

AD Seminar Aberystwyth 210510



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# Anaerobic Digestion in Wales – an overview

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# New Sustainable Development Scheme – “One Wales, One Planet”



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- “Within the lifetime of a generation, we want to see Wales using only its fair share of the earth’s resources, ....1.88 global hectares per person – ‘One planet living’ “
- “To achieve this goal over a generation, we will need to **reduce by at least two thirds the total resources we currently use** to sustain our lifestyles. To reduce this must include:
  - .....a society where we focus on eliminating waste, and waste that can’t be eliminated must be recycled in “closed loop” systems that achieve the best reduction in ecological and carbon footprints. This will build on our stated goal of achieving 70% recycling across all sectors, and diverting waste from landfill by 2025.”

# Towards Zero Waste Wales



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- Our aim is to:
  - Take a “zero waste” approach, which means we aim to produce no waste in the long term, by designing products and services that reduce or reuse waste as far as possible, and developing a locally and highly skilled economy for waste management and resource efficiency.
- High level framework
  - Long term, outcome focussed plan – certainty for investment
  - Focus on areas of most benefit
- Outcomes sought:
  - Achieving sustainability
  - Reducing ecological-footprint
  - Limiting climate change; and
  - Improving resource efficiency

# Two-pronged approach in “Towards Zero Waste”



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- **2050: Towards Zero Waste**
  - reduce our share of Wales’ ecological footprint to ‘one Wales: one planet’ levels by 2050.
  - produce no waste in the long term, by designing products and services with waste prevention in mind.
- **2025: A high recycling society**
  - Recycling rate of at least 70%
  - AD food waste priority + ‘Closed loop recycling’ systems
  - Meet 2012/13 and 2019/20 Landfill Directive targets through source separated recycling/composting/ anaerobic digestion
  - Residual waste to high efficiency energy from waste plants

# Why the emphasis on food waste?



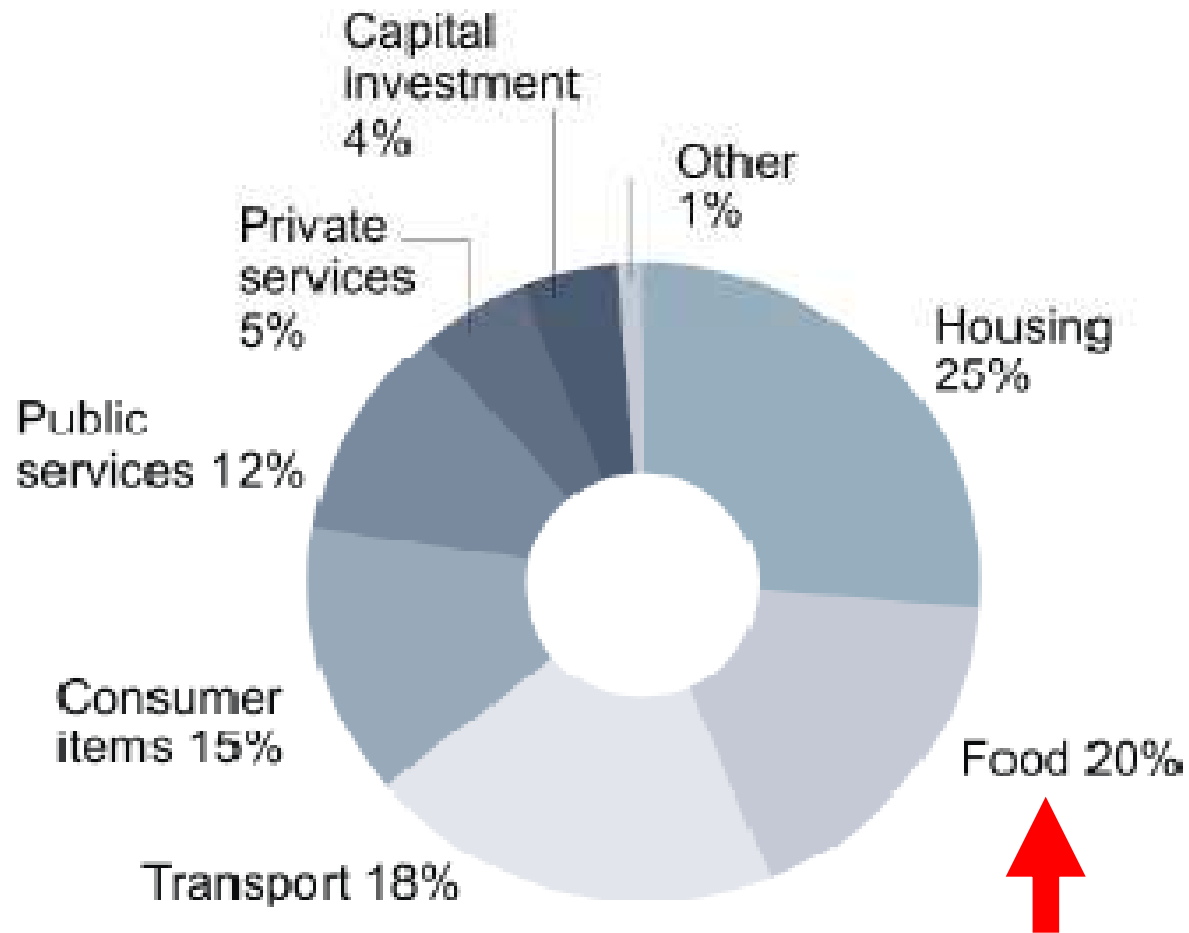
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- Ecological & carbon footprint reduction
- EU Landfill Directive / Landfill Allowances Scheme
- Landfill costs/tax
- Energy prices
- Waste strategy – priority material
- Consumer expectations
- Fortnightly residual / AWC
- Pre-treatment requirements
- Increase in fertiliser costs

