineration processes tend to look less good.

Slide 10 shows an example of the alternative method used to analysis the relative performance of technologies - external costs and benefits. This data was published 4 years ago by Her Majesties Customs and Excise, on the back of reports comparing the costs and benefits associated with just incineration and landfill. There is a differential in the costs of the treatment, and in terms of the amount of global warming potential associated with those technologies.

In their example incineration with energy recovery definitely does not come out better than landfill, suggesting they should be considering some kind of incineration tax. At the time they decided incineration capacity was still needed so they stopped short of recommending an incineration tax at the time and didn't take forward the results of their analysis in trying to develop recommendations. However, many other countries in Europe with a high proportion of incineration also have quite high incineration taxes.

Last week's budget announced a landfill tax consultation, and the continuation of the landfill tax escalator till 2013, up to £72 / tonne.

Eunomia ran a project putting together an evidence base on what is happening in Europe, to consider assessing the taxation of landfilled pre-treated waste differently. They argued waste that has been through a pre-treatment process shouldn't be taxed at the same level as untreated waste, because the environmental benefits associated with MBT processes are not being recognized.

The landfill tax consultation suggests the Treasury is starting to tentatively consider this as an option. We would definitely support this. Currently incineration facilities aren't being taxed apart from a tiny amount based on the residues going to landfill, subject to the inert tax rate and no escalator. At the same time stabilisation type processes, that we believe have a much lower environmental impact, are still charged at the same rate when sent to landfill.

There can be benefits associated with recovering energy from materials. Treatments that generate energy fare better where they can use all of the energy that is available, including the heat. Once we start to decarbonise our energy then thermal treatments tend to do less well in comparison.

Materials that are not a source of energy, such as glass and metals, should be removed as much as possible from the waste stream. Materials for which the emissions intensity of energy generation is greater than that of the displaced material should be recycled wherever possible (plastics).

From a climate change perspective, where residual waste is concerned, it is better to extract materials for recycling; or to extract materials for landfilling, so as to sequester carbon where you can. Recycling is the best option for metals. Low grade recycling or sequestration may be better for plastics if high grade recycling is not possible. For biowastes, 'segregation' for energy generation may be the preferred option, in which case, AD can have a role to play.

The most climate friendly approach is not necessarily the one which generates most energy. Recovering materials for recycling has significant environmental benefits. Is it time within the current taxation regime to consider an incineration tax and a lower rate of tax for pretreated wastes?

10. Dr Michael Warhurst - Senior Resource Use Campaigner, Friends of the Earth

Long contracts… 10 Key questions

View slides at http://www.foe.co.uk/campaigns/biodiversity/news/taking_rubbish_20031.html

Long contracts briefing based on these 10 key questions is at
http://www.foe.co.uk/resource/briefings/long_contracts.pdf

Why are long contracts important? We have heard a lot today about opportunities to increase reuse, recycling, composting etc. It is difficult to predict the future - we also know that environmental and economic challenges, and changes in society, will mean moving goalposts. Yet, in many places there is a drive to sign long waste contracts of 20-30 years. This talk poses 10 key questions to ask if you are getting into that situation and wondering whether it the right thing to do, and looks at some key risks.

Why do people want long contracts of 20-30 years? They are usually suggested because of the need to pay for large, expensive infrastructure. Residual waste facilities such as incinerators usually need to be large (for economies of scale) to make sure the gate fee is low enough, and are very expensive to build.

Often this infrastructure is very inflexible - e.g. an incinerator needs to run continuously, with limited variation in quantity of waste per day, of ideally consistent composition. In contrast, other techniques (e.g. some MBT plants) can be much more flexible. Shorter contracts - 5-10 years - give greater flexibility. You are more able to adjust to changes in waste volumes, composition, recycling rates and regulation.

Q1: Has the council considered smaller, cheaper, facilities on shorter term contracts (e.g. 5 - 10 years)?

Predicting municipal waste?

Predicting MSW is difficult. There was a 1.9% drop in MSW in England in the last DEFRA audited figures from last year [1]– before the economic crisis.

In a recession we would expect further drops in waste quantities. We've been hearing that in recent

months this has been happening. If contracts are modelled on 3% a year growth, as many consultancies have recommended, the waste will not be there and they will have problems.

