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WASTE TO ENERGY - ENVIRONMENTAL CONSIDERATIONS

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OVERVIEW

- Prevention and Recycling
- Why Burn Waste?
- Current Position in England & Wales
- Environmental Protection
- Emission Reduction
- Still to Resolve

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WHY WE BURN WASTE

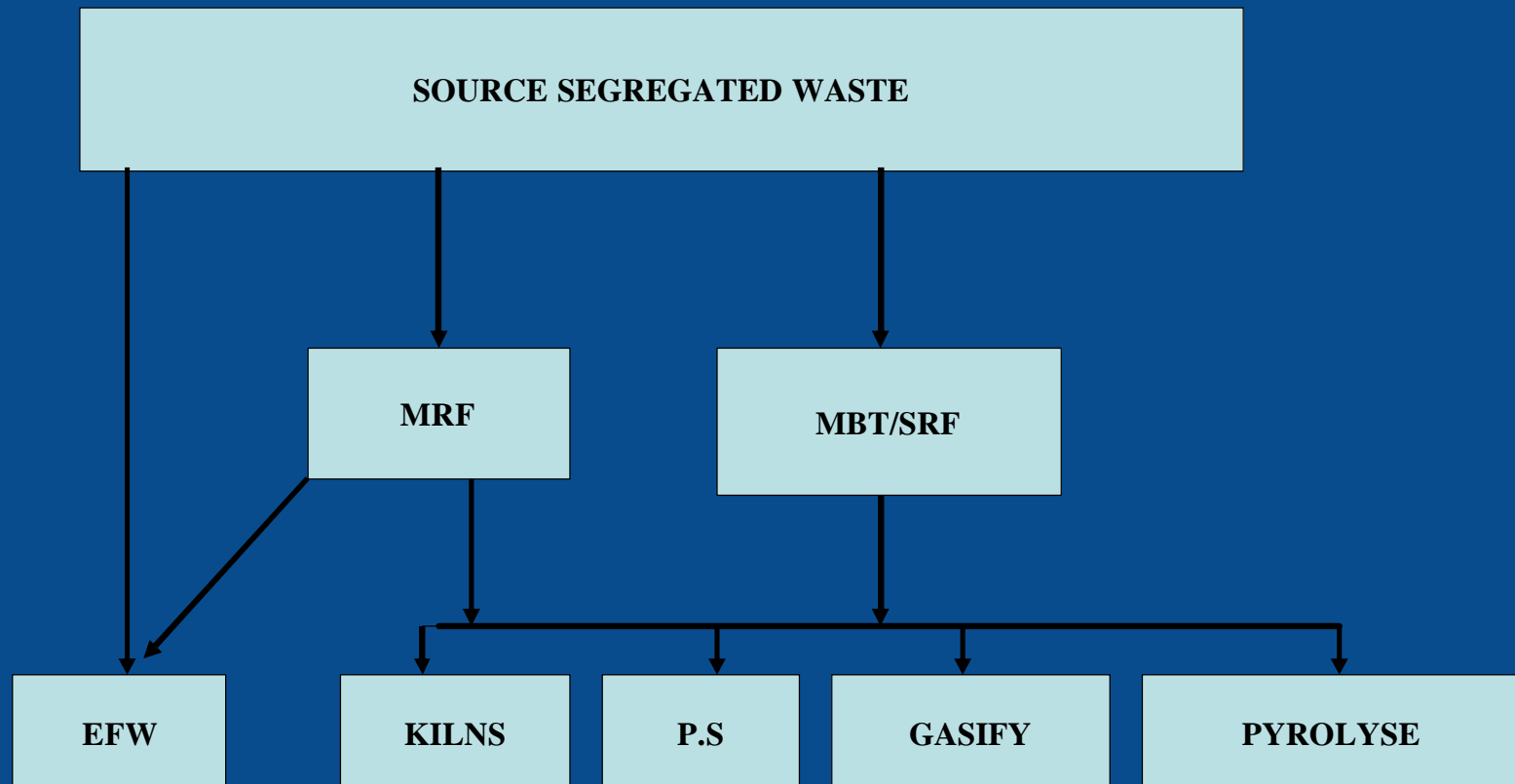
- Disposal (haz waste, some CW, radioactive)
- Disposal and Energy Recovery (MSW, SS, CW)
- Energy Recovery (Solvents, RFO, Biomass)
- Regulatory requirements (Landfill diversion targets, Epidemics/health like BSE, Foot and Mouth, Avian Flue)

