Waste Management in Europe and Canada

Meeting with the Canadian Energy-From-Waste Coalition

16 November 2007

Embassy of Sweden, Ottawa, Ontario

Magnus Schönning, First Secretary
Embassy of Sweden

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Ottawa

The waste hierarchy

Reduce

Recycle

Recover

biological treatment

waste to energy

Dispose

EU Ambitions – Waste

- EU Waste Hierarchy;
- Reduce the total generation of all waste, not only MSW;
- Materials/energy from waste should be utilized as efficiently as possible;
- Reduce to a minimum the waste going to landfills;
- Minimizing the environmental impact of waste.

EFW: Instrumental in EU Waste Policy

- According to the Landfill Directive (1999/31/EC) biodegradable municipal waste going to landfills must be reduced to 35 % of the total amount (base year 1995) by 2016.

→ Reducing greenhouse gas emissions by around 74 million tons CO_2-equivalents

- Methane emissions from landfills are much more significant to global warming than CO_2.

- EFW helps to fulfill the Landfill Directive while also contributing to climate protection through the substitution of fossil fuels.

From: Carl Lilliehöök, Waste & Recycling, Tekniska Verken AB, Linköping Sweden

EFW goes hand-in-hand with recycling

Country	Diversion (per cent of total)	Landfill (per cent of total)	Incineration (per cent of total)	Waste per capita (kg)
Netherlands	65	3	32	624
Austria	59	31	10	627
Germany	58	20	22	600
Belgium	52	13	35	469
Sweden*	44	5	50	464
Denmark	41	5	54	696
Luxembourg	36	23	41	668
Spain	35	59	6	662
Ireland	31	69	0	869
Italy	29	62	9	538
Finland	28	63	9	455
France	28	38	34	567
Canada	24	74	2	1037
UK	18	74	8	600
Greece	8	92	0	433
Portugal	3	75	22	434

Source: Institute for Public Policy Research, base yr: 2003/4, Environment Canada (2004) * 2005

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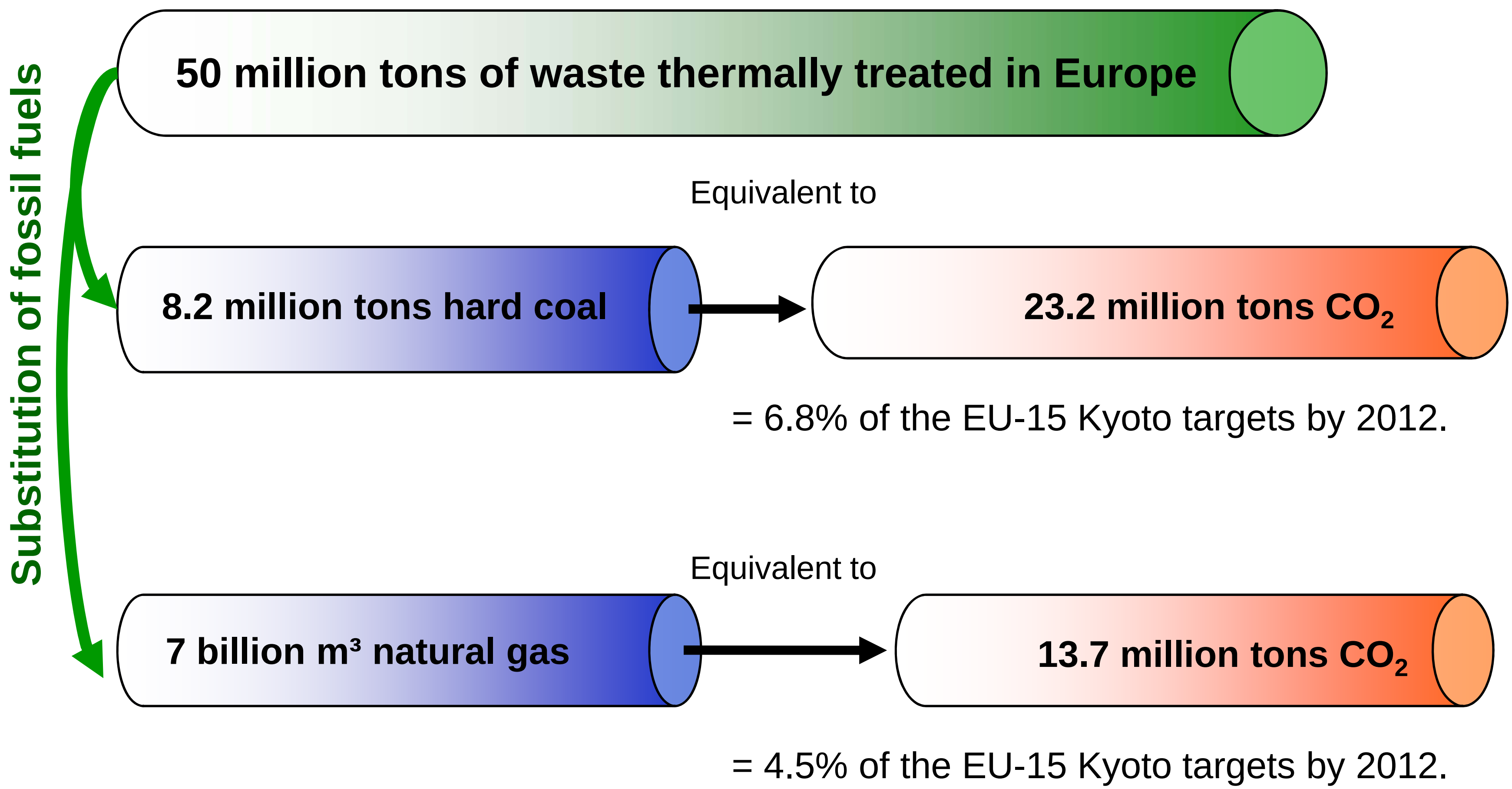
EFW: Contribution to Climate Protection



