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Urban Mining: Recycling – or more?

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Urban Mining Forum, Taipei, October 21st, 2011

- What is urban mining?
- Why urban mining?
- Four elements of an urban mining strategy
- Urban mining and re-industrializing the city
- Summary

What is urban mining?

Systematic, goal oriented management of anthropogenic resource stocks in view of:

- long-term environmental protection
- resource conservation
- economic benefits





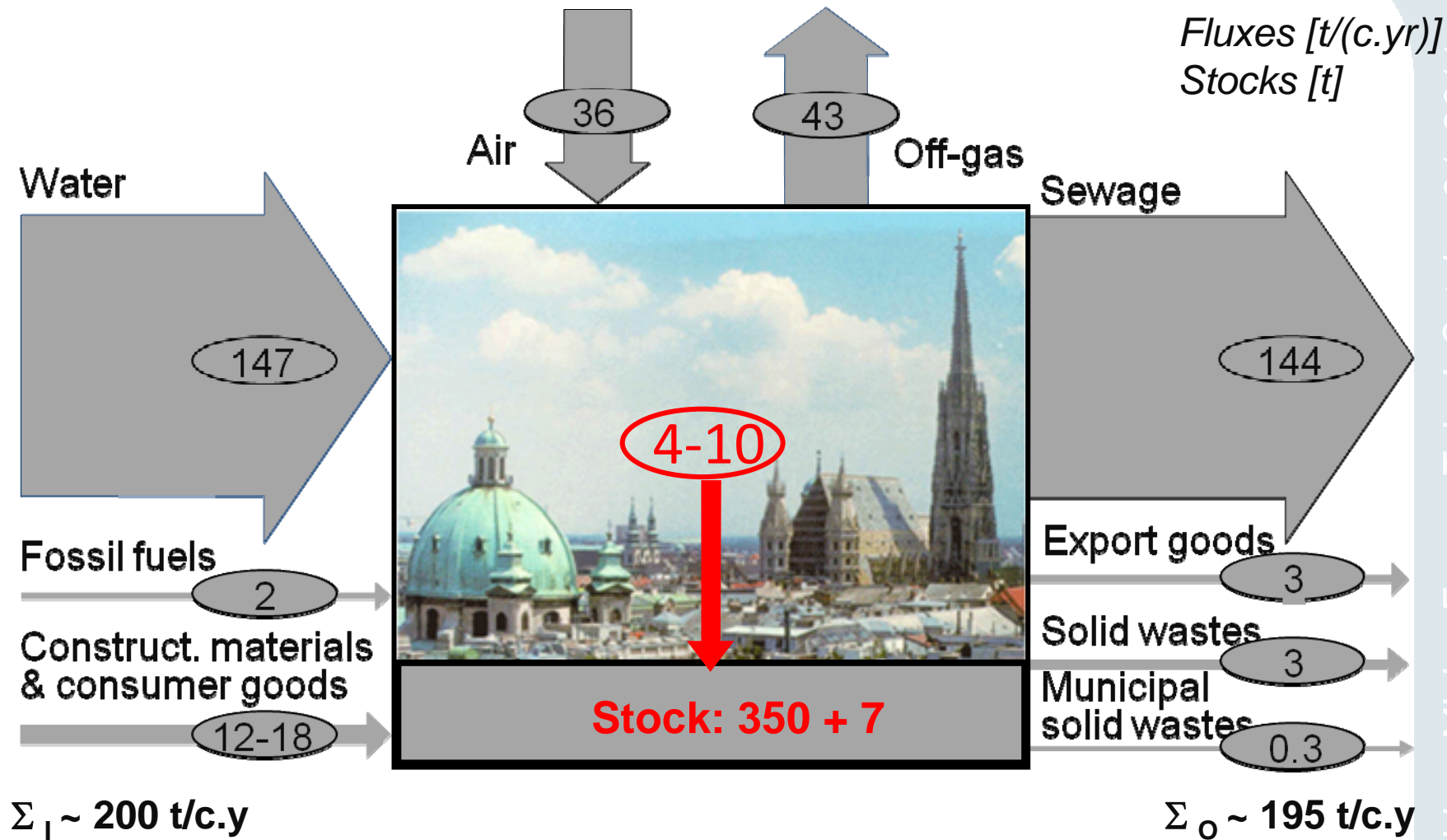
Environmental degradation
by mining



Environmental burdens by
primary production

Why urban mining?