# Wales Ecological Footprint



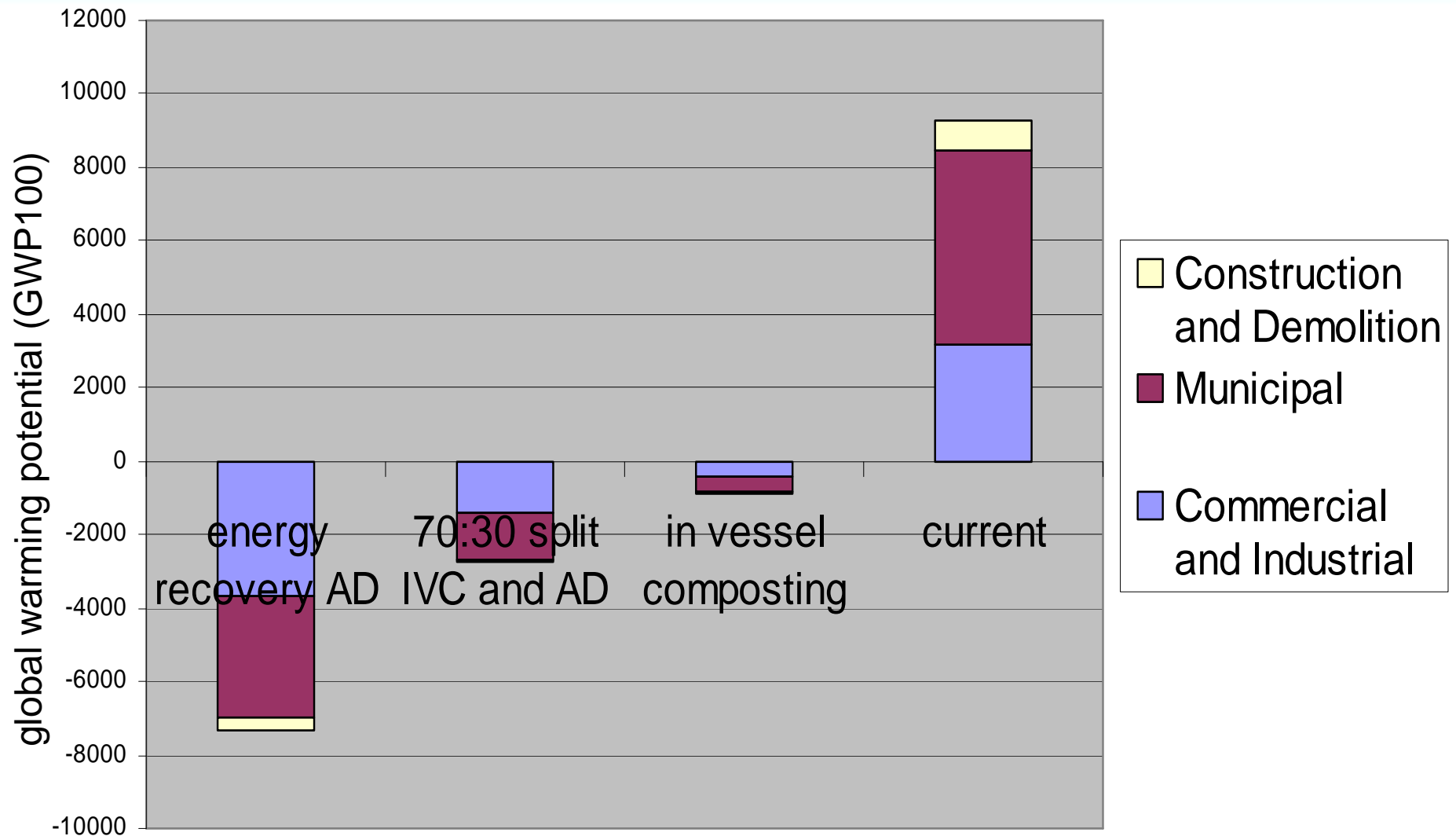
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# Anaerobic digestion (AD) v in-vessel composting (IVC) – Differences in Global warming potential



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# The double benefit of AD



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- Net delivery of renewable energy:
  - Biogas to electricity/ CHP/ heat
  - Biogas – clean up & compression – vehicle fuel
  - Biogas – clean up & injection into National Gas Grid - use in home (green tariff?)
  - Biogas – hydrogen in fuel cells
  - Renewable Obligation Certificates (ROCs)
- Valuable fertiliser
  - PAS 110
  - EA/WRAP Protocol

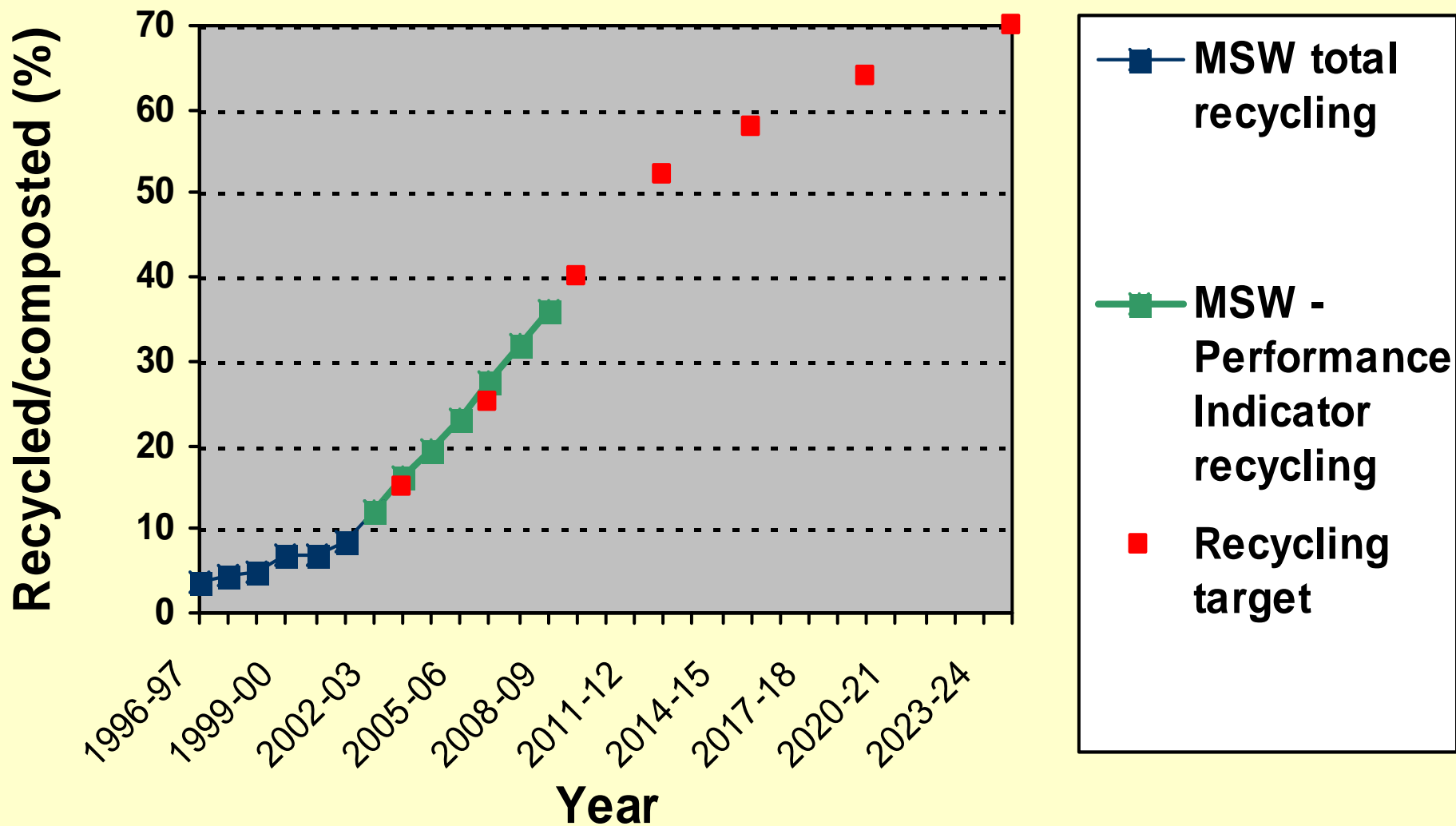
# Target proposals for municipal waste



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Each Authority	09-10	12-13	15-16	19-20	24-25
Recycling/comp/ AD (statutory min)	40%	52%	58%	64%	70%
Min proportion from source separation	80%	80%	80%	80%	80%
Food waste (min) – out of total MSW	-	<b>12%</b>	<b>14%</b>	<b>16%</b>	<b>16%</b>
EfW (max)	-	-	42%	36%	30%
Landfill (max)	-	-	-	10%	5%
Residual/person / annum (max)	-	295kg	258kg	210kg	150kg