From: Carl Lilliehöök, Waste & Recycling, Tekniska Verken AB, Linköping Sweden

What are the environmental benefits of incinerating 100 000 tonnes of waste?

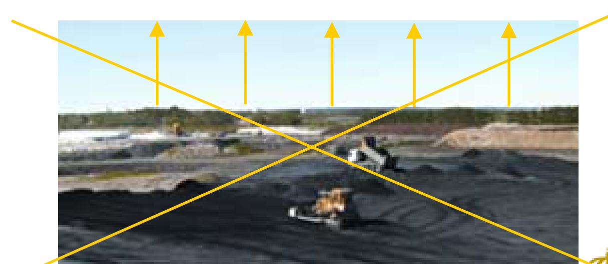
Reduces the amount of fossile CO_2 by replacing oil and coal in the energy production

55-75 000 tonnes/year

Termination of landfills

Reduces the emissons of fossile CO_2 with 260 000 tonnes/year

Heat and electricity to 11 000 houses



From: Carl Lilliehöök, Waste & Recycling, Tekniska Verken AB, Linköping Sweden

Emissions to air from incineration - Sweden

	1985	1996	2004	Change 1985-2004
Nitrogen oxides (tons/year)	3 400	1 463	1 707	-50%
Sulphur (tons/year)	3 400	1 121	337	-90%
Particulates (tons/year)	420	33	24	-94%
Hydrogen chlorides (tons/year)	8 400	412	101	-99%
Mercury (kg/year)	3 300	77	37	-99%
Cadmium (kg/year)	400	8	5	-99%
Lead (kg/year)	25 000	214	54	-99,8%
Dioxins (g/year)	90	2	0.7	-99,2%
Waste incinerators (number of plants)	18	N/A	29	+61%
Incinerated waste (million tons)	N/A	1.7*	4.1**	+141%
Energy produced (TWh)	N/A	4.3*	11.5**	+167%
Recovered materials (household waste, 1000 tons)	N/A	580	1 658**	+186%

Source: Swedish EPA

*1994 **2006

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Dioxins – no longer an issue

Annual emissions of dioxins (g) in Sweden:

- Waste incinerators	0.7 g
- Industry	10 - 30 g
- Landfill site fires	3 - 30 g
- Energy production (excl. waste)	3 - 22 g
- Transportation	0.8 - 2.9 g
- All other sources app.	50 g

Non-controlled landfill fires are much worse than controlled combustion!!!

Source: RVF and the ÅF Group

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Dioxins – Millennial celebrations

"Environment Agency estimates that during the Millennial celebrations in London the emissions from one 15 minute, 35 ton firework display equalled **120 years of dioxin emissions from the SELCHP waste incinerator**."

