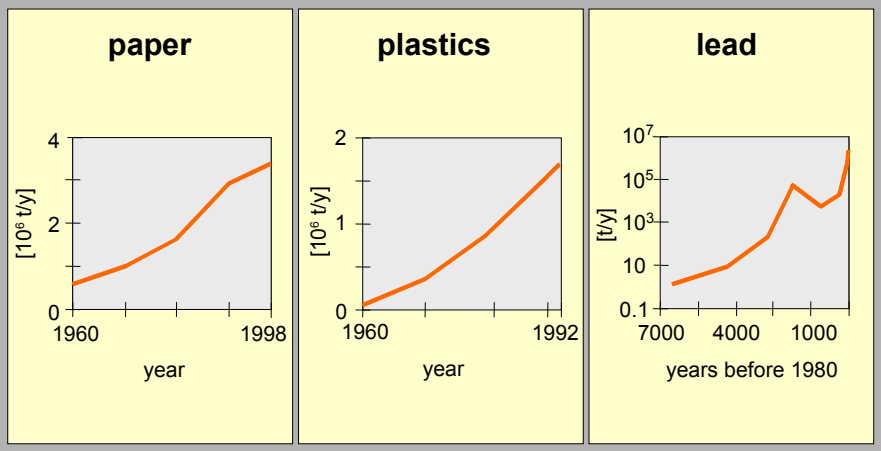
Thermal Waste Treatment - a Necessary Element for Sustainable Waste Management

Paul H. Brunner
Vienna University of Technology
Institute for Water Quality and Waste Management
http://www.iwa.tuwien.ac.at

Goals and Principles of Waste Management

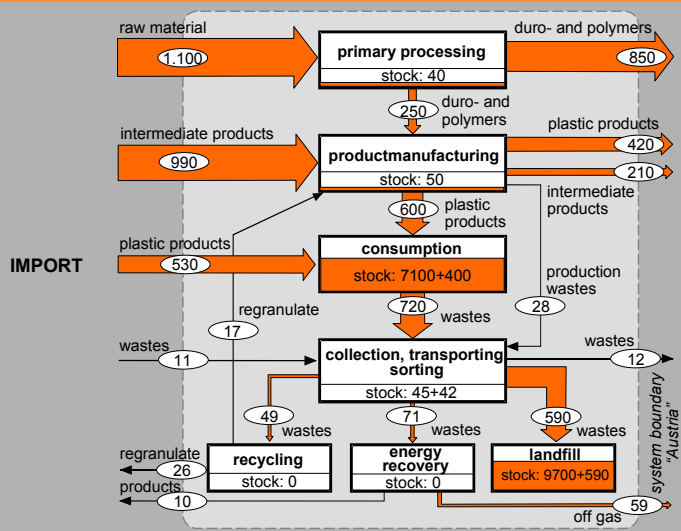
- **Goals**
  - **protection of men and environment**
  - **conservation of resources**
  - **after-care-free landfills (precautionary principle)**
- **Principles**
  - **prevention**
  - **recycling**
  - **disposal**

Growth of material flows



Plastic flows in Austria

[kt/y 1994]



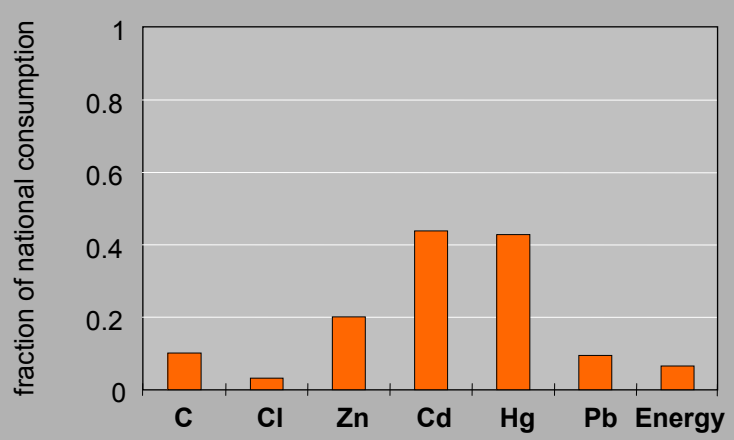
Source: R. Fehringer, 1996

Composition of Combustible Wastes in Austria

mg/kg dry matter	N	Cl	Cd	Hg	Pb	Zn
Minimum conc.	200	10	0.01	0.001	<1	1
Maximum conc.	670,000	480,000	500	10	4,000	16,000
Average of all wastes	9,100	4,300	5.7	0.8	230	520
MSW	**7,000**	**8,700**	**10**	**2**	**800**	**1,100**