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POSSIBLE OPTIONS



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WHAT DO EU MEMBERS DO

Country	Mte(plants)	Country	Mte(plants)
Austria	0.9 (5)	Norway	0.8 (21)
Belgium	1.64 (17)	Netherland	5.2 (12)
Denmark	3.28 (31)	Sweden	3.13 (28)
France	11.3 (123)	Switzerland	3 (29)
Germany	13.2 (58)	Spain	1.9 (11)
Italy	3.5 (49)	UK	3.2 (15)

Total : 12 Countries, 51 Mte, 399 plants (2003)

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PLANTS BURNING WASTE

- 133 plants permitted under WID, of which:
- 17 MWIs burning 3.4 Mte MSW - 245 Mw_e, 500 kte/a under commissioning
- 22 Clinical Waste Incinerators
- 9 Sewage Sludge Incinerators
- 2 Commercial Haz Waste Incinerators
- 11 Cement/Lime Plants
- 8 Animal Carcass Incinerators

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PERMITTED WASTE CAPACITY

Cement Plants	1,080,000 te
Lime Plants	60,000 te
RDF (Slough, Novera)	460,000 te
Misc (Ancillary Components)	438,000 te
Chicken litter/MBM	695,000 te
In-House Boilers	480,000 te

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MSW FUEL EQUIVALENTS

MSW 3.3 M Tonnes

Fuel Oil 1.0 M Tonnes

Coal 1.5 M Tonnes

Natural Gas 900 M m³

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REGULATION UNDER PPC/WID

■ BASIC PRINCIPLE

- PPC: Achieving a high level of the protection of the environment by preventing or where that is not practicable, reducing emissions into the air, water and land.
- WID: Prevent or limit as far as practicable pollution by emissions to air, water and soil and resulting risk to human health from the incineration and co-incineration of waste

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DEFINITION OF POLLUTION

- **PPC Regulations define pollution as:**

“Emissions as a result of human activity which may be harmful to human health or the quality of the environment, cause offence to any human senses, result in damage to material property, or impair or interfere with amenities and other legitimate uses of the environment”

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WID & ITS REQUIREMENTS

- Achieves its aims by means of stringent operational conditions and emission limits for **INCINERATORS & CO-INCINERATORS**
- Operational conditions - waste reception, time, temperature, **STOP WASTE FEED IF...**
- Emission limits - tighter limits than any other type of plant. **STOP FEEDING WASTE IF....**
- Monitoring requirement - measure specified operational and emission parameters using **CEN STANDARDS WHERE AVAILABLE**

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INCINERATOR EMISSION LIMITS

- Tighter limits than any other type of plant
- Tighter limits for dioxins and heavy metals
- Limits on more pollutants than other plants
- Continuous monitors if developed
- Monitoring over and above that in Directives
- Annual check of monitors to EU standards

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TIGHTENING OF EMISSION LIMITS

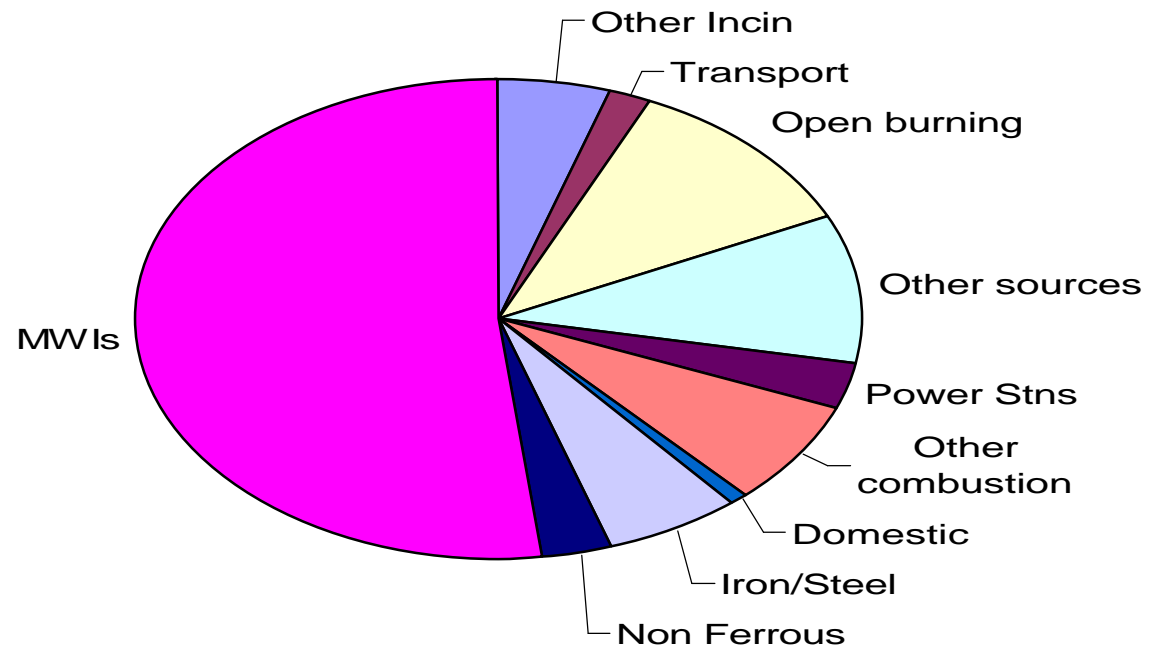
Pollutant	Pre 1991	MWID	WID	% 1991
Dust	500	30	10	98
SO ₂	338	300	50	98.5
NO _x	NA	NA	200	
Hg	0.26	0.2	0.05	80
Metals	>11	6	0.5	95
Dioxins	>225	NA	0.1	99.1