Source: APSWG briefing on Energy from Waste;
UK Environment Agency 2000

From: Carl Lilliehöök, Waste & Recycling, Tekniska Verken AB, Linköping Sweden

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Heat Values

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or

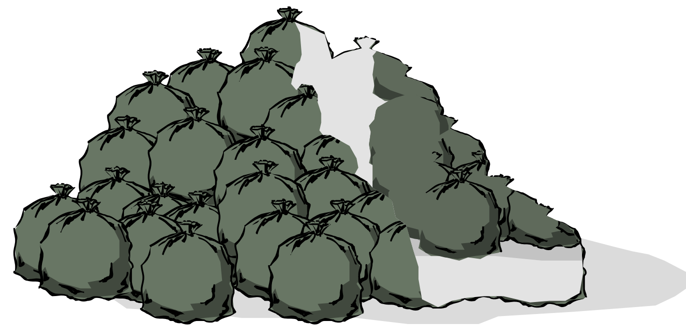
1 ton oil

1.6 ton Coal/rubber waste

4.5 ton wood

or

or



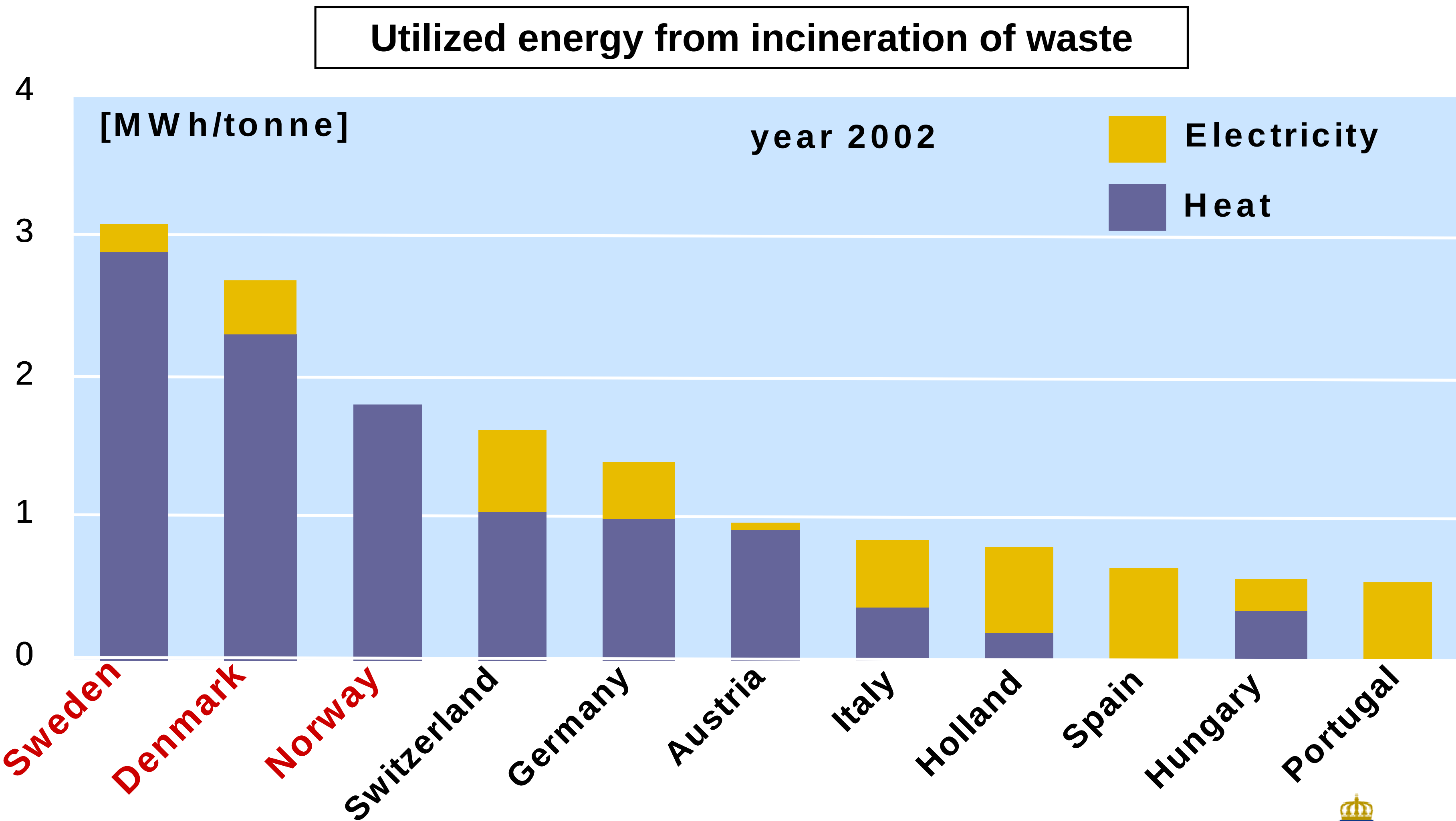
5 ton waste wood

4 ton waste

A valuable fuel - 85% biological origin (Sweden)

From: Carl Lilliehöök, Waste & Recycling, Tekniska Verken AB, Linköping Sweden

Incineration in Europe



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Sweden, Sävenäs, Toronto and Ontario

- a comparison

Annually	Sweden (2004)	Sävenäs	Toronto*	Ontario*
Incinerated waste (1000 tons)	3 188	434	975	3 500
Energy (GWh)	9 300	1 173	2 635	10 210
Electricity (GWh)	740	210	471	812
Apartments heated	880 000	120 000	270 000	966 000
Apartments electrified	440 000	60 000	135 000	483 000
Replacing oil equivalent (tons)	955 000	130 000	292 500	1 050 000

* "Toronto" and "Ontario " are estimates, based on the amount of waste that is annually sent to landfills in the USA.

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Example of what Sweden can offer

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Tekniska Verken ”Export AB”:

- Solutions of waste problems – better environment
- Extreme utilization of waste – improved energy production (heat, cooling, steam and electricity)
- Security in the establishment process
- Education, training and secured production

Process knowledge

Production knowledge

Education and information

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