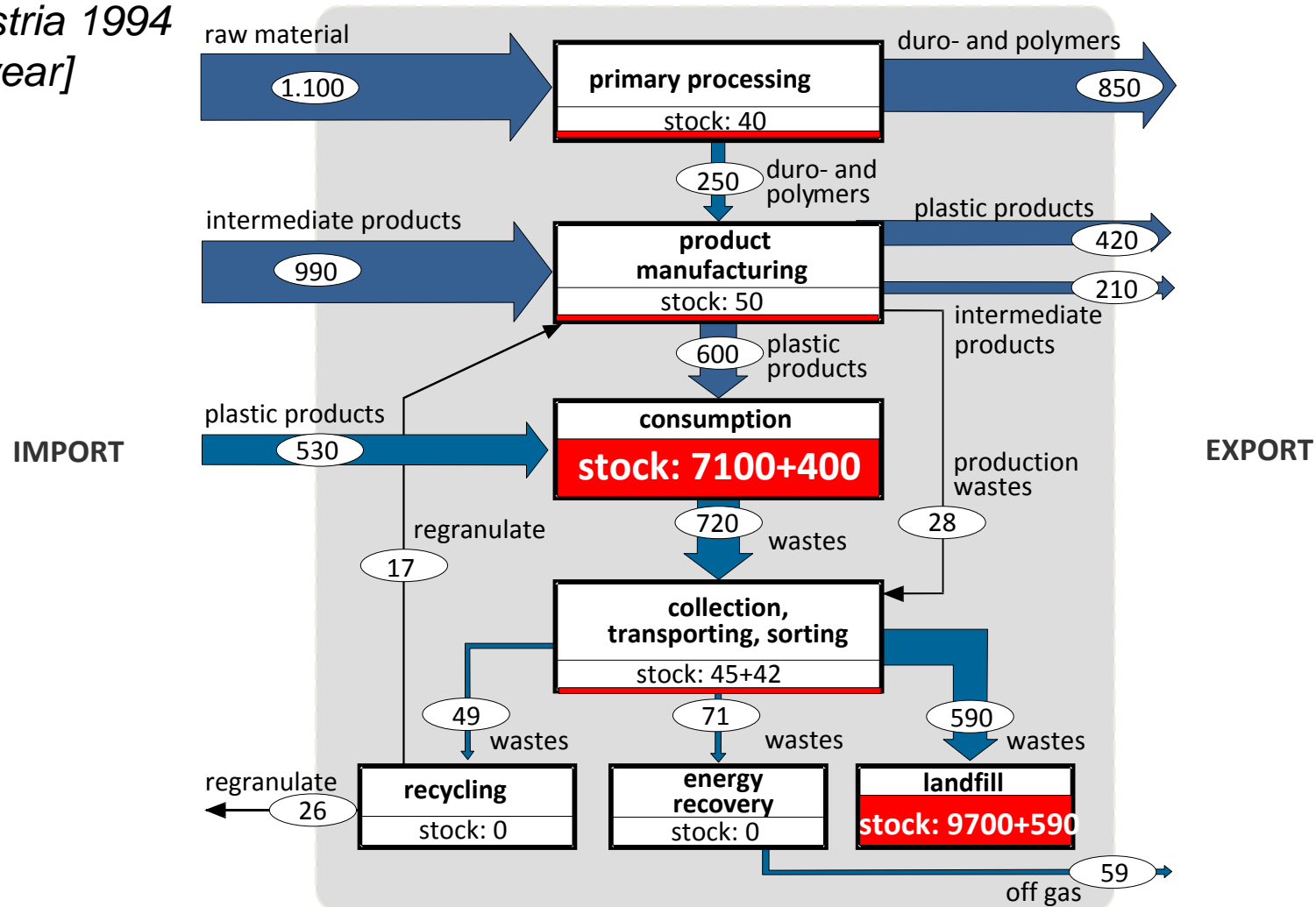
large resource stocks



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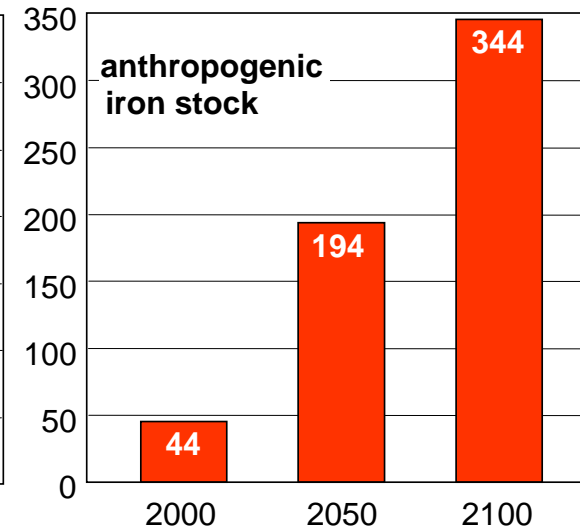
