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Don't waste waste – it is a resource

Waste is a resource. However, almost 50% of Municipal Solid Waste across the EU-27 is still landfilled. There is general agreement that we need to minimise landfilling, but what are the alternatives and how can they be intelligently combined to achieve maximum reduction of environmental impact?

The Member States who have most successfully reduced dependence on landfill have done this by combining recycling, biological treatment (e.g. composting and anaerobic digestion), and Waste-to-Energy.

Modern Waste to Energy technology deserves a balanced debate, bearing in mind the contribution it can deliver in both environment and energy policy. Further increases in energy efficiency can contribute to the further development of district heating and/or cooling systems wherever feasible under local conditions[1]*.*

Therefore the aim of this paper is to try to dispel the myths surrounding Waste to Energy by attempting to present factual answers to the concerns about incineration that are most often brought forward in the political debate in the hope that we can then, together, fully focus on the best ways forward as regards promoting truly sustainable waste management priorities and practices.

Waste-to-Energy goes hand in hand with Recycling

In order to achieve sustainable waste management the waste hierarchy, which places prevention as the highest priority and final disposal as the least favoured option, should be supported, as the guiding principle.

While separate collection and recycling of waste must be supported where environmentally and economically efficient, the remaining materials, which cannot be fully reused or recycled, should be treated in the most environmentally sound way. That means instead of simply disposing of waste to landfill, it should be recovered and serve a useful purpose in substituting other resources in the wider economy.

European Policy should also be aligned to help Member States to fulfil the targets of the European Landfill Directive, i.e. diverting biodegradable waste from landfills. This has to be done by a combination of waste treatment methods.

[1] The ECOHEATCOOL project (http://www.euroheat.org/ecoheatcool/) has investigated the options for further expansion of district heating and cooling in Europe offering higher energy efficiency and higher security of supply with the benefit of lower carbon dioxide emissions. The ECOHEATCOOL project was co-financed by the European Commission Intelligent Energy Europe Programme.

As the following table shows, countries where recycling levels are amongst the highest in Europe are also the countries with high levels of Waste to Energy, and low dependence on landfills. Hence these treatment options are complementary in order to achieve low landfill rates. In order to bring about sustainable waste management we need a combination of the complementary options of material recycling, biological treatment (composting and anaerobic digestion) and Waste to Energy. Through sound waste management capacity planning any constraints to recycling market growth can certainly be avoided.

It is worth bearing in mind that residues from recycling processes also quite often need to be thermally treated.

Country	*Recycling, composting etc. In % of total*	*Thermal Treatment In % of total*	*Landfill In % of total*
Germany	**68**	**32**	**0,7**
Netherlands	**64**	**34**	**2**
Belgium	**62**	**33**	**5**
Denmark	**55**	**40**	**5**
Sweden	**48**	**47**	**5**
Austria	61	29	10
Luxembourg	43	38	19
France	32	33	35
Spain	43	7	50
Italy	36	12	52
Finland	33	9	58
United Kingdom	31	9	60
Portugal	15	22	63
Czech Republic	11	10	79
Hungary	11	8	81
Greece	13	0	87
Poland	9	0,37	91

A snapshot of waste management in Europe based on Eurostat data 2006[2]

[2] Eurostat tables on municipal waste 1995-2006
http://epp.eurostat.ec.europa.eu/portal/page?_pageid=1996,45323734&_dad=portal&_schema=PORTAL&screen=welcomeref&open=/&product=STRIND_ENVIRO&depth=2

Health: low emissions, strictly controlled

Waste to Energy plants have to comply with the strict emission limit values laid down in the Waste Incineration Directive 2000/76/EC and they achieve very low emission levels.

According to the UK Environment Agency 15 minutes of millennial fireworks celebrations in London produced more dioxin than would more than a century's operation of the South East London Combined Heat and Power Waste to Energy facility.[3]

While dioxins exist naturally in the environment the manmade ones come from a variety of combustion processes including power plants, cement kilns, diesel vehicles, buses, open fires in the home, bonfires, barbecues, jet engines and forest fires. Emissions from Waste to Energy plants present just a tiny fraction of such emissions.

Whereas in 1990 one third of all dioxin emissions in Germany came from Waste to Energy plants, for the year 2000 the figure was less than 1%.[4] Today it is even lower. In Europe the contribution of Waste to Energy plants to national dioxin emissions is 0.07%.[5]

In 2000 the Committee of Carcinogenity published a statement based on the cancer incidences near Municipal Solid Waste Incinerators in the UK. The evaluation concluded that "any potential risk of cancer due to residency near to municipal solid waste incinerators was exceedingly low, and probably not measurable by the most modern epidemiological techniques".[6]

A recent study carried out by Lisbon University's Institute of Preventive Medicine concluded that waste incineration "does not impact on dioxin blood levels of nearby residents" of Waste to Energy Plants[7].

The German Environment Ministry has also calculated that there would be at least 3 tonnes of arsenic and 5000 tonnes of particulate matter more in the air in Germany if the energy generated by Waste to Energy plants would have been produced by traditional power stations.[8]

It could be detrimental to the environment if Waste to Energy plants, which operate with the lowest emissions are classified as disposal, while any industrial plant taking waste for co-incineration is qualified as an energy recovery option**.** This is because industrial co-incinerators that also take municipal waste (which is quite heterogeneous) are not legally compelled to comply with the same requirements, particularly regarding emission limit values, as Waste to Energy plants.

