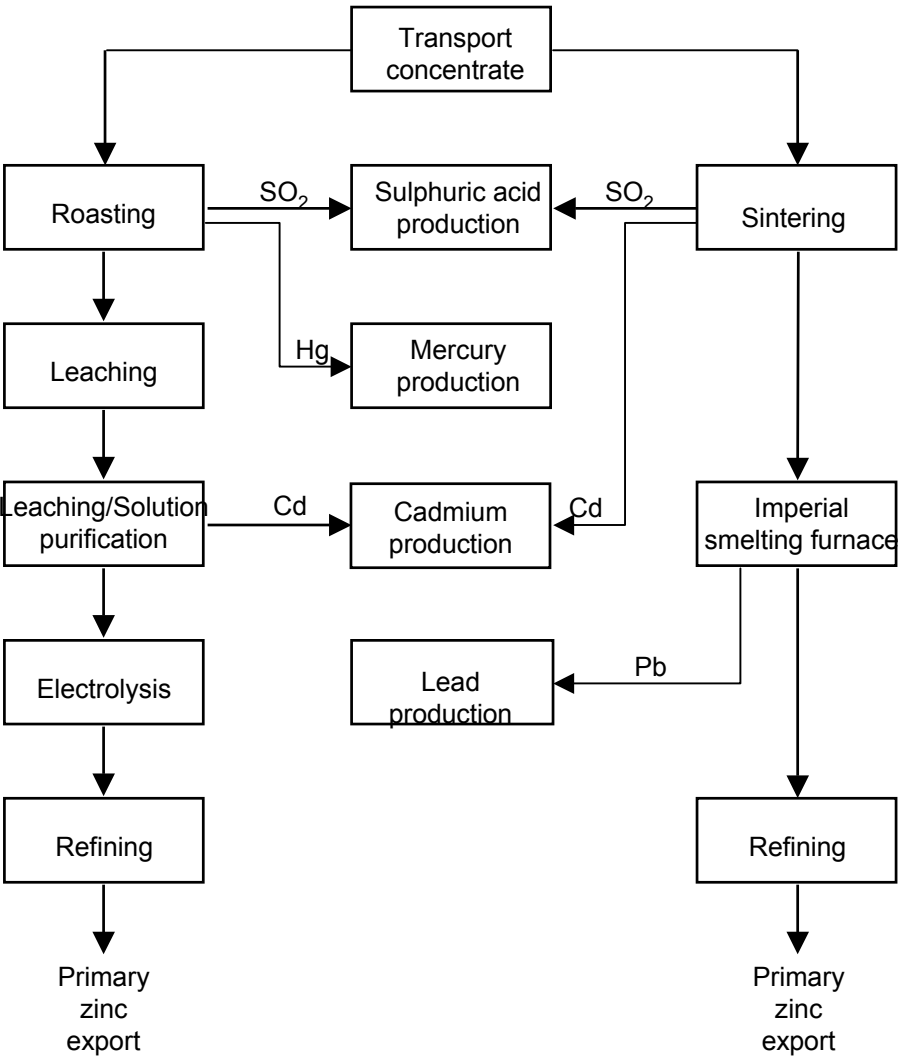


Zinc ecoprofile data: the results of a pan-European study

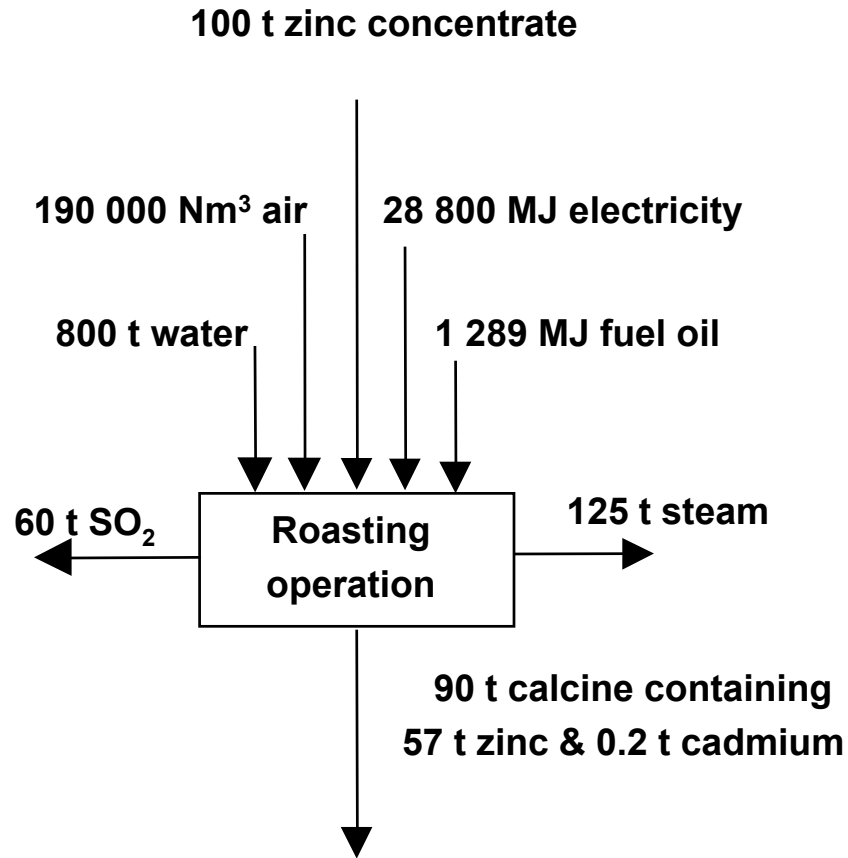
William Dove and Ian Boustead

Boustead Consulting Limited, 2 