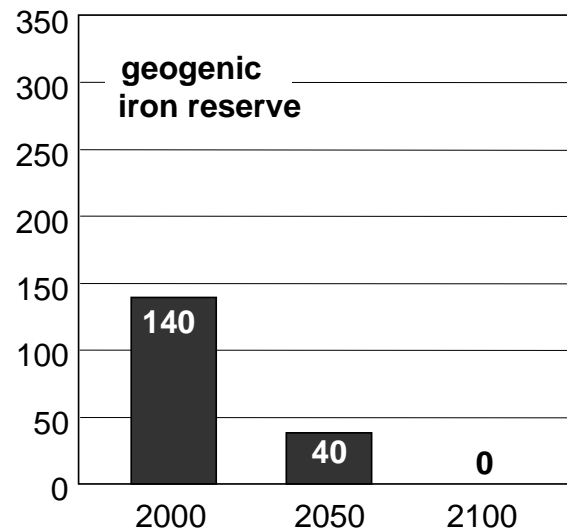
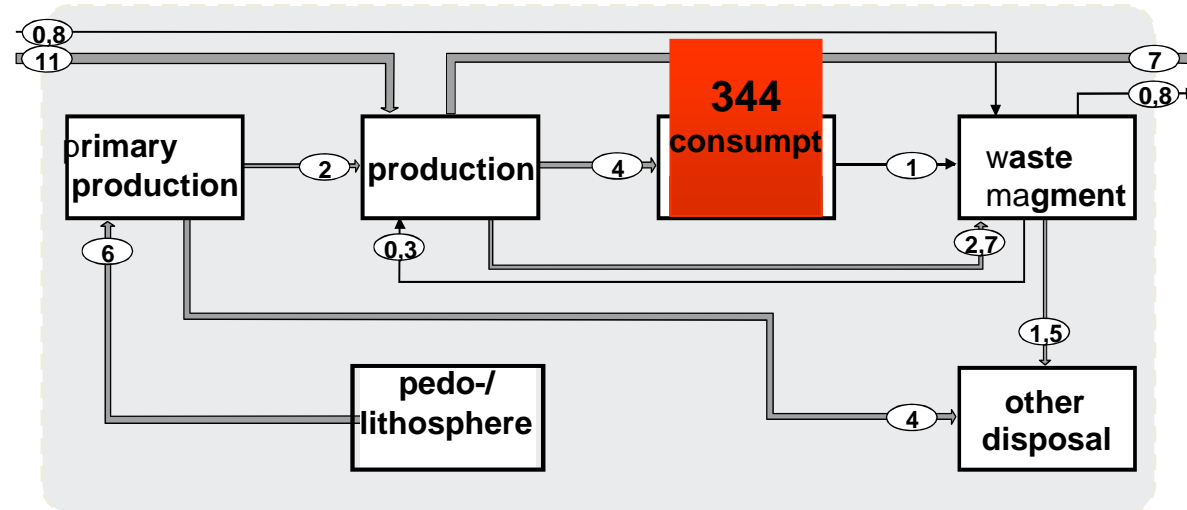
Source: Daxbeck et al. 1996 (updated)