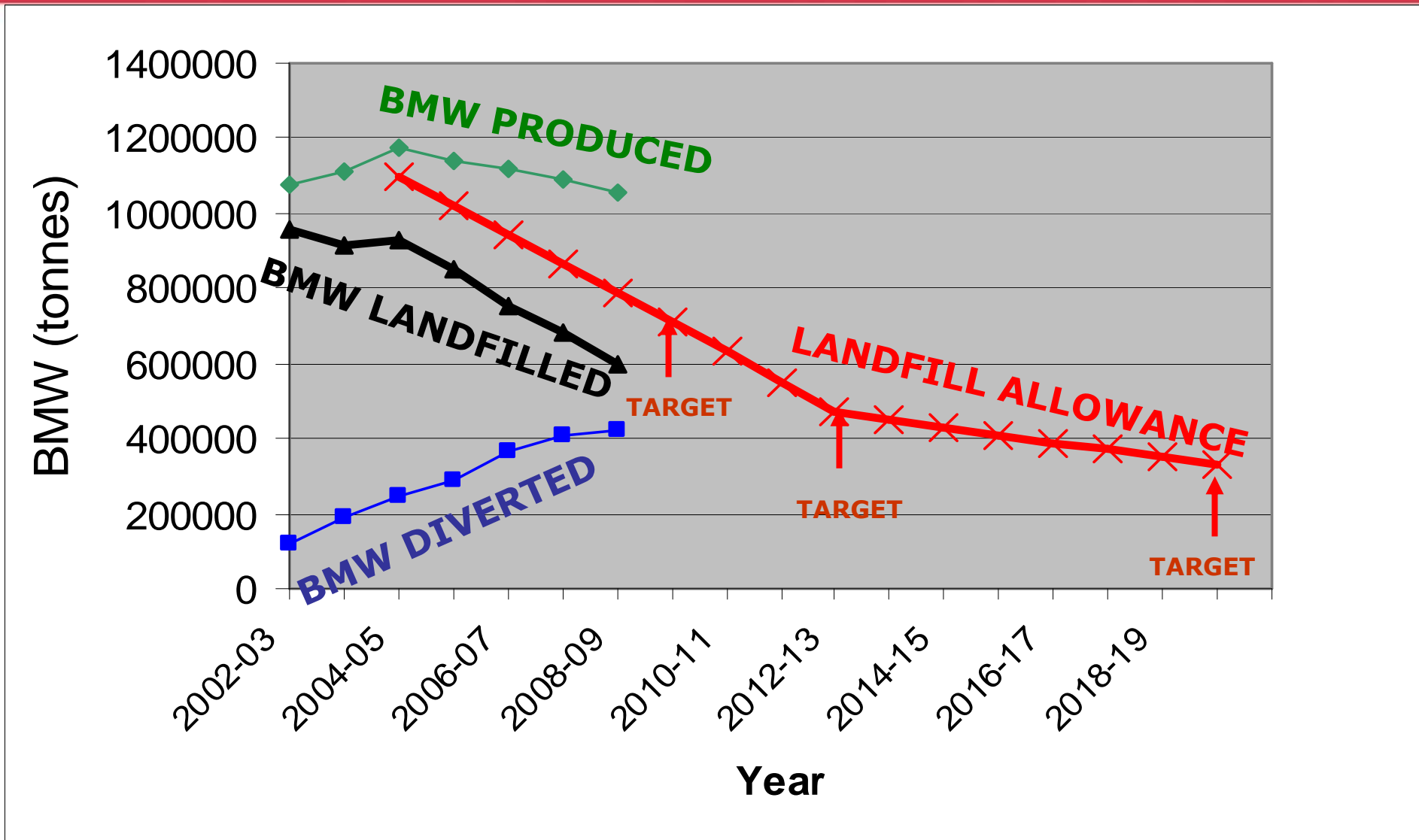
# Progress so far: Municipal Waste & Recycling/ Composting targets to 2024-25



# Meeting EU targets limiting the landfilling of biodegradable municipal waste in Wales



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# The approach in Wales to realising the value of food waste



- **Municipal food waste**
  - Signal need to collect & treat food waste
  - Propose (& set) food waste targets
  - Appraise evidence on affordable solution delivering best SD outcomes
  - Secure funding support
  - Introduce universal household food waste service
  - Quantify capacity need and secure procurement of treatment
  - Secure technical expertise
  - Secure markets for outputs
  - Resolve development planning & public perception
- **Industrial and commercial food waste**
  - Quantify
  - Grant support for AD
  - Encourage local authorities to collect commercial food waste
  - Examine levers