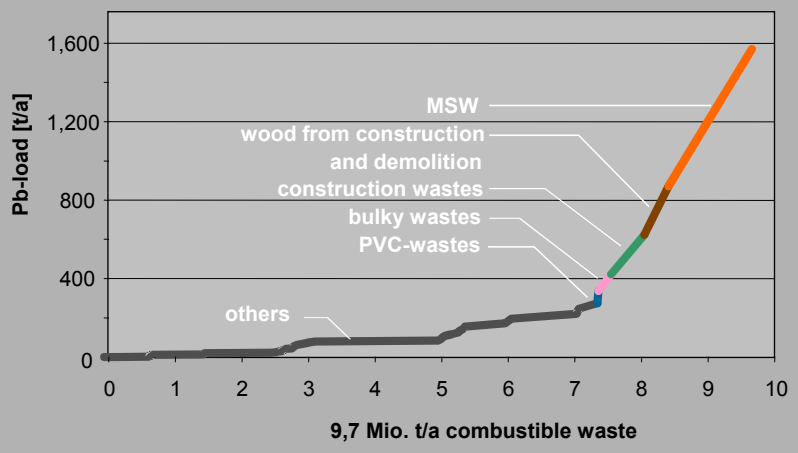
design: inge Hengl

Relative Flow of Materials and Energy in Combustible Wastes in Austria



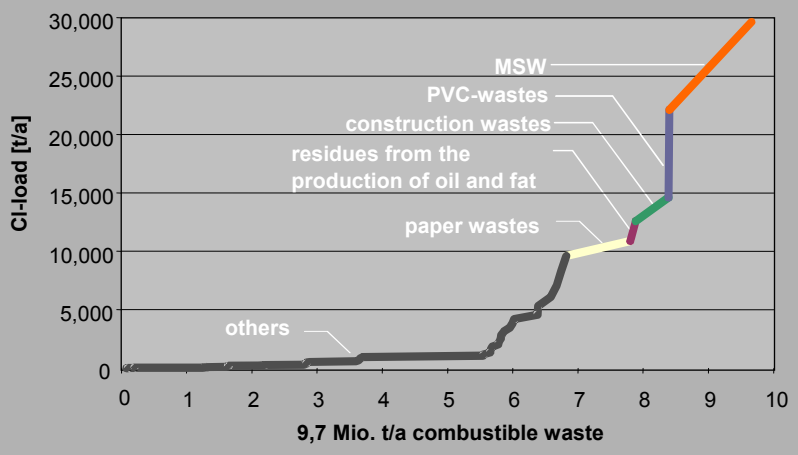
design: inge Hengl / data: ASTRA

Occurrence of Lead in waste materials



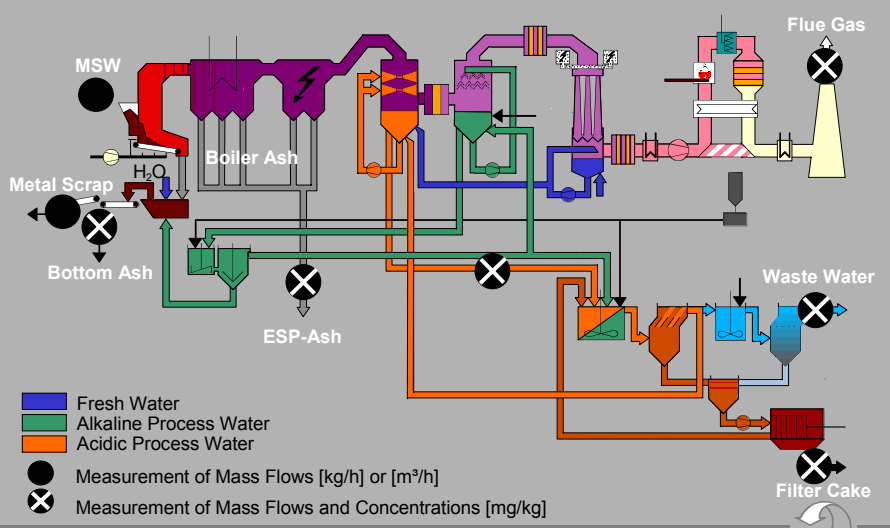
design: inge Hengl / data: Roland Fehringer