*plastic flows
in Austria 1994
[in kt/year]*



Source: R. Fehringer, 1998

Iron flows through Austria

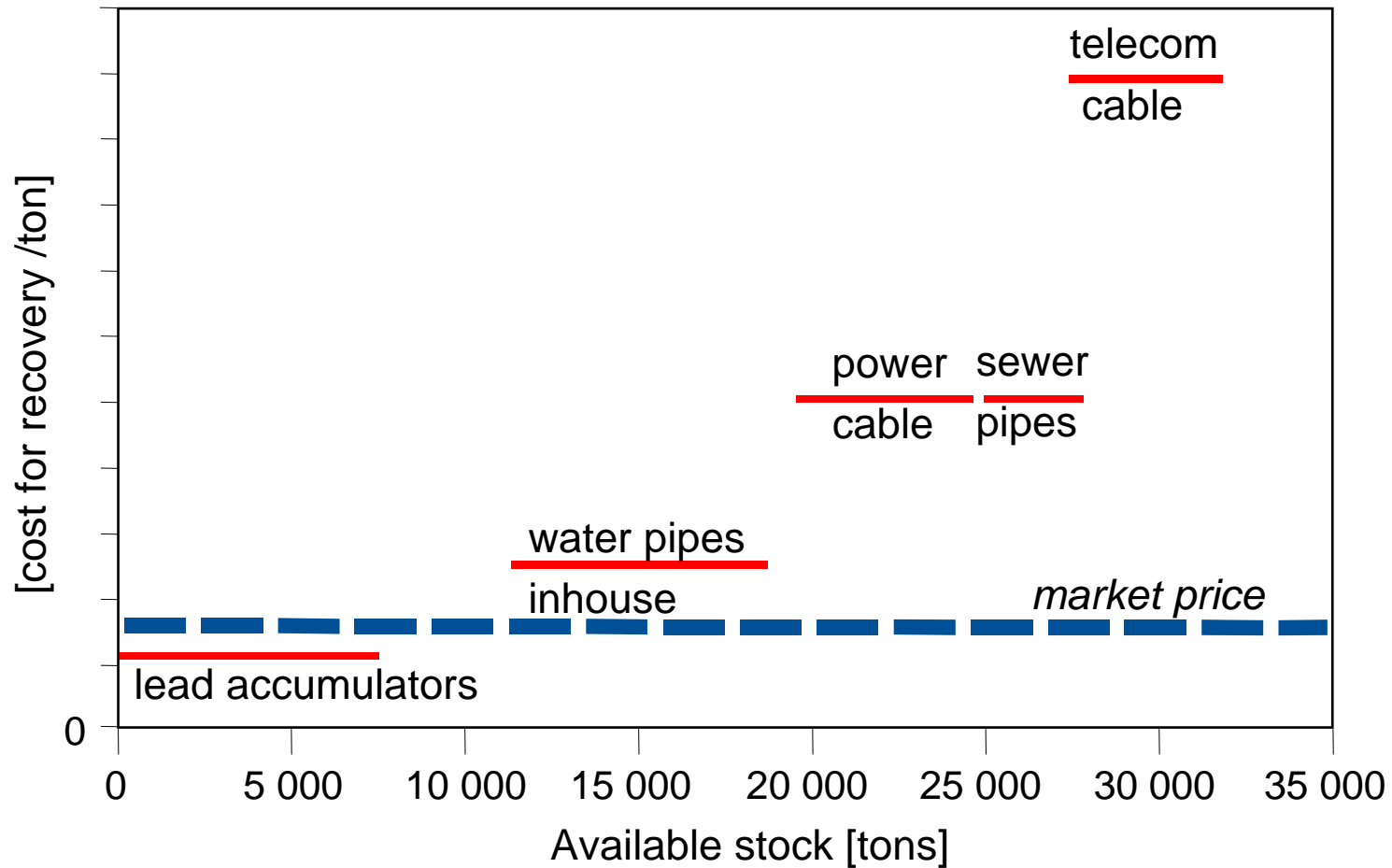


The 4 elements of an urban mining strategy

Topic	Actor
1.Design for Urban Mining	industry & academia
2.New knowledge base: <ul style="list-style-type: none"> • Urban prospection methodology • Resource cadastre 	public -> private sector public & private sector public sector
3.High-Technology logistics, separation, and recovery processes	industry & academia
4.Final sinks for the „useless“	public & private sector