# Where is the food waste?



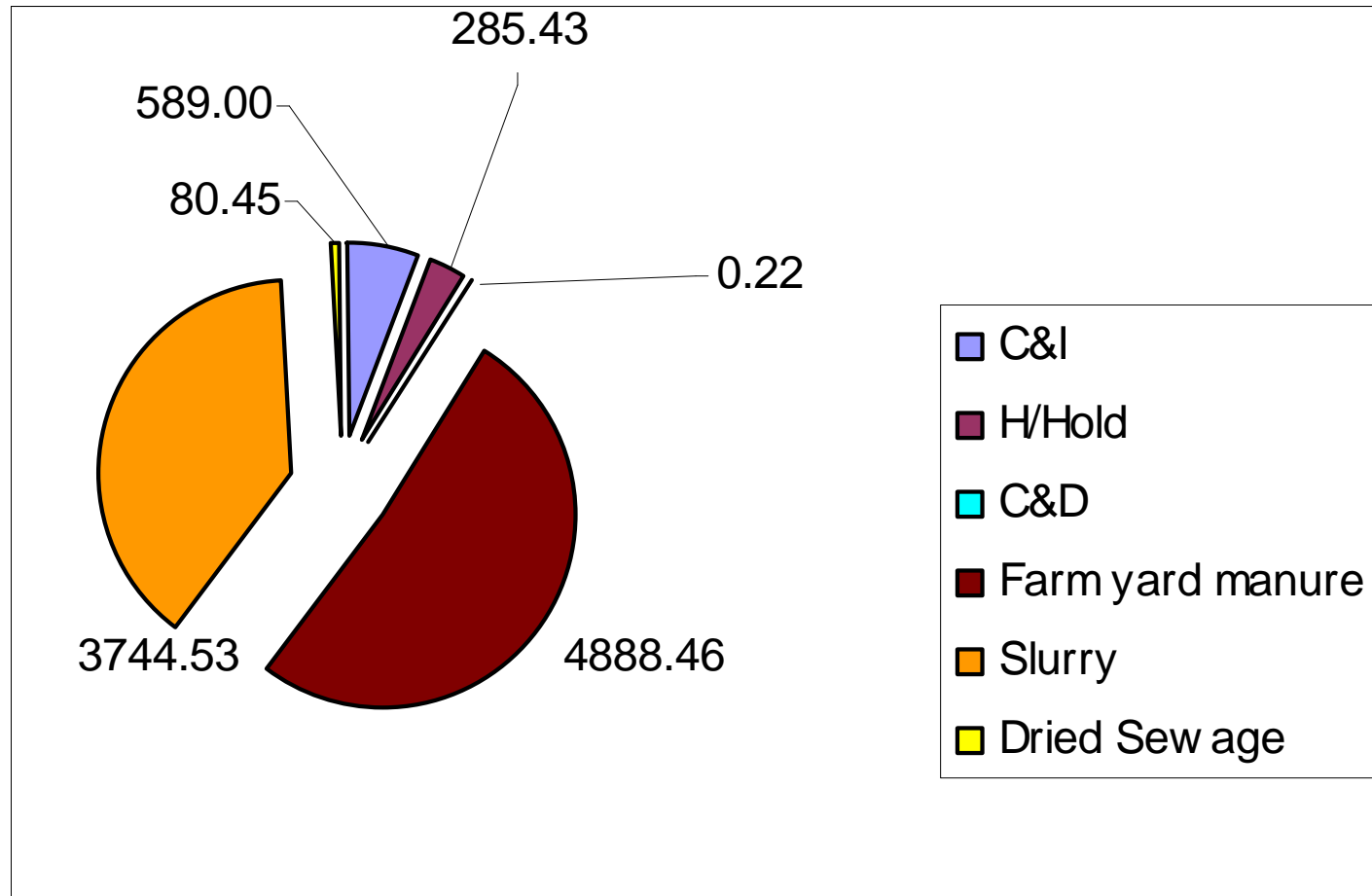
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- Waste plant and animal material from:
  - Households, e.g.:
    - Kitchen waste
  - Commerce (shops/offices etc), e.g.:
    - Spoilt/out of date food
    - Canteen/restaurant waste
  - Industrial, e.g.
    - Food and drink industry waste
    - Canteen waste
  - Construction & demolition
    - Canteen waste
- And not forgetting previously digested food!
  - Manure from agriculture
  - Sewage sludge

# Estimates of food & food related waste arising from different sectors in Wales (k tonnes)



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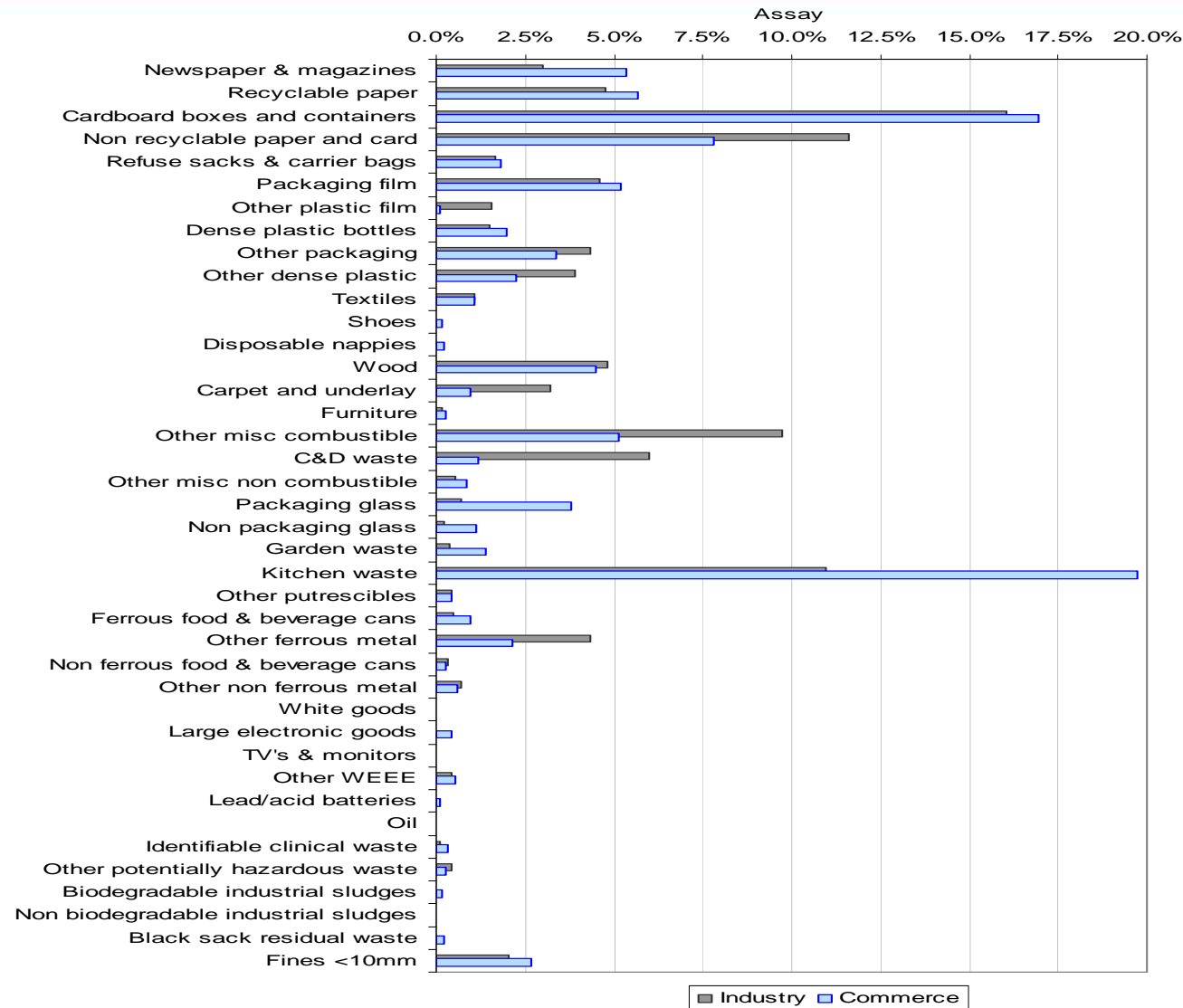


Data Sources: Industrial food waste calculated from EAW 200& I&C study - combination of 1) "Animal waste of food and food preparation"; 2) "Animal faeces, urine and manure"; 3) "animal & vegetal wastes"; 4) and " Household and similar wastes" + "Mixed and undifferentiated materials" X 11% food waste composition (from 2005 Compositional analysis study); Household from 2007/08 MSW Survey and composition of household waste from 2002 study; Dried sewage sludge from DCWW; and Farmyard manure from EAW

