




Resource and Waste

- Waste is at the heart of sustainable development:
 - 100 million tons of commercial and industrial waste annually
- Government targets to:
 - To recover recycle or compost 45% of waste by 2010.
 - This means reducing it from the 22.3 million tonnes in 2000 to 15.9 million tonnes by 2010 for England.
 - To reduce landfill for industrial and commercial waste through
 - The £8 escalator
 - Pre-treatment of non hazardous waste (Oct 2007)
 - Banning of liquid waste from landfill (Oct 2007)
 - Closure of landfills not meeting Directive requirements by 2009



Why Bother ? A Reminder...

- CCL is about 10% of energy bill.
- Energy costs will rise - the less energy you use – the less tax you pay
- Landfill tax at £40.00 per tonne. Landfill now costs approximately £100/tonne (tax+gate fee+transport)
- Water and effluent costs will continue to rise
- There are good environmental reasons – don't ignore saving money!



Obvious Wastes & Costs

Directly charged costs

- Skip removal
- Effluent charges
- Energy costs

..... Can be easily identified



Other Waste Costs

Cost of things you throw away

For example

- cost of raw materials in skip
- cost of labour in scrapped product
- cost of consumables in all products
- cost of wasted energy



How Much Does Waste Cost Us?

- Hidden costs much higher than obvious
- Waste costs Industry about 4.5% of turnover
- For the UK this equates to £15 billion annually
- Companies can turn 1% of costs into profit



Waste Management Hierarchy

Highest priority

↑



- Reduction
- Reuse
- Recycling & Composting
- Energy Recovery
- Disposal

Lowest priority




Measuring And Estimating Waste

- Review existing practices to identify opportunities for minimising wastes and improving the efficient use of resources
- Know where wastes are produced and where raw materials are used
- Estimate how much this is costing you each year



Gathering And Organising Information

- Where you find the information in your company
- Map out how you are using resources
- Build a picture of your processes
- See the true cost of waste
- Set priority areas for waste reduction
- Use the Envirowise tools



A Waste Audit Should..

- Identify all points at which waste is generated
- Identify the origin of each type of waste
- Monitor the waste to identify its quantity and type, and its environmental effects
- Establish methods of measuring for monitoring purposes
- Identify the costs of the current disposal methods, including treatment, handling, storage and transport.
- Look at opportunities to reduce, recycle or re-use waste
- Set targets for reducing waste

Where Do You Find Information?

- Company records and reports
- Invoices and purchase ledgers
- Energy and water meters and bills
- Waste disposal bills
- Effluent discharge consents
- Authorisations to operate processes
- Process maps and flow diagrams of operations
- Duty of Care documents
- Packaging waste data forms




Map Your Wastes




Useful Facts About Waste Skips



- Standard size 4.5m³ or 6 yds³
- Standard size 9m³ or 12 yds³
- Standard size 15m³ or 20 yds³
- Standard size 24m³ or 36 yds³




Skip Weight Estimates

Typical Skip waste densities (tonnes/m³) [Loose]

- Paper 0.34
- Cardboard 0.30
- Glass 0.45
- Plastic Bottles 0.03
- Domestic refuse 0.15 - 0.25

Useful Facts About Waste Bins

Standard sizes
90, 120, 140, 240 and 360 litres (wheelie bins)

Standard sizes
700, 800, 1000 and 1100 (Eurobin) litres

Density of wastes

- Mixed domestic waste 0.25 tonnes/m³
- Cardboard waste 0.35 tonnes/m³
- Glass waste 0.45 tonnes/m³






Useful Facts About Waste Amounts

- Sack of paper 10kg
- Box A4 paper (5 reams) 12.5kg
- Laser printer toner cartridge..... 2kg
- 50,000 drinks cans 1 tonne
- 250,000 plastic vending cups.. 1 tonne










Plastic Types

-  Polyethylene Terephthalate (PET) - Soda & water containers, some waterproof packaging.
-  High-Density Polyethylene - Milk, detergent & oil bottles, Toys and plastic bags
-  Vinyl/Polyvinyl Chloride (PVC) - Food wrap, vegetable oil bottles, blister packages.
-  Low-Density Polyethylene - Many plastic bags. Shrink wrap, garment bags, recycled LDPE are plastic trash bags and grocery sacks, plastic tubing, agricultural film, and plastic lumber.
-  Polypropylene - Refrigerated containers, some bags, most bottle tops, some carpets, some food wrap.
-  PS Polystyrene - Throwaway utensils, meat packing, protective packing.
-  Usually layered or mixed plastic. No recycling potential - must be landfilled.




Rules Of Thumb

- Make your best estimates
- Number of skip lifts, composition and weights
- Electricity consumption per output of product
- Water consumption per output of product
- Metering and monitoring energy & water
- Comparison with industry best practice

Interactive Waste Audit



The following exercise has a number video clips to help you think laterally about your site and identify opportunities for waste minimisation.