The 4 elements of an urban mining strategy

1. Design for Urban Mining: example lead



source: Lohm et al., 1998

The 4 elements of an urban mining strategy

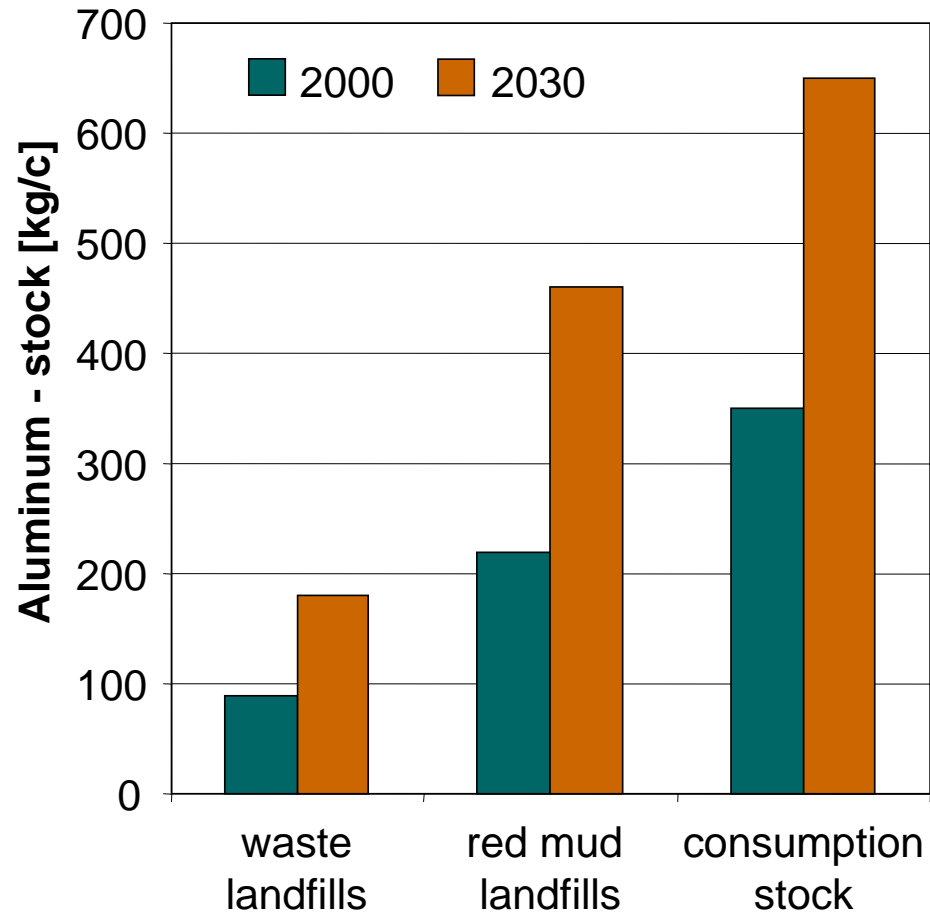
1. Design for Urban Mining: example copper