# Composition of landfilled mixed industrial & commercial waste 2005 (EA study)



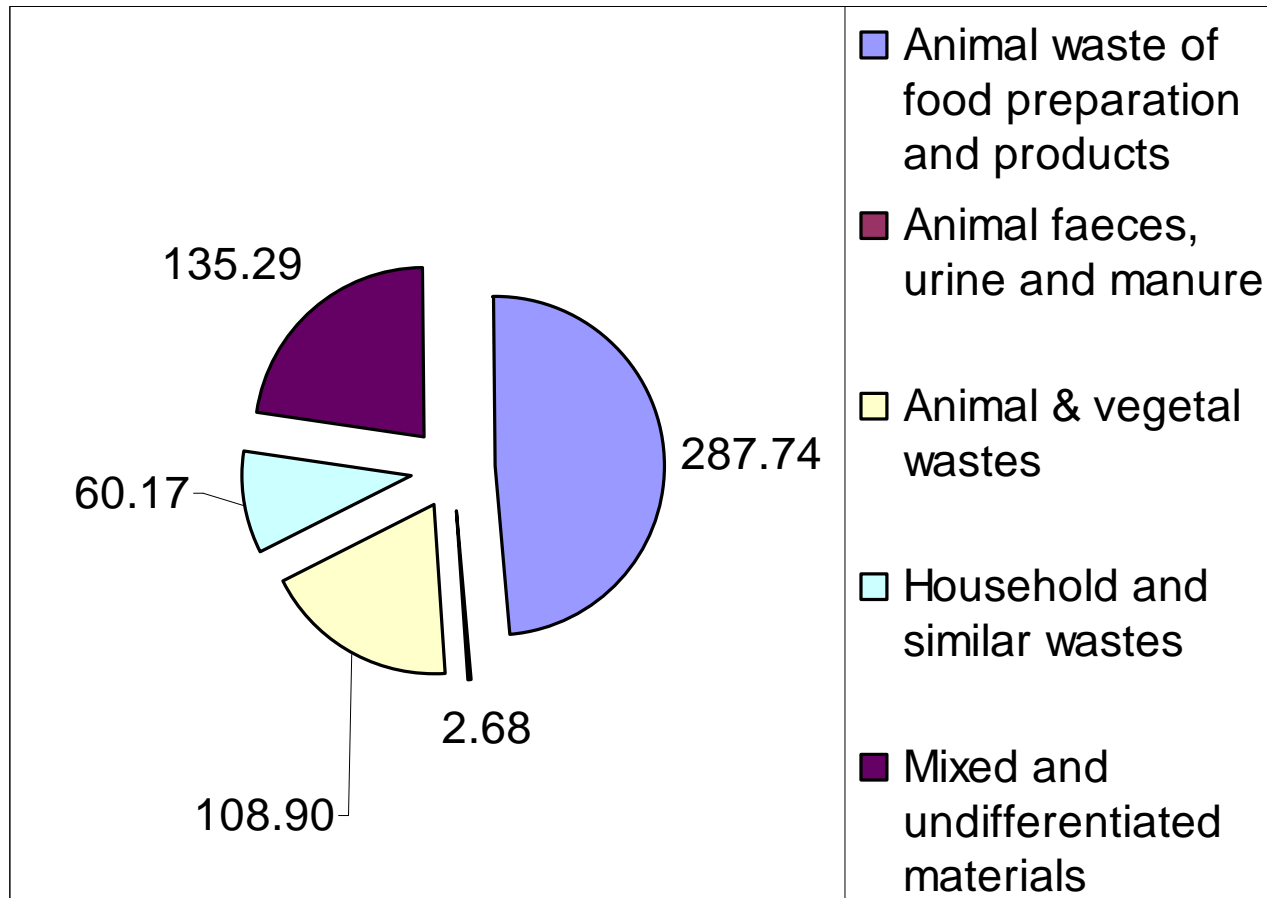
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# Combined Commercial and Industrial Food waste streams 2007 (000s tonnes)



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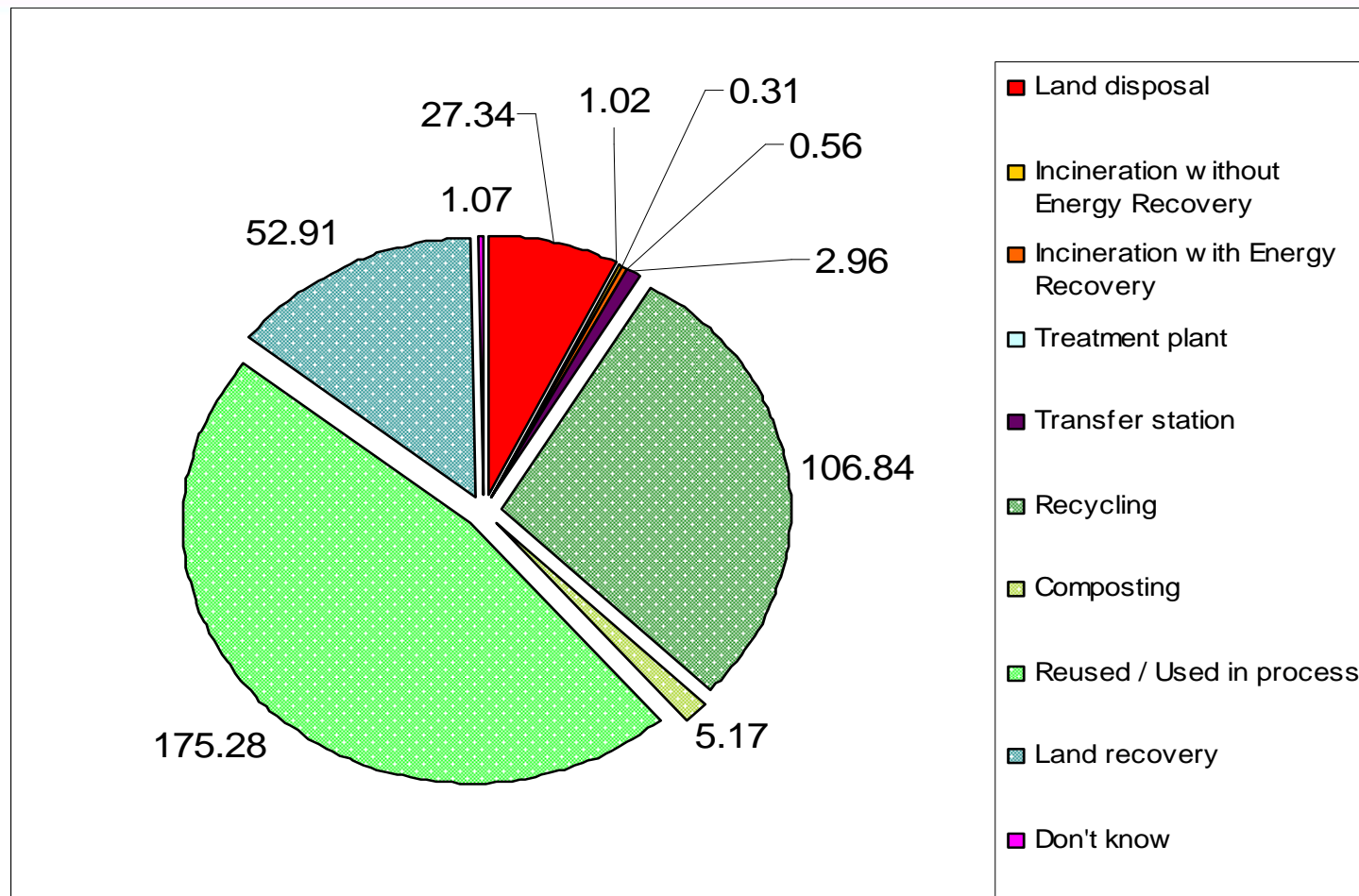
For industrial waste, the food component of "Household and similar wastes" + "Mixed and undifferentiated materials" is taken as 11% and for commercial waste the food component of "Household and similar wastes" + "Mixed and undifferentiated materials" is taken as 20% (from EAW 2005 Compositional analysis study of mixed landfilled C&I waste)