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DIOXIN RELEASES IN UK 1990

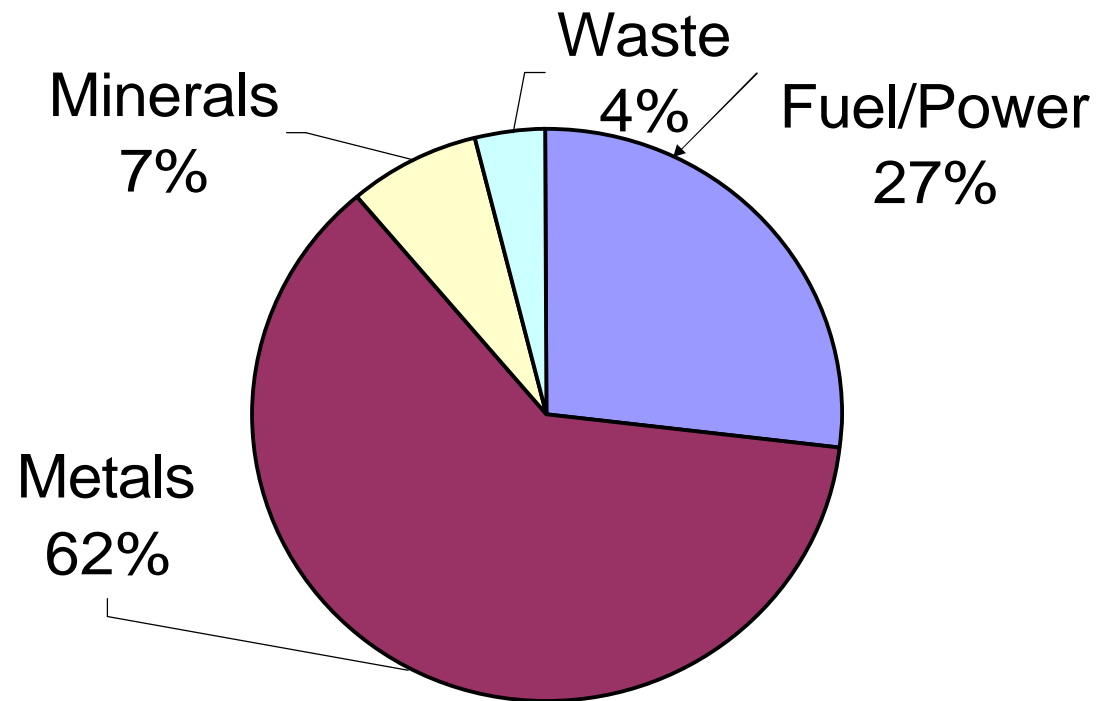


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DIOXIN RELEASES IN 2004



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EFW EMISSIONS AS % NAEI*

Sulphur Dioxide	0.06
Oxides of Nitrogen	0.24
PM ₁₀	0.01 (if all dust PM ₁₀)
Cadmium	0.06
Mercury	0.06
Lead	0.1
Dioxins	0.2 (industrial sources)

*NAEI= National atmospheric emissions
inventory

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EMISSION FACTORS

Fuel	Coal	Gas Oil	Natural Gas	Waste
CO ₂ (kg/GJ)	95	74	57	18
CH ₄ (g/GJ)	1.5	1.5	15	0.6
N ₂ O (g/GJ)	3	2	1	1.5
SO ₂ (g/GJ)	45	23	0	23.9
NO _x (g/GJ)	130	52	50	124

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STILL TO RESOLVE

- Public acceptability and perceptions
- Are Emissions Real or Perceived Issue?
- “Unknown” Emissions - What?
- Environmental Performance of New Technologies
- Health Considerations
- Focus Shifting to Fine Particles