The 5 elements of an urban mining strategy

1. Design for Urban Mining
2. New knowledge base: Resource cadastre

New knowledge base: the case of aluminum



*aluminum in
packaging wastes:*

1.9 kg/c.year

= 3 % of total Al-turnover

New knowledge base: the case of Vienna

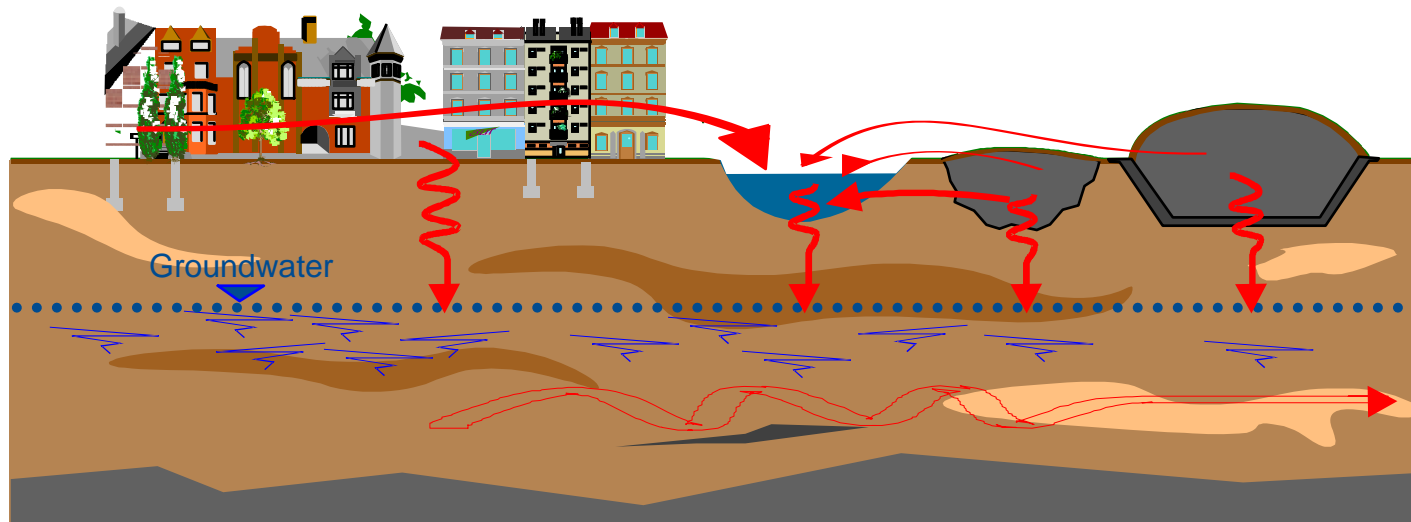
[kg/capita]

Vienna stock in use and hibernating

Lead	200
Iron	5,000

Stock in Vienna landfills

Lead	20
Iron	350



Source: R. Obernosterer et al, 1998

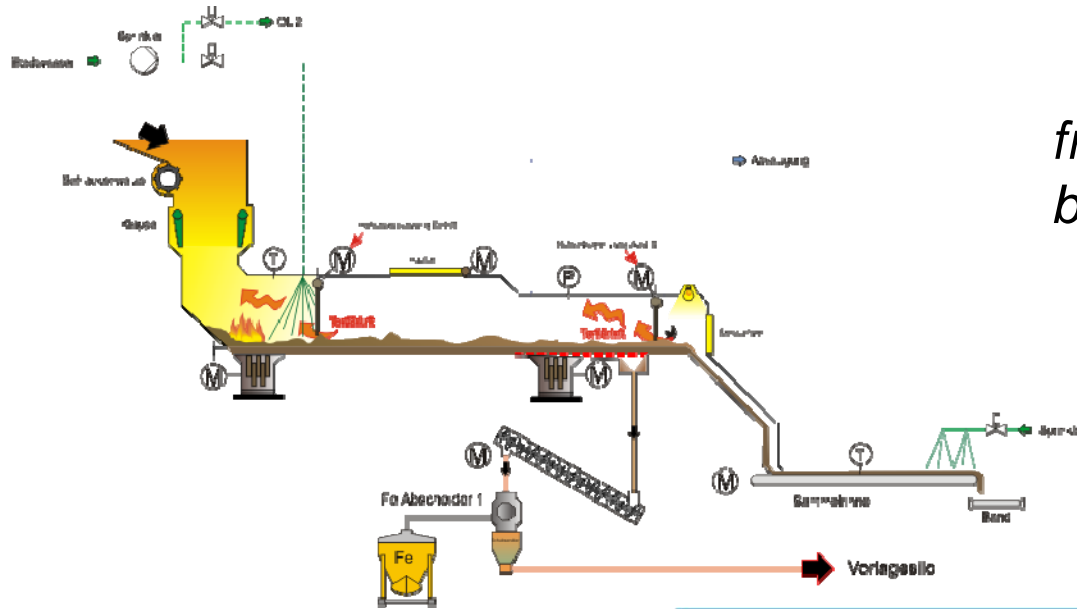
The 4 elements of an urban mining strategy

1. Design for Urban Mining
2. New knowledge base: Resource cadastre and
Urban prospection (*analogon to geophysical prospection*)
 - Concentration [mass per mass]
 - Density [mass per area]
 - Total mass of substance
 - Speciation
 - Other constituents
 - Costs of exploitation
 - others