Source: Environment  
Agency Wales

# Management of industrial food waste in Wales 2007



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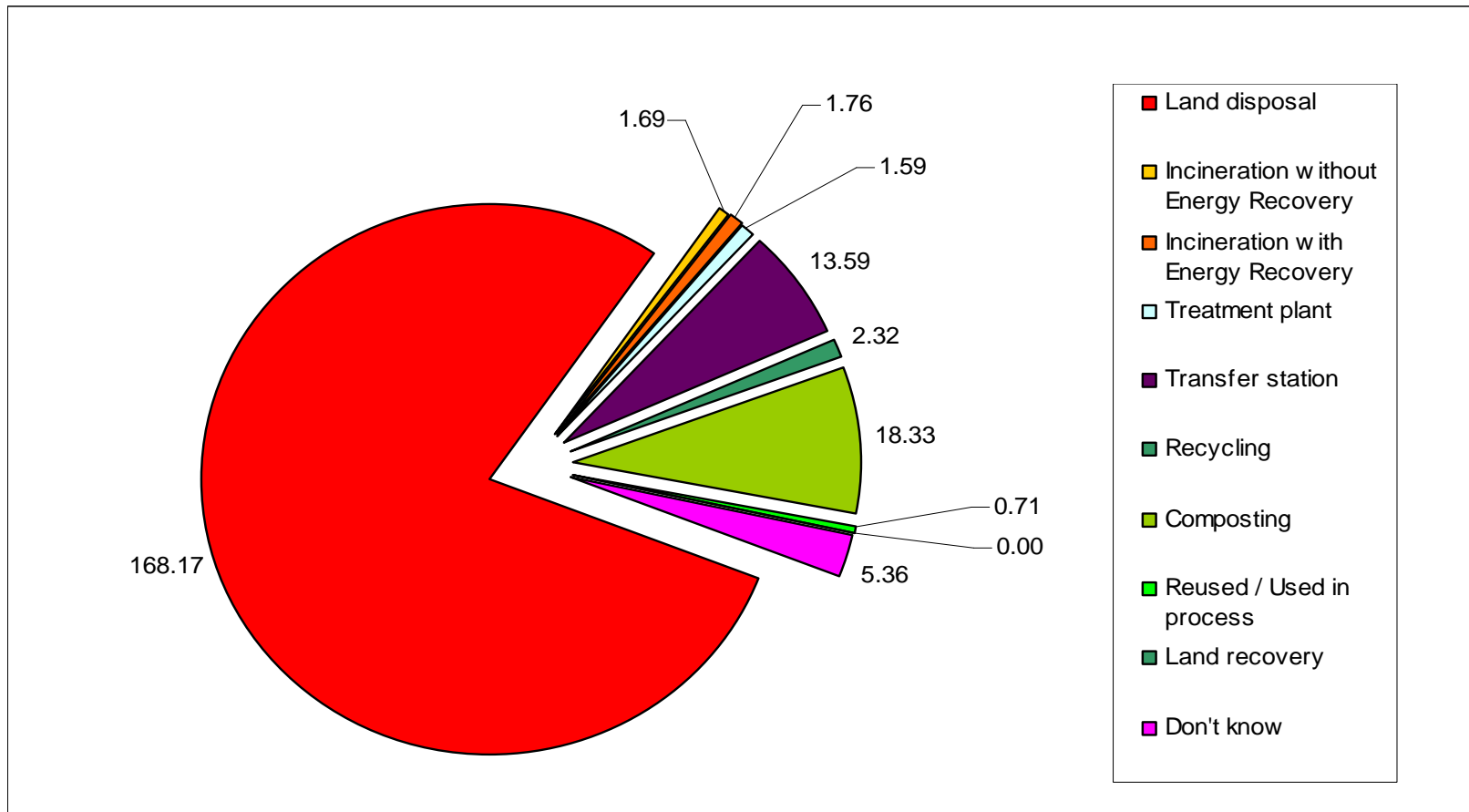
Industrial food waste calculated from combination of 1) "Animal waste of food and food preparation"; 2) "Animal faeces, urine and manure"; 3) "animal & vegetal wastes"; 4) and "Household and similar wastes" + "Mixed and undifferentiated materials" X 11% food waste composition (from 2005 Compositional analysis study)

Source: Environment  
Agency Wales

# Management of commercial food waste in Wales 2007



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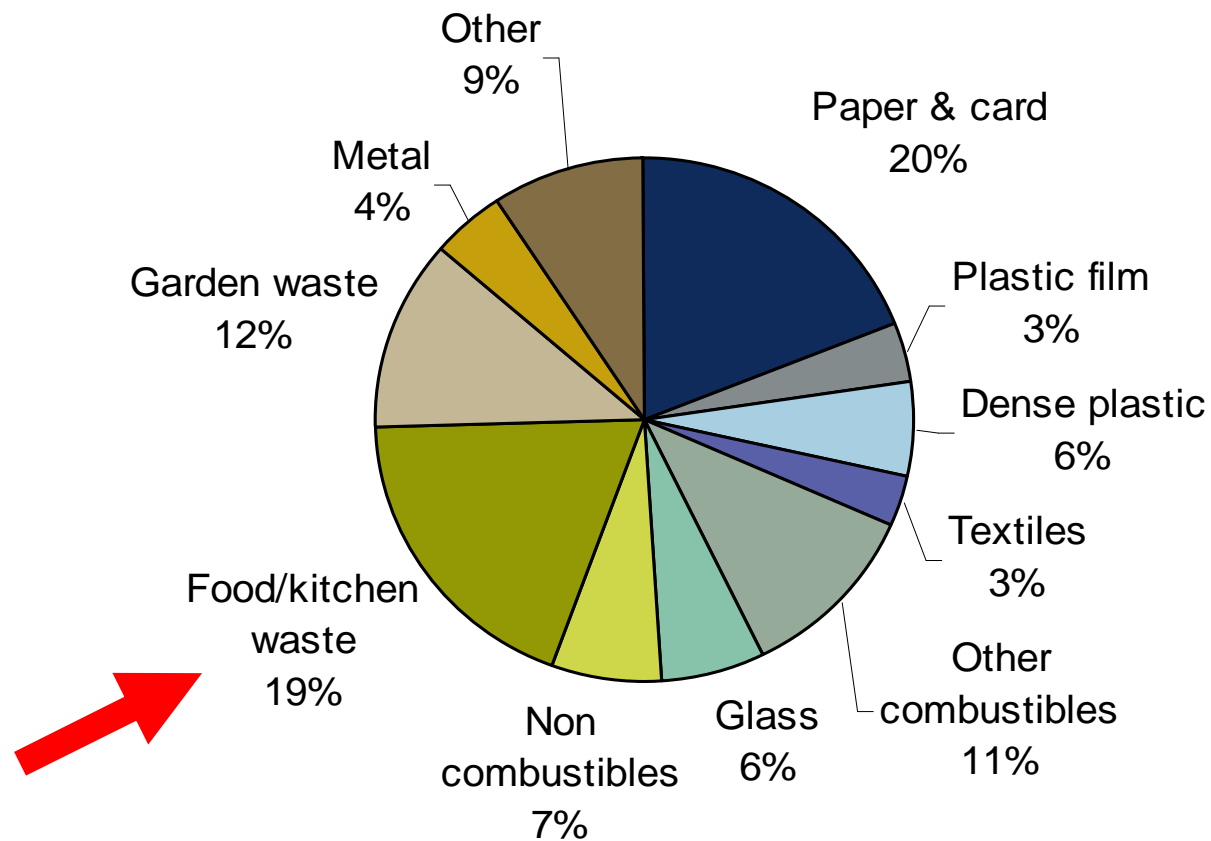
Calculated from tonnage of "animal and vegetal wastes" and "Household and similar wastes" + "Mixed and undifferentiated materials" X 20% food waste composition (from 2005 Compositional analysis study)