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[3] UK Environment Agency 2000, briefing note from the APSWG (Associate Parliamentary Sustainable Waste Group) by Neil Carrigan and Prof. Chris Coggins

[4] German Environment ministry study: *Waste Incineration – A Potential Danger?,* September 2005 http://www.bmu.de/english/waste_management/downloads/doc/35950.php).

[5] Presentation by Prof. Rechberger, Technical University of Vienna, click on event, Cewep Congress 2006, Rechberger Presentation at www.cewep.eu

[6] Committee on Carcinogenity, *Cancer incidence near municipal solid waste incineration in Great Britain,* statement COC/00/S1 - March 2000
http://www.advisorybodies.doh.gov.uk/Coc/munipwst.htm

[7] Lisbon University's Institute of Preventive Medicine, *Determinants of Dioxins and Furans in blood of non-occupationally exposed populations living near Portuguese solid waste incinerators,* 2007 www.sciencedirect.com .

[8] German Environment Ministry study, see footnote 4.

Transboundary Shipments: Member States have control

The recently adopted Waste Shipment Regulation (Article 3(5)) provides the Member States with the right to reject 'shipments of mixed municipal waste (waste entry 20 03 01) collected from private households, including where such collection also covers such waste from other producers'. Irrespective of whether this waste is shipped for recovery or disposal, the competent authorities can apply the proximity and self sufficiency principles because this is 'subject to the same provisions as shipments of waste destined for disposal'.

This Regulation entered into force on 15th July 2006 (Official Journal, published on 12th July 2006, L 190/1) and applies from 12th July 2007. It is binding in its entirety and directly applicable in all Member States.

Waste to Energy contributes to climate protection

Waste to Energy avoids CO_2 and methane emissions from landfill (methane being 21 times more powerful a greenhouse gas than CO_2). The application of the Landfill Directive in the Member States will reduce 74 million tonnes of equivalent CO_2 emissions by 2016[9].

Waste to Energy also contributes to climate protection through the substitution of fossil fuels used by traditional power plants.

Comparing with traditional power stations (coal, oil and gas-fired) CO_2 emissions from Waste to Energy plants perform very favourably. Only gas fired power stations perform better than those Waste to Energy plants generating electricity only (the minority in Europe). The majority of Waste to Energy plants generate heat or combined heat and power and perform even better than gas-fired power plants. Compared with coal and oil fired power stations all Waste to Energy plants (including the electricity only plants) emit less fossil CO_2[10].

Security of EU energy supply: reducing dependence on fossil fuels

Energy generated from waste substitutes imported fossil fuels used by power plants. Currently, Waste to Energy plants in Europe can supply 7 million households with electricity and 13,4 million households with heat.[11]

The technology is one of the most robust and effective alternative energy options to reduce CO_2 emissions and to save limited fossil fuel resources.

The cost to avoid 1 tonne of CO_2 with Waste to Energy is about 43€[12], whereas the costs to avoid 1 tonne of CO_2 with biomass are 80€. For photovoltaic it would be more than 1000€.[13] While it is necessary to explore all alternative energy paths to move away from a high dependence on fossil fuels Waste to Energy clearly has a role to play alongside other technologies.

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[9] German Ministry of Environment, *The contribution of waste management to sustainable development in Germany,*
http://www.bmu.de/files/pdfs/allgemein/application/pdf/klima_abfall_en.pdf
[10] Eunomia 2006: *A changing climate for energy from waste: final report for Friends of the Earth*
http://www.foe.co.uk/resource/reports/changing_climate.pdf
[11] CEWEP http://www.cewep.eu/climateprotection/renew/index.html
[12] EdDE-Dokumentation 10, project management by Prof. Bilitewski et al, Pirna, December 2005
[13] Deloitte

WWF, Greenpeace and some other organisations do in fact take a quite pragmatic approach towards their vision to achieve a 2000-watt-society by 2050.[14]

This includes a specific fee for electricity from renewable sources, starting with the use of the less costly options. The study gives priority to support energy from renewables in the following order: energy from waste treatment, biomass, wind, photovoltaic, geothermic as soon as technically available. This study of Swiss environmental NGOs proves that a pragmatic approach, exploring all options will be needed to successfully move away from the high dependence on fossil fuels and achieve environmental objectives.

In addition waste is widely available across the EU and Waste to Energy plants are therefore a reliable energy source and should be viewed as an essential contribution to security of energy supply.

Conclusions:

Setting specific standards now for efficient energy recovery and recognizing the Waste to Energy plants which meet these standards as recovery operations, will provide an incentive to all plants to further improve plant efficiency and accelerate the reduction of environmental impact.

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[14] Greenpeace Switzerland study, April 2006, *Energieperspektive 2050* (German version) http://www.greenpeace.ch/uploads/tx_ttproducts/datasheet/Energieperspektive_2050_Dt_kurz.pdf or *Itinéraire vers la société à 2000 watts* (French version) http://www.greenpeace.ch/uploads/tx_ttproducts/datasheet/societe_2000_01.pdf).