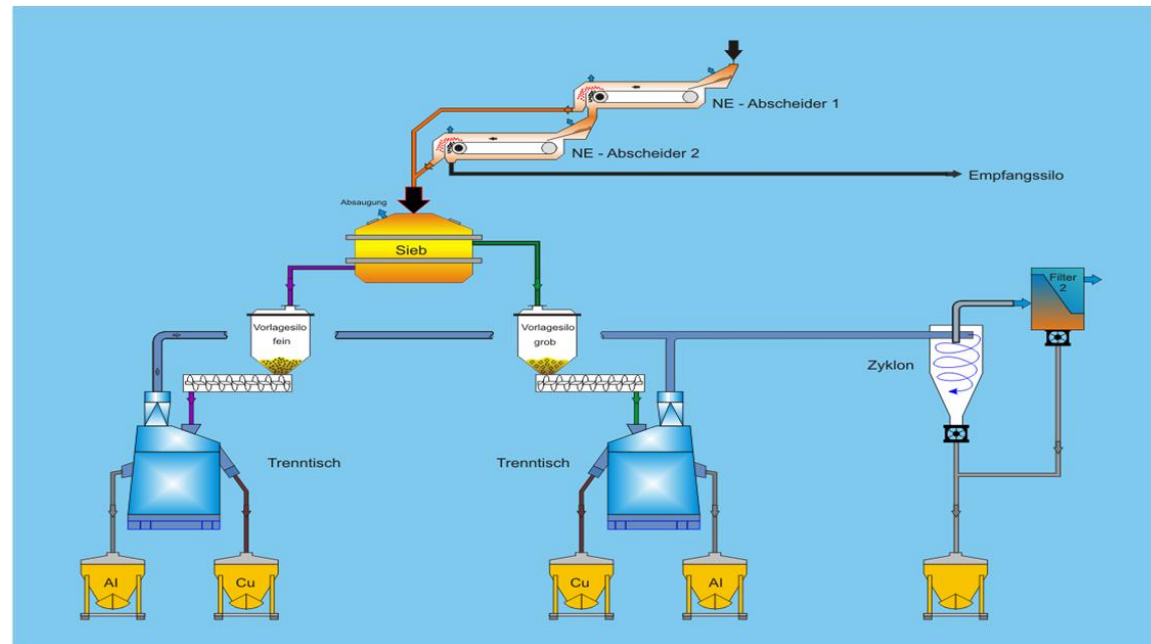
The 4 elements of an urban mining strategy