Source: Environment Agency Wales

# Composition of total municipal waste in Wales – June 2009 sample



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# Restaurant food waste in Wales – case study



- Waste audit of 23 catering businesses

## Food Waste sources

Preparation	30%	63.6t/yr
Customer leftovers	55%	116.6t/yr
Overproduction	10%	21.2t/yr
Out of date food	5%	10.6t/yr
Total	100%	212.0t/yr

## Recommendations

- Collect food waste by prep and KP wash up areas
- Segregated food waste bins
- Food waste can include paper towels and napkins

# Household food waste - recommended collection method



- Source separated collection as a single stream, NOT mixed with green waste
  - reduces treatment costs
  - reduces contamination
- Kitchen caddy + transparent compostable liner
  - oxy-degradable may be cheaper (for the moment) but uses fossil fuel and may not be digested properly – not sustainable
- Dedicated kerbside bin
- Dedicated vehicle / compartment
  - no need for compaction, dense material – saves on transportation costs

# Food waste collection – funding



- £77 m increase in Sustainable Waste Management Grant specifically for food waste, provided to LAs by WAG:
  - 2008-09 extra £15 m (total SWMG £50 m)
  - 2009-10 extra £24 m (total SWMG £59 m)
  - 2010-11 extra £38 m (indicative) (total SWMG £73 m; indicative)
- Regional Capital Access Fund
  - 2007/08 & 2008/09 - support for collaborative projects
  - £11,001,000 provided for vehicles and equipment for food waste collection
  - 7 projects, 15 local authorities

# Food waste collection – progress so far



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- 21 out of 22 local authorities collecting in 2009
- >603,150 households in Wales are receiving a food waste collection service
- 47% of households served
- All 22 LAs plan to collect by 2010

# Some examples

**WEEKLY KITCHEN WASTE COLLECTION**

Food waste forms 30% of the average Rhondda Cynon Taf refuse bin contents. You have been provided with two food waste containers - a kitchen waste bin for your weekly waste collection and a smaller kitchen caddy. Use the caddy to collect food waste in the kitchen and transfer to your kitchen waste bin when convenient. **Only fill to 80% of your bag. This will allow you to tie your bag securely.**

**You can place the following in your kitchen waste bin:**

<input checked="" type="checkbox"/> Fruit and vegetables	<input checked="" type="checkbox"/> Meat and fish
<input checked="" type="checkbox"/> Cooked and uncooked food	<input checked="" type="checkbox"/> Leftover food
<input checked="" type="checkbox"/> Bread, pasta, cereal and rice	<input checked="" type="checkbox"/> Tea bags and coffee grounds
<input checked="" type="checkbox"/> Dairy products and eggshells	<input checked="" type="checkbox"/> Bones
<input checked="" type="checkbox"/> Kitchen towels	
<input checked="" type="checkbox"/> Contaminated or soiled Paper / cardboard food wrappings	

**The following are not suitable for your kitchen waste bin:**

<input checked="" type="checkbox"/> Plastic (including plastic bags from food packaging plastic)	<input checked="" type="checkbox"/> Metal, Glass or polystyrene	<input checked="" type="checkbox"/> Any other household waste
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It is important the only items requested are placed in the kitchen waste bin this will ensure quality compost. Kitchen waste bins containing the wrong waste will not be emptied. The kitchen waste bin can be easily locked. The lid secures when the handle is positioned at the front of the container. To open the lid, lift the clip to the rear of the container. The lid of the kitchen waste bin must be locked shut for collection - make sure the lid is securely in place by pushing the handle forward to lock the lid down. Please ensure that ALL kitchen waste bags are tied/sealed when placed out for collection.

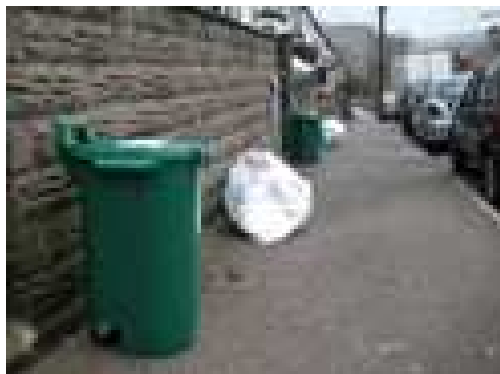
**What can I use to line my kitchen waste bin?**

You **MUST** only use bio bag liner's (supplied) in your kitchen waste bin and caddy.

We will not collect any kitchen waste or garden waste bins that contain any bags or food wrapping that are not made from paper or cardboard.



- Rhondda Cynon Taf
  - Kitchen caddy and 25 litre bin
  - Compostable liners for both
  - Over 15,500 properties on the scheme so far
  - 48 schools taking part
  - Participation over 75%
  - 5-6 kg on av in each bin on each lift



- Cardiff City Council
  - Rolled out weekly food waste collection to all 140,000 properties in one go
  - Kitchen caddy and free liners
  - Collected with green waste in 240 litre wheelie bin (or transparent bag)

# Support for municipal food waste treatment (AD) facility procurement



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- WAG procurement funding support
  - £6 million to support procurement costs
  - Rigorous process to be followed by local authorities
  
- WAG revenue and capital grant support
  - Revenue / gate fee (25%)
  - Capital (£20 million)

# Municipal food waste treatment procurement programme



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- Indicative targets of 12-16% of municipal waste, under consultation
- WAG is funding food waste collection, but shortage of treatment facilities for 2012/13
- Some authorities already have access to facilities or projects in development (IVC)
- Additional capacity of c. 200,000 tpa required by 2012/13 to meet EU targets
- AD is WAG preferred technology, on environmental and sustainability grounds

# Municipal food waste treatment procurement programme



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- Central WAG Waste Procurement Programme Office
- 5 procurement “hubs” set up, 15 local authorities
- All OBCs submitted to deadline
- Industry day held in March 09 – 150 delegates
- 2 Market Consultation Days held in July 09 - over 200 contractor meetings facilitated with LA hubs
- PIN issued centrally on 18 June 2009.
- Single OJEU contract tender notice issued in August 2009
- Single prequalification exercise
- Single OJEU tender notice
- 29 PQQs submitted for four central pre-qualification projects
- Hubs to then lead, with support from the designated WPPO Transactor.