Ashdown Field, Shalmsford Street,
Chartham, Canterbury, CT4 7QS, UK

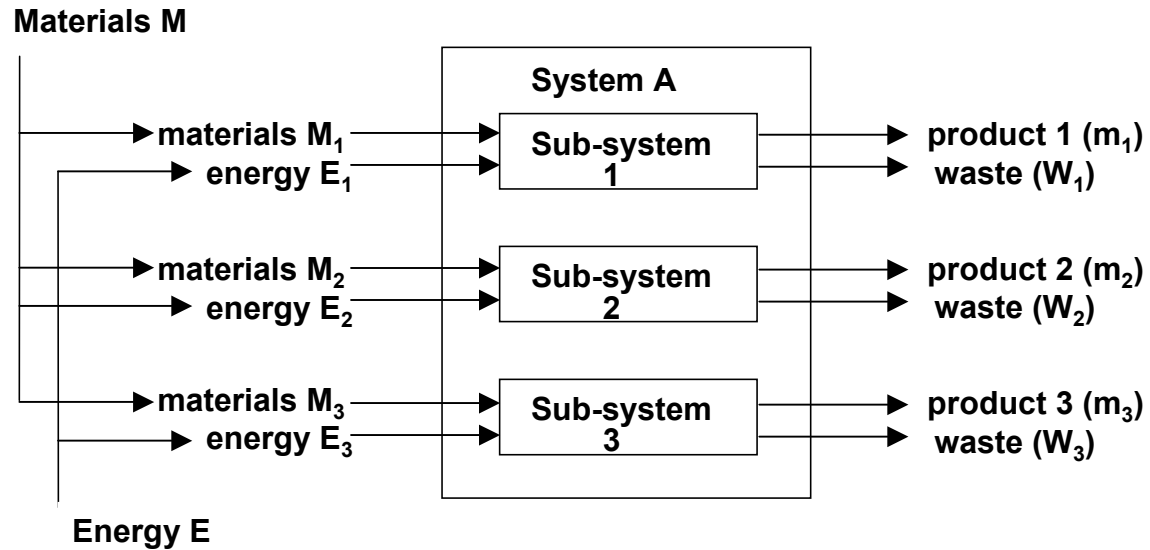
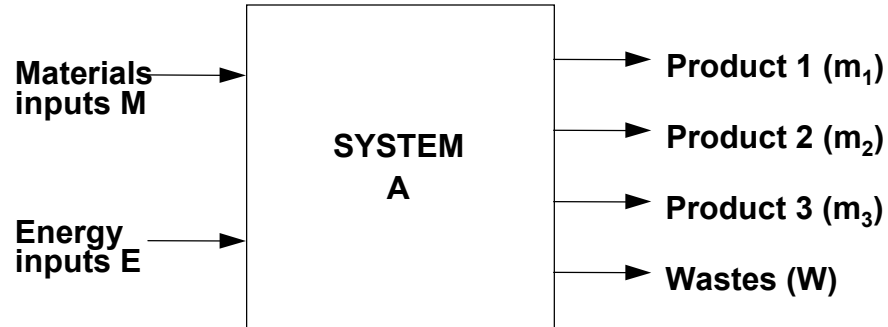
The two main European primary zinc production routes