Occurrence of Chlorine in waste materials



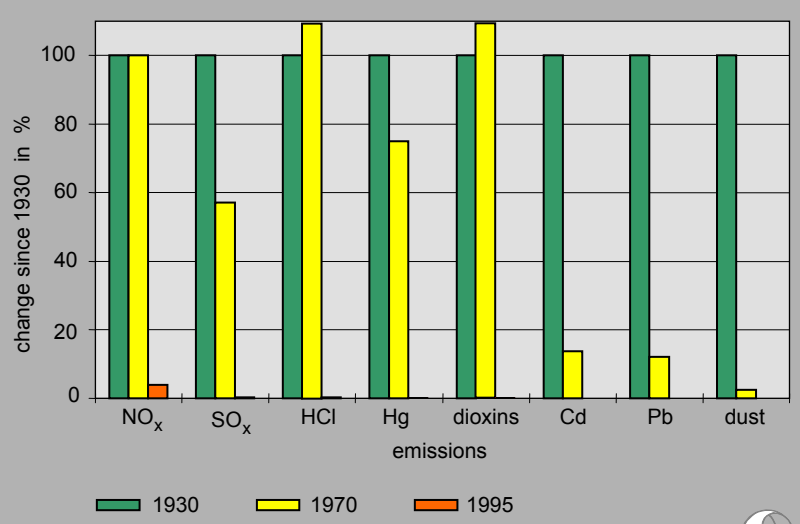
design: inge Hengl / data: Roland Fehringer

Waste Incineration means Pollution Control

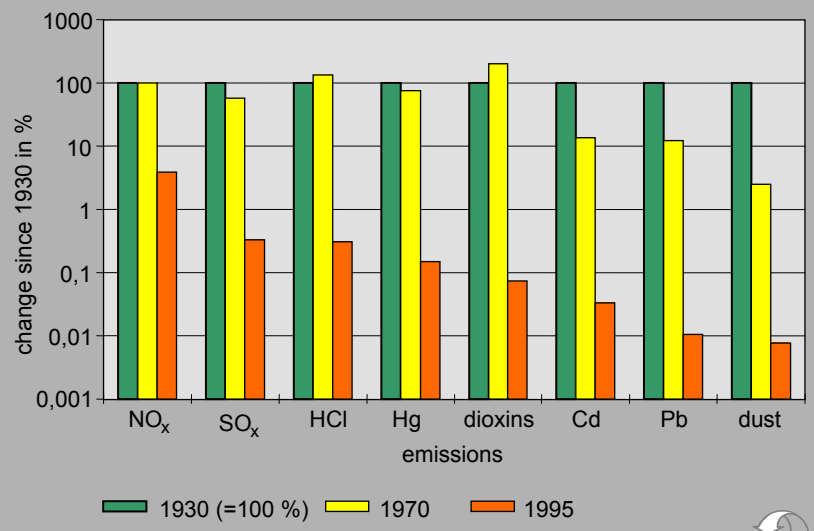


design: inge Hengl

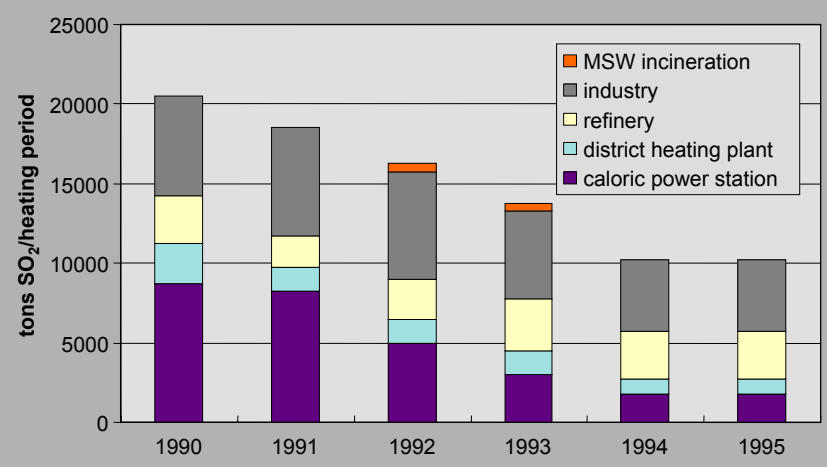
Reduction of MSW incineration emissions from 1930 to 1995