# Food waste Treatment Procurement Programme – Ideal timescale and milestones



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Achieved	Jun-Dec 2008	Memoranda of Understanding
	Dec 2008	Funding secured
	Feb 2009	Approval of Project Initiation Documents and Strategic Outline Cases
	Jul 2009	Evaluation of Outline Business Cases
	Aug 2009	OJEU contracts tender notice published
	Nov 2009	Commencement of Dialogue
	Oct 2010	Contract award
	Nov 2010	Financial close
	May 2011	Construction start
	Apr 2012	Commissioning
Target	Oct 2012	Full service commencement

# Food waste treatment procurement programme



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- Planning Task Force
  - Ministerial Programme Board request for Planning Risk Assessment – January 2009
  - Planning risk register & mitigation measures identified - March 2009
  - Support solution development
  - Members representing
    - WPPO WAG; WAG Waste Strategy Branch; WAG DE&T; WAG Planning; Institute of Society, Health and Ethics; PUK; Clarkslegal; WLGA ; Countryside Council for Wales; Regional Waste Plan Co-Ordinating local authority; POSW; EA Wales; WRAP
- Community Engagement Campaign

# Community engagement campaign (AD aspects)



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- Aims
  - Raise awareness of why we need to treat food waste
  - Communicate change and reduce public anxiety
  - Raise understanding and promote the benefits of AD technology
- Through
  - an integrated national to local level communications campaign
  - use of consistent terminology and public key messages
  - promotion of ‘best practice’ in community consultation and engagement
  - provision of consumer facing information (web, social networking, printed media)
  - engagement of national and local media

# Industrial & commercial food waste treatment grant support



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- WRAP Capital Grant Scheme running since 2005/06, now with calls for applications every 6 months.
- c.£7.5m committed to or 'ring fenced' (prior to contract) for 7 AD projects due to be commissioned by Q2 2011 (October 2009 position)
- c.145,000 tonnes per annum potential treatment capacity by Q2 2011

# AD – tracking proposals in Wales



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- Facilities with planning permission
- Facilities proposed (intelligence gathering)
- Facilities to be procured for municipal food waste

# AD – where are the likely facilities – Local authority?



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Local authority food waste procurement hubs covering :-

- Blaenau Gwent, Torfaen, Caerphilly
- Newport
- RCT/Merthyr
- Pembrokeshire, Carmarthenshire, Swansea, NPTCBC, Bridgend & VoG
- Powys & Ceredigion
- Gwynedd
- Conwy, Denbighshire and Flintshire

# AD – where are the likely facilities – Merchant plants?



WAG supported 'Capital Grant Application' plants (proposed) at :-

- Anglesey
- Llanidloes
- Talgarth
- New Inn, Pontypool
- Rogerstone, Caerphilly

Private proposals at :-

- Hirwaun
- Bridgend
- Llangadoc, Carmarthen

Total number of AD plants taking food waste likely for Wales? Projected to be between 15-20 plants. At present, we have three operating in Wales.

# Markets for AD digestate



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- WRAP Wales organics programme
  - Extended Implementation Programmes to encourage innovation and growth in Quality Compost & Digestate Markets.
  - Technical Focus on Agricultural Applications of Quality Outputs from AD plants.
- PAS 110
- EA/WRAP Waste Protocol on AD Digestate
- Wales “Sector Plan for Waste Collection, Infrastructure & Market Development”

# Other supporting measures in Wales for AD



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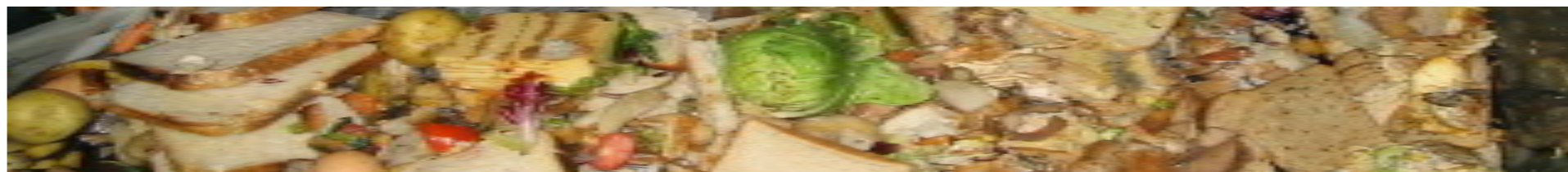
- University of Glamorgan AD Centre of Excellence provides advice and support
- Technical review of the AD of municipal waste in Europe
  - See: [http://serc.research.glam.ac.uk/media/files/documents/2006-11-20/AD\\_of\\_BWM\\_Poster.pdf](http://serc.research.glam.ac.uk/media/files/documents/2006-11-20/AD_of_BWM_Poster.pdf)
- Chemical analysis of household waste in Wales
  - Protein / N content critical in respect of operational control
- Waste Awareness Wales campaign
  - Supporting local authorities to increase householder participation in food waste separation and collection
  - Waste prevention campaign

# Tackling the top of the hierarchy



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- The food we waste....
  - UK households waste 6.7 million tonnes of food every year – one third of 21.7 million tonnes purchased
  - 4.1 million tonnes (61%) could have been eaten – worth £420 for av household each year (£10.2 billion for whole of UK)
  - UK food waste is responsible for equivalent of 18 million tonnes of CO<sub>2</sub> (through whole life cycle)
  - Each tonne of avoidable food waste is responsible for 4.5 tonnes of CO<sub>2</sub>
- "Love Food Hate Waste" campaign
  - **Focus on reducing food waste in the home**



# To home compost or not to home compost food waste?



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- “.....the performance of anaerobic digestion equipment is superior – environmentally - to that of home composting. It is also the case, in the analysis undertaken, that the external benefits associated with the products from centralised composting /anaerobic digestion facilities are higher than those for home composting facilities (because of the assumed displacement effects associated with the material derived from the different approaches).”
- *Managing Biowastes from Households in the UK: Applying Life-cycle Thinking in the Framework of Cost-benefit Analysis; Eunomia report to WRAP, May 2007.*



Helpu Cymru i leihau  
ei Hôl Troed Carbon

Help Wales reduce  
its Carbon Footprint



**reduce** arbed  
**reuse** aildefnyddio  
**recycle** ailgylchu