There are also policy changes. The EU parliament was pushing for waste prevention targets in the debate on the Waste Framework Directive. In the end, Member States weren't keen on this. We ended up with a compromise.

The final Directive obliges Member States to produce Waste Prevention Plans, and the Commission to report on the potential for waste prevention by the end of 2011, with the aim of setting 2020 targets in 2014.

Q2: Is your council modelling a reduction in municipal waste?

Predicting residual waste?

Predicting residual waste is challenging if we can't predict total waste. The amount of residual waste will depend on point A, and on how much reuse, recycling and composting there will be in the future. The 50% target that England has adopted for 2020 is now the legal EU minimum. The Commission will review this target by the end of 2014. Wales has already agreed 60% by 2020, 70% by 2025. Flanders has been recycling over 70% for several years. The environmental and economic pressures, and pressure to create jobs, will push for waste prevention and recycling. What will recycling targets be in 2020 - 2025 or 2030?

Q3: Has your council modelled recycling and composting rates of 70% and above?

How much C&I waste?

Key issue and deficiency in the UK

It is sometimes argued that over-large residual waste facilities will be OK because there will be plenty of Commercial & Industrial (C&I) waste to dispose of.

How much total C&I waste is there? We don't know - the government only knows how much is landfilled. The last survey (which is often criticised) was carried out by the Environment Agency in 2002, before the big growth of manufacturing in China and the growth in recycling.

How much could be recycled? Some companies (e.g. Coca Cola) already have 'zero waste' factories.

How much residual is really there, and what could change in the future? A recycling target for C&I waste is a possibility, either in the UK or from EU level. An EU target of 70% recycling by 2020 was supported by the European parliament, but opposed by Governments – this will be reviewed in 2014.

There is the debate on landfill and incineration bans on recyclables – DEFRA is investigating this.

Q4: Are there real figures for how much C&I waste there is in your area, and how much could be recycled?

An anaerobic digestion explosion?

Anaerobic digestion (AD) takes food, agricultural waste and sewage sludge and makes biogas, which can be burnt to make 100% renewable electricity on-site, used as a transport fuel or piped into the gas grid. The National Grid have said biogas could produce 50% of domestic gas use [2]. AD is now finally on the agenda, with funding, 'task groups' and incentives. But will the waste be available or will it be heading into the local incinerator? Civil servants and industry are voicing concerns about this issue.

Q5: Is your council assuming separate collection of food waste and anaerobic digestion?

Who pays for changes?

Long contracts are legally complex, as the world will change during the contract - but who will pay the

costs - the contractor or the local tax payer? There may be planning delays or legal challenges.

Councils may indemnify contractors against these costs. What if there are regulatory/tax changes?

E.g. landfill tax on bottom ash, incineration tax, or new CO2 charges? Who will pay for that – the company or the council? What if there is not enough waste? Will the council have to pay for not producing waste?

Q6: Who pays in the event of (i) planning delays or legal challenges; (ii) not enough waste; (iii) tax changes.

Who takes the risk?

If there are changes in the economic environment, the contractor may claim that it will go bankrupt without contract changes. The multinational wouldn't go bankrupt; just the company they have set up for the contract.

This is reported to have happened in Newhaven, in 2007, by a local newspaper.

"*A copy of the papers, leaked to Lewes MP Norman Baker, suggests that Veolia claimed that the waste contract, agreed four years ago, was no longer profitable and would have to be extended by five years.*

Under the contract Veolia is liable for all increased costs to the project but councillors feared that without help the contractor would go bankrupt causing the project to collapse.

Veolia faces a rise in construction costs from £71.7 million to £145.7 million. The longer contract will give Veolia an extra £35 million in income. Councillors feared that if they refused to extend the contract Veolia would walk away."

This decision is now under investigation by the Commission, to see if it is legal under competition law.

Q7: What procedures has the council put in place to prevent later forced re-negotiation of the contract?

Democratic process?

Long private contracts often force councillors to take decisions in private. And to keep key documents out of the public domain, ideals of openness and Freedom of Information are lost in sea of commercial confidentiality. With PFI funding the inability to fully examine background documents raises the risk that the PFI credit makes the project look better value than it really is.