Reduction of MSW incineration emissions from 1930 to 1995



Contribution of MSW incineration to SO_2 emissions in Austria



source: UBA-Info 1/97

Fraction of Dioxins from MSW incineration in A and D

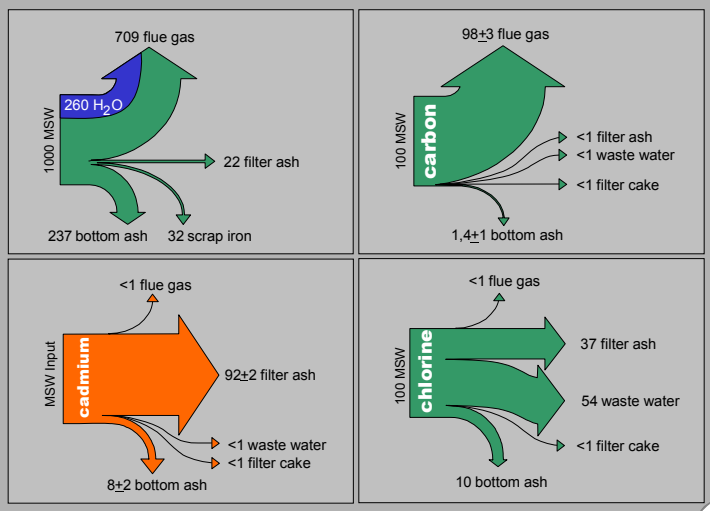
	Total emissions of PCDD/PCDF	Contribution of MSW Inc.*) PCDD/PCDF	
	[g TEq/a]	[g TEq/a]	[%]
BRD***)	800-1200	5,5	0,5-0,7
Austria**)	50-320	0,53	0,2-1,1

*) ..... Assuming all waste is incinerated
**) ..... Orthofer, R.; Vesely, A., 1990
***) ..... Wintermeyer, D.; Rotard, W., 1994

Comparison of emissions from MSW incineration and from household burning of refuse

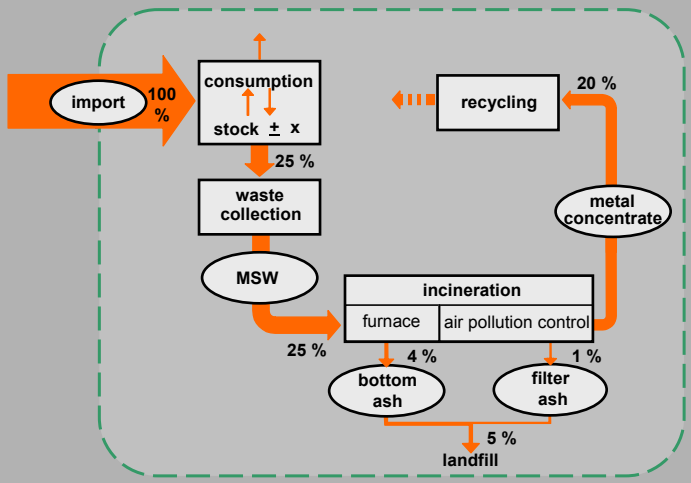
	dust g/t	HCl g/t	SO_2 g/t	NO_x g/t	CO g/t	Hg g/t	dioxins µg TE/t
household	30.000	5.300	1.000	2.000	60.000	1	3.200
MSW incineration	40	40	150	400	200	0,3	3

Mass and Element Partitioning during MSW Incineration



design: inge Hengl

Cd Recycling by MSW Incineration



design: inge Hengl

Goals for MSW Incineration

- desinfection
- volume reduction
- energy recovery
- environmental protection
- complete mineralisation
- immobilisation
- concentration
- materials recycling