Typical inputs to and outputs from a zinc concentrate roaster



Treatment of a multi-product system (co-product allocation)

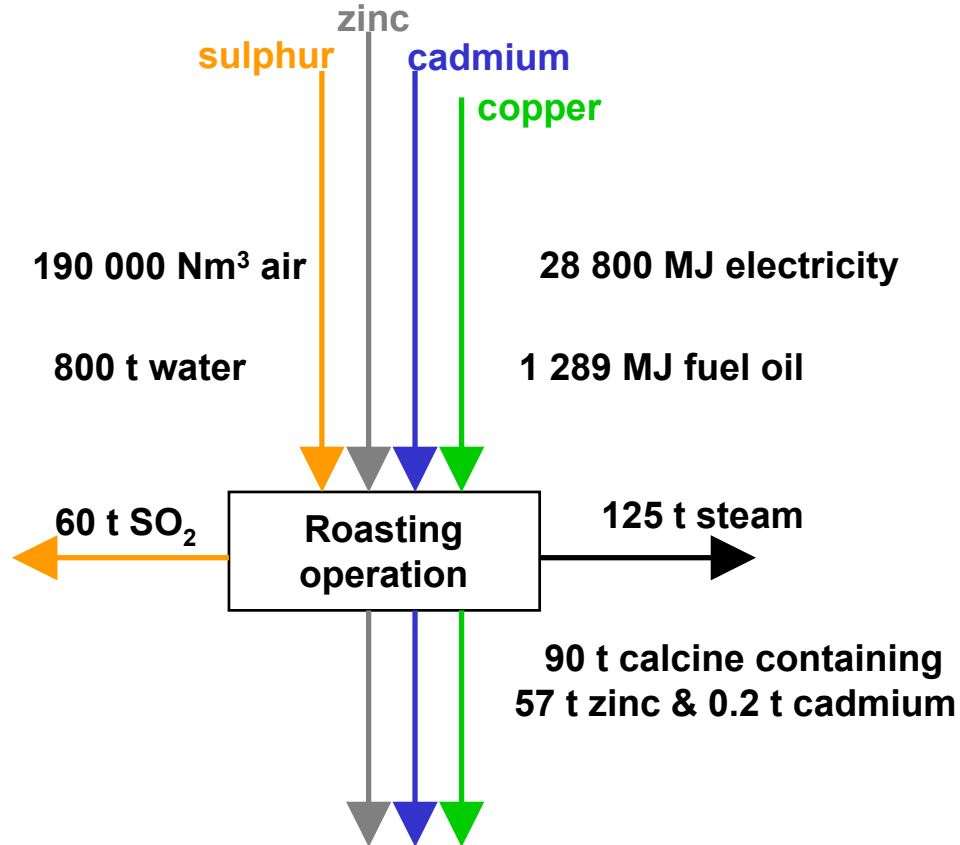


**Traditional way of treating roaster SO₂ gas output
(typical calcine roaster operating data)**

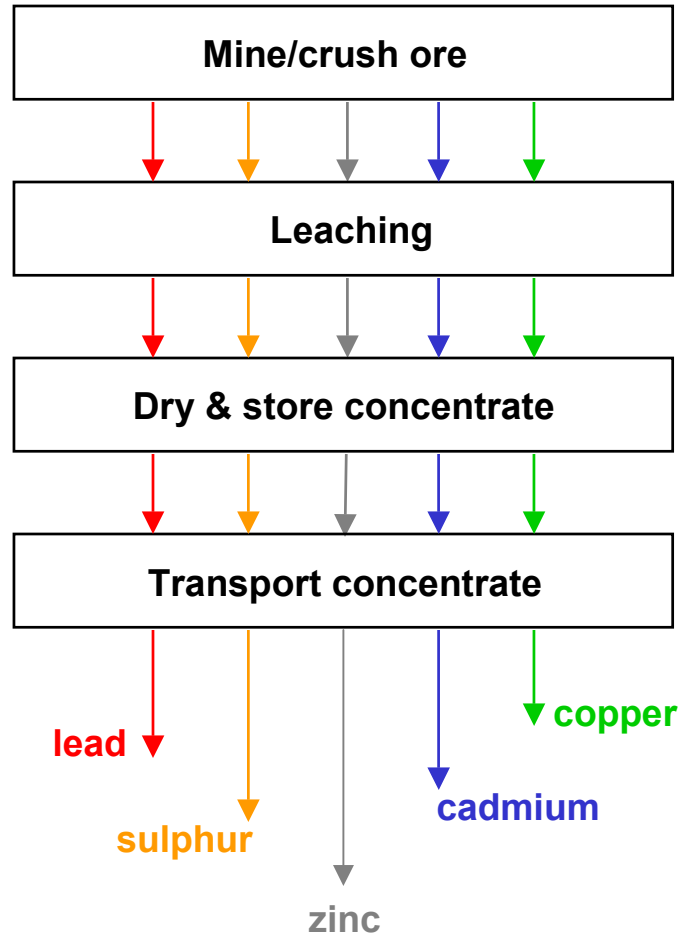
Raw data				Normalising parameter		Normalised data	
Inputs	Electricity	28,800	MJ			0.503	MJ
	Fuel oil	1290	MJ			0.023	MJ
	Zinc concentrate	100	t			1.749	kg
	Water	800	t			13.986	litre
	Air	190,000	Nm ³			2.980	Nm ³
Outputs	Steam @ 40 bar	125	t			6.121	MJ
	Calcine with:	[90	t]				
	Zinc	57	t	57,000	kg zinc	0.997	kg Zn
	Cadmium	200	kg	200	kg cadmium	0.003	kg Cd
	SO ₂	60	t				
Total zinc & cadmium				57,200	kg		

Tracking elemental flows

100 t zinc concentrate



Tracking elemental flows — back to ore extraction



Gross energy in MJ required to produce 1 kg of Zn in concentrate.

Fuel type	Fuel prod'n & delivery energy	Energy content of del'd fuel	Energy use in transport	Feedstock energy	Total energy
Electricity	3.72	1.75	0.04	0.00	5.51
Oil fuels	0.26	1.23	0.05	0.06	1.60
Other fuels	0.03	0.44	0.00	0.02	0.49
Totals	4.01	3.42	0.09	0.08	7.60

Gross energy in MJ required to produce 1 kg of SHG zinc/zinc alloy.

Fuel type	Fuel prod'n & delivery energy	Energy content of del'd fuel	Energy use in transport	Feedstock energy	Total energy
Electricity	27.31	13.90	0.18	0.00	41.39
Oil fuels	0.63	2.16	1.02	0.25	4.06
Other fuels	0.78	3.64	0.07	0.05	4.54
Totals	28.72	19.70	1.27	0.30	49.99

In Summary

- Tracking elemental flows means
 - variations in ore and concentrate compositions can be handled;
 - burdens can be assigned up until the point at which the main sequence is left;
 - any primary metal production system is well-suited to this analytical approach.