The Newhaven experience is particularly worrying *"And even though the project has a £1 billion price tag almost nothing is known about the financing or the costs of the buildings or services."* [3]

Q8: Are councillors and the public able to access enough information to make informed judgements?

The climate driver

In a time of public spending cuts combined with ever-stronger climate targets, government incentives are most likely to be directed towards the best climate solutions. If you are contracted to build an incinerator, expect the incentives to move against you. As DEFRA says - incineration of plastic is a bad idea: "*where fossil fuel based products are incinerated (e.g. plastics) they tend to generate energy less efficiently than using fossil fuel directly, hence are associated with an overall carbon cost*"

English Waste Strategy, May 2007, Annex E: Summary guidance on energy from waste (EfW) technology

Once food waste is removed, there is an even higher % plastic in waste - will the incentives adjust to reflect this?

Q9: Has the council got the evidence to show that it has adopted the best environmental option?

Looking back...

When local people look back on the signing of this contract, after say, 20 years – 2031 if you signed the contract in 2011, will they be impressed with what the council did then or will they believe that the councillors and officials at that time made a serious mistake? e.g. how will public spending cuts have affected the money left over after paying for the PFI?

Q10: Is the council confident that future council tax payers will look back on this contract as a good use of taxpayers' money?

Long contracts and residual waste

Long contracts and inflexible residual waste treatments are a serious threat to maximising prevention, reuse and recycling. Danish data [5] shows how recycling is held back by incineration – some regions are stuck at 25% recycling as incineration levels are so high, therefore insisted the EU target allows them to burn biomass. Any residual waste technology should support the aim of gradually phasing out residual waste. This is easier to achieve with more flexible facilities, and shorter contracts.

References

1] "*Municipal Waste Management statistics 2007/08*", DEFRA, 6th Nov 08, http://www.defra.gov.uk/environment/statistics/wastats/archive/mwb200708_statsrelease.pdf

[2] "*The potential for renewable gas in the UK*", National Grid, January 2009. http://www.nationalgrid.com/uk/Media+Centre/Documents/biogas.htm

[3] "*Incinerator's cost doubles*", Brighton Argus, 28th Sep 2007. http://www.theargus.co.uk/news/1720827.incinerators_cost_doubles/

[4] *"European Commission to scrutinise East Sussex contract",* Lets Recycle, 24th April 2009 http://www.letsrecycle.com/do/ecco.py/view_item?listid=37&listcatid=217&listitemid=51806&section=legislation

[3] "*Stopping the Waste*", Friends of the Earth Europe, 2007. (Data from Waste Centre Denmark): http://www.foeeurope.org/publications/2007/FoEE-EEBWastebrief-Apr07.pdf

Question and answer session with panel

- **All arisings statistics are for waste that is being collected – part of the waste that doesn't appear in the statistics is waste that has been avoided. Eg Uttlesford have avoided food and garden waste through home composting, reuse through table top and car boot sales.** (Maike Windhorst, Mid Essex Friends of the Earth)

Julian – yes there is a lot more to waste arisings than what is captured by municipal systems. Home composting can't be accounted for in municipal stats yet it amounts to a substantial amount of materials. When an authority collects garden waste free of charge, it doesn't get the balance right in the capacity allocation between those elements leading to extra material being collected. This isn't a cost effective solution. The issue of including home composting diversion in LATS has been discussed but never resolved, as it created lots of legal issues to do with definition of waste. We need to get the balance right and not inadvertently mobilise material. One of the biggest threats to reuse is our innate hording instinct. A lot of the electrical appliances that could be reused now are kept for years in the loft. We need to try to get stuff into reuse and charity shops and collection systems as soon as possible. This might lead to increase in MSW arisings, but it would still be a good outcome. The full carbon benefits of reuse haven't been worked out, just the end of life benefits. If an unwanted appliance isn't stored but reused and genuinely displaces a new appliance, and the whole burden of a supply chain, that is a massive benefit. We need more innovation in the way policy makers take on board materials higher up the hierarchy

because although the accounting is more difficult, the environmental outcomes are a lot better.