Introduction



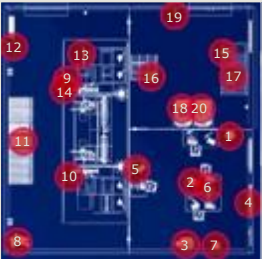

Example Site




Results






Summary



Results for the Tour

1. Waste Bin	11. Waste Segregation
2. Printer	12. Water Leak
3. Photocopier	13. Steam Leak
4. Open Window	14. Air Leak
5. Lamp	15. Poor Packaging
6. PC Monitor	16. Over Packaging
7. Plastic Cups	17. Poor Labelling
8. Open Paint tins	18. Poor Waste Segregation
9. Oil Leak	19. Tap Running
10. Spilled Product	20. Pallets not Reused

Recycling


Material Prices (Letsrecycle.Com)

MATERIAL	SELLING PRICE(£) Sept 2009
Compost Green Waste Catering Waste	(Gate Fee) -18 to -26 -27 to -50
Glass Clear Mixed	(Delivered to collector, for collection -10 to -20 per ton) 29 to 33 13 to 18
Metals Steel Cans Al Cans	(Delivered to collector) 10-30 475
Paper Card White	(At merchant) 5 to 20 25 to 40
Plastic Clear PET Mixed	(At Merchant, collection 15 to 35) 160 to 190 100 to 150
Wood High Grade Low Grade	(Gate Fee) 1 to -17 -16 to -35



The Immediate Future


- Quality is still a key issue with good quality materials more readily finding markets and higher prices
- Prices have continued to rise pointing to sustained activity and value in the recycling of these materials
- The long term market outlook would suggest that prices are beginning to stabilise, while there are still concerns about volatility in certain markets, including cardboard
- Evidence from traders suggests that, due to the fragility of the Chinese market, prices for plastics and cardboard could come under pressure.




(WRAP 25/2/09)

Why Recycle?

- Reduces resource and energy consumption
- Avoids impact of landfill and Landfill Tax £40 rising to £48 next April

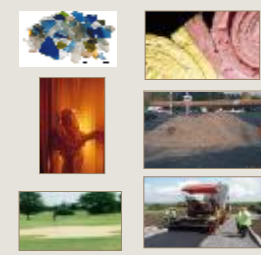



- Minimize first then recycle remainder



Glass


- Container Manufacture
- Glass-fibre insulation
- Blasting abrasive
- Abrasive wheel manufacture
- On-site water filter medium
- Textured wall coatings
- Golf course sand
- Concrete paving
- Aquarium gravel
- Cement block filler
- Tile manufacturing
- Construction aggregate
- Asphalt

Currently we landfill around 1,400,000 tonnes of glass each year.

Plastics

- Buckets, containers
- Lumber (profile extrusion)
- Film (eg. grocery bags)
- Injection moulded parts
- Structural foam
- Drainage pipe, Traffic cones
- Safety fencing
- Wood / plastic composites
- Thermoformed parts
- Soda bottles
- Boat hulls & car parts
- Landfill liners,
- Polyester fibre & fabric, stuffing for ski jackets, Carpets, strapping, twine




The amount of plastic waste generated annually in the UK is estimated to be nearly 3 million tonnes and only 7% of total plastic waste arisings are currently being recycled.

Paper

- New paper and cardboard products
- Tissue products
- Moulded packaging
- Cellulose insulation
- Hydro-seeding mulch
- Building products
- Compost bulking agent
- Animal bedding
- MDF Products





5 million tonnes of waste paper are still sent to landfill or incineration each year

Basic Recycling

- Staff are familiar with domestic recycling / composting
- Workplaces now routinely recycle:
 - Office paper
 - Cardboard packaging
 - Drinks cans
 - Plastic cups and bottles



-But,.....

- Poor understanding of further opportunities
- Little knowledge of the value of recyclates
- Poor understanding of the scale of environmental benefits



How To Improve Recycling

- Apply sustainable procurement policies
 - Demand recyclable packaging or take back scheme
 - Specify recycled content
- Determine the value of your recyclable waste
 - Market values for collected and delivered (you do not need waste carriers licence if you are the producer)
- Get the best from your current waste contractor
 - Ask for information on their full range of recycling services
 - Seek good data on waste vs recycling from your sites
- Investigate alternative waste contractors
 - <http://wastedirectory.netregs.gov.uk/>




How To Improve Recycling

Example from last week: What to do with 30t of leather scrap currently to landfill?

Substitute leather for alternative (it is sustainable but not "green") and replace it with the eco leathers and return all cuttings to the supplier for re-manufacture (even the packaging) - but what about the product, cost and customer?


They could source companies that uses leather and send the trimmings (if it is chromium free) - e.g those producing for Biome (bags, book covers etc), Torly, Eco Domo (Leather floors), Glove and Apron companies etc - but these will be based abroad - cost?

Are there local / UK manufacturer's that could use the leather - research?

France and Italy both have recycling companies that collect leather scrap internationally and ship to the Far East - at a cost? A local waste contractor could collect and supply the waste to these groups - cost?