- **What is actually non-recyclable or compostable out of residual waste? Massive contracts are being signed, contracting into supplying valuable resources to disposal**. (Paula Whitney – Colchester and North East Essex Friends of the Earth)

Julian - It comes down to economics – if you're not worried about money you can recycle just about anything. Some materials are more difficult, such as composites, some papers, and with material separated from residual waste, contaminants may cause problem in the end markets. Changes in materials being used in packaging and newsprint. Its not right to pick a percentage, but we've got to make sure we've moving in right direction at the right velocity. The composition of waste stream might look different by the time we're recycling high amounts. Designing out non-recyclables is not easy to grant, given our global economics and supply chains.

- **A company called 'No waste' in Birmingham are building a plant to reprocess used disposable nappies. Another company, Vioplas in Halifax, will be using mixed plastic waste to create materials to replace wood in building industry. We need to persuade the Government to support SMEs that wish to use waste, but if it is tied into long contracts the SMEs won't get that encouragement. We need flexibility, eg small MBT. How can we change the weighting in WRATE, to create a fair playing field for new innovative technology?** (Mary Newton – Gloucestershire Friends of the Earth)

Peter – Businesses have to spend some money and develop processes from their own funds, work with consultancies to produce empirical data, put Michael's 10 questions back to your elected representatives. Scalability is important – we chose MBT as it is a non-destructive process. You can build up capacity according to waste production needs – you don't need to start at 200 000 tonnes, you don't need to put 80% material into landfill. There are different types of MBT, some are more genuine than others. Subjecting it to a robust LCA is crucial, WRATE doesn't do that but should improve with evidence NES are providing. I've heard for each kg of plastic, 5 kg of waste materials are produced in the manufacture. Those materials and energy used in manufacture that should be included in the LCA. Also, the American Environment Agency have produced figures showing that 4 times more GHG can be saved by recycling and reuse than by EfW.

Michael – One of the reasons we're looking at resource use more, there has been a trend for products to get carbon footprints on them, but we need to get across that prevention – eg not eating crisps - avoids generating that carbon. We're in a moving situation – for example the example of composites. The argument for composite packaging is it is lighter, can be packed more tightly and so save energy on transport. The next idea was compostable composites, that can be composted together. However, WRAP are now looking at multiple composites that are compatible when recycled, so can all be recycled through one route. This shows that with innovation and change something that appears difficult at first may not be that difficult.

Peter – We need to hold policy makers to account on residual waste. Are the interests of big business driving the agenda, rather than concern for climate change? Ask the 10 questions posed in Michael's talk, and use the Freedom of Information Act if you don't get answers.

Ann – There are always problems when you're presented with data – how have the answers been arrived at? When looking at plastics over whole life time, some studies include information on the disposal impacts, but often they don't. Often is isn't possible to tell whether they have been included as there is a lack of transparency in the data – you can't tell how it has been calculated. The problem with LCA is they're not all carried out in same way. Some of work that WRAP has done has been good at trying to analyse the difference in approaches, try to understand how they arrived at these conclusions, and you end up with an enormous amount of data to compare.

Julian – In terms of the reasons for doing things in GHG terms, we spend too much time trying to work out overall benefits of things, and not enough time getting on with it. The most important realities in terms of recycling and reuse in the UK is getting people to concentrate on the quality issues – where the stuff is actually going, is the focus on end market values? Studies stating the GHG benefits by recycling don't tell you if the system you send materials to meets the basic criteria for putting quality into the end market, so we don't want to be driven by these universals, when the drivers are actually the realities of local systems. For example, for reuse it is important to understand where materials are being sent, what are the grades of materials being reused, how long are they reused for, rather than exactly the GHG savings. We know it is worth doing so we should focus on the qualities of the system we want to encourage.

Chairman's conclusion

It is clear from what we've heard that the agenda for high diversion away from landfill through waste prevention, recycling and reuse is certainly not impossible, we've seen excellent examples from Flanders and Somerset on what is achievable. The resource use issues, jobs issues and climate change issues do start to feel like its time for a new wave of thinking on our national objectives for waste and resources. It's only 2 years since the last Waste Strategy, but the world is moving swiftly around us and we're not always moving swiftly as we need to. If in any way the thinking and learning today helps to further push our policy makers and leaders into genuinely fresh thinking then that would be a good thing. Play your part in creating that political climate in which that kind of forward thinking review is possible.