Leather can be composted - depending on the tanning process - what is available locally - if PAS 100 unlikely to take it ?

Leather can also be used in a waste to energy gasification plant (leather has 20 MJ/ kg) - it cannot be openly burned due to the chromium. One is to be built in Knowsley Business Park next year - feasibility?




Questions

'If you think you are too small to have an impact, try going to bed with a mosquito'

Philip Elmer-Delwitt

- 1 recycled Al can would save enough energy to power a television for 3 hours.
- 1 recycled glass bottle would save enough energy to power a computer for 25 minutes.
- 1 recycled plastic bottle would save enough energy to power a 30-watt light bulb for 6 hours.



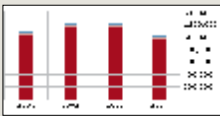

**Better Management
through Key
Environmental
Performance Indicators**

Key Environmental Performance Indicators

(KEPI's)

- Measures performance
- Tracks performance
- Helps identify opportunities

Therefore: Saves money, resources, waste and pollution

Key Environmental Performance Indicators



The impacts of organisations on the environment can be complex, and will vary according to the size and nature of your organisation. So how can you measure and report impacts in a way that is meaningful?

- Indicators relevant to all organisations
- Indicators that apply to certain organisations







Indicators Relevant To All

KEPI	Units
Greenhouse gas emissions	Total tonnes of carbon dioxide equivalents
Water consumption	Total tonnes of water abstracted and purchased
Waste(Non-product output)	Tonnes of waste sent to disposal from company sites

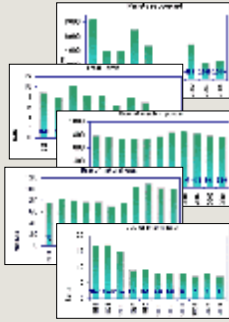

Categories of KEPI's

- Absolute – key resource
 - litres of water per year, tonnes of waste per month
- Relative – specific measure
 - litres of water per tonne of product, kg waste per item made or a % i.e. raw material to product
- Weighted – factor applied
 - Area coated with paint in m² as appropriate unit to measure production



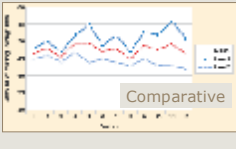





Choosing KEPI's

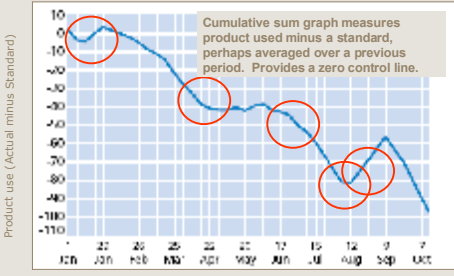
- You need your own set
- Cover your range of issues
- Check your sector and clients
- Use the process map
- Remember
 - Which data are available
 - What is practical


Using KEPI's

Monitoring and Control




Cumulative sum graph measures product used minus a standard, perhaps averaged over a previous period. Provides a zero control line.



envirowise } **Workshop**
Key Environmental
Performance Indicators

KEPI's Workshop

- Calculate the absolute KEPI's for energy, waste & water the the relative indicators related to turnover and production
- What targets would you set for the company?
- How would you measure them if they are going to be met next year?
- Why is it important to relate to product and turnover?



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SUSTAINABLE PROGRESS

Results

Parameter	Consumption 2005/6		KEPI per EK turnover	KEPI per m ² of product
		kWh / Tonnes		
Energy				
Oil (Heavy)	20,000	228,000	50	0.017 tCO2/EK
Electricity	400,000	400,000	172	0.057 tCO2/EK
TOTAL		628000	222	0.074
Water				
Mains Water	2100	m ³	0.7	0.21
Effluent	1500	m ³	0.5	0.15
TOTAL		3600		
Waste				
Landfill	52000	kg	17.3	5.2
Recycled	10000	kg	3.3	1
TOTAL		62000		
Packaging				
From Suppliers	5000	kg	1.6	0.5
Bought in	8000	kg	2	0.6
Recycled	800	kg	0.27	0.08
TOTAL		11800		
Special Waste				
Ink	1200	kg	0.4	0.12
Tins	800	kg	0.27	0.08
Solvent	2000	kg	0.7	0.2
TOTAL		4000		

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Benchmarking


Don't forget you can benchmark not only against yourself but your sector / operation.




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Benchmark 1


- Paper - 7 reams of paper /person/year
- Waste - 200 kg waste paper/person/year
- Recycling - 60-70% recycling rate for paper, card, glass, toner, cans
- Water - 7700 litres (7.7 m³) /person/year
- Transport - no official figures



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Benchmark 2

- Electricity - 33kWh/m² small office
- 54kWh/m² naturally ventilated open plan
- 128kWh/m² air conditioned open plan
- 234 kWh/m² headquarters
- Typical practice 2/3 higher electricity use



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When You Get Back

- Get management commitment
- Conduct a waste survey
- Find out costs and quantities of wastes
- Decide priorities for action
- Use the support available



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