1. Design for Urban Mining
2. New knowledge base
3. High-Tech logistics, separation, and recovery processes

High-Tech logistics and recovery processes



from MSW to material resources by means of MSW incineration



High-Tech logistics and recovery processes

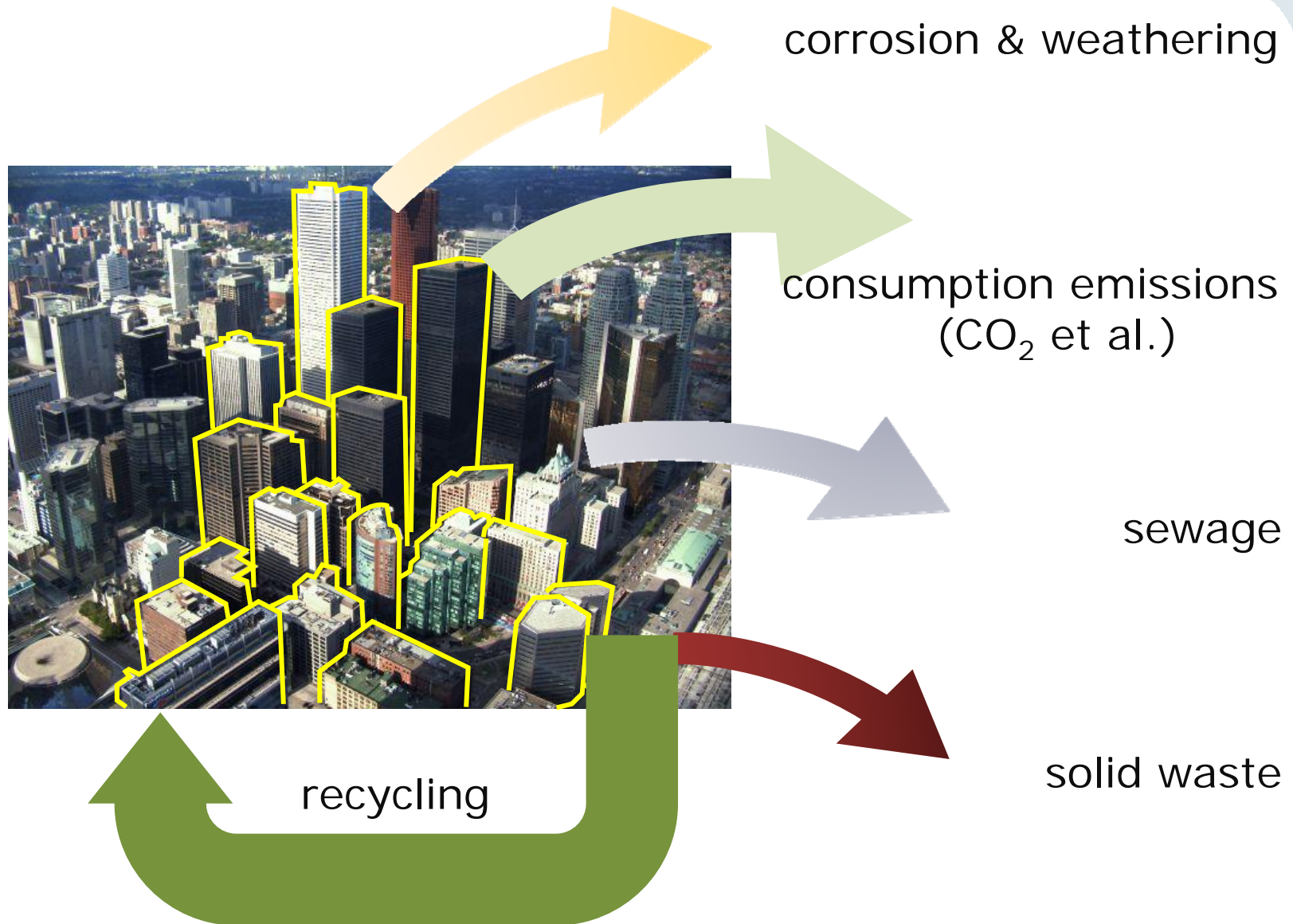


from Morf & Böni, 2011

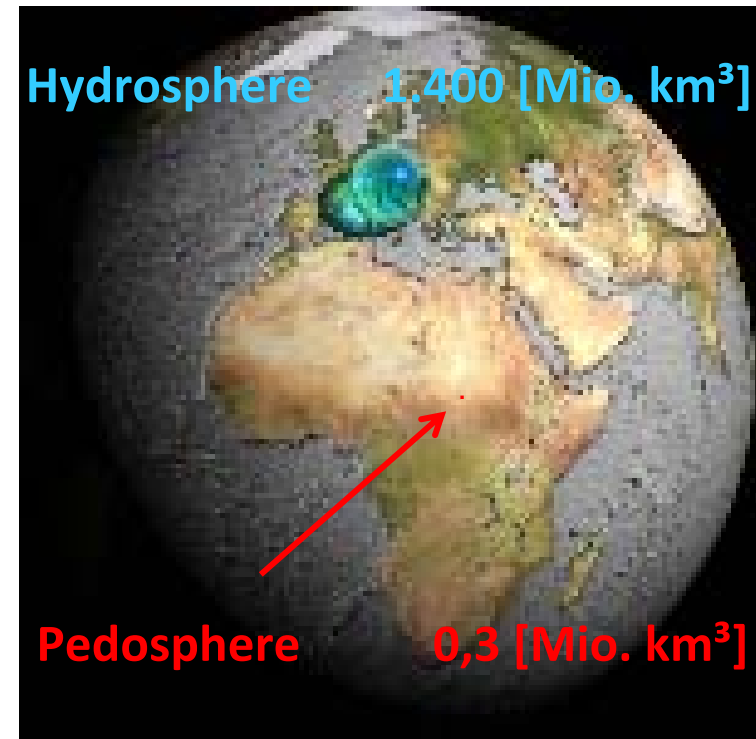
The 4 elements of an urban mining strategy

1. Design for Urban Mining
2. New knowledge base
3. High-Tech logistics, separation, and recovery processes
4. Final sinks for the „useless“

Not all flows go in cycles -> need for sinks!



The sinks on planet earth are limited



After A. Nieman supplemented by G. Döberl

1. Goal of urban mining:
 - resource conservation and environmental protection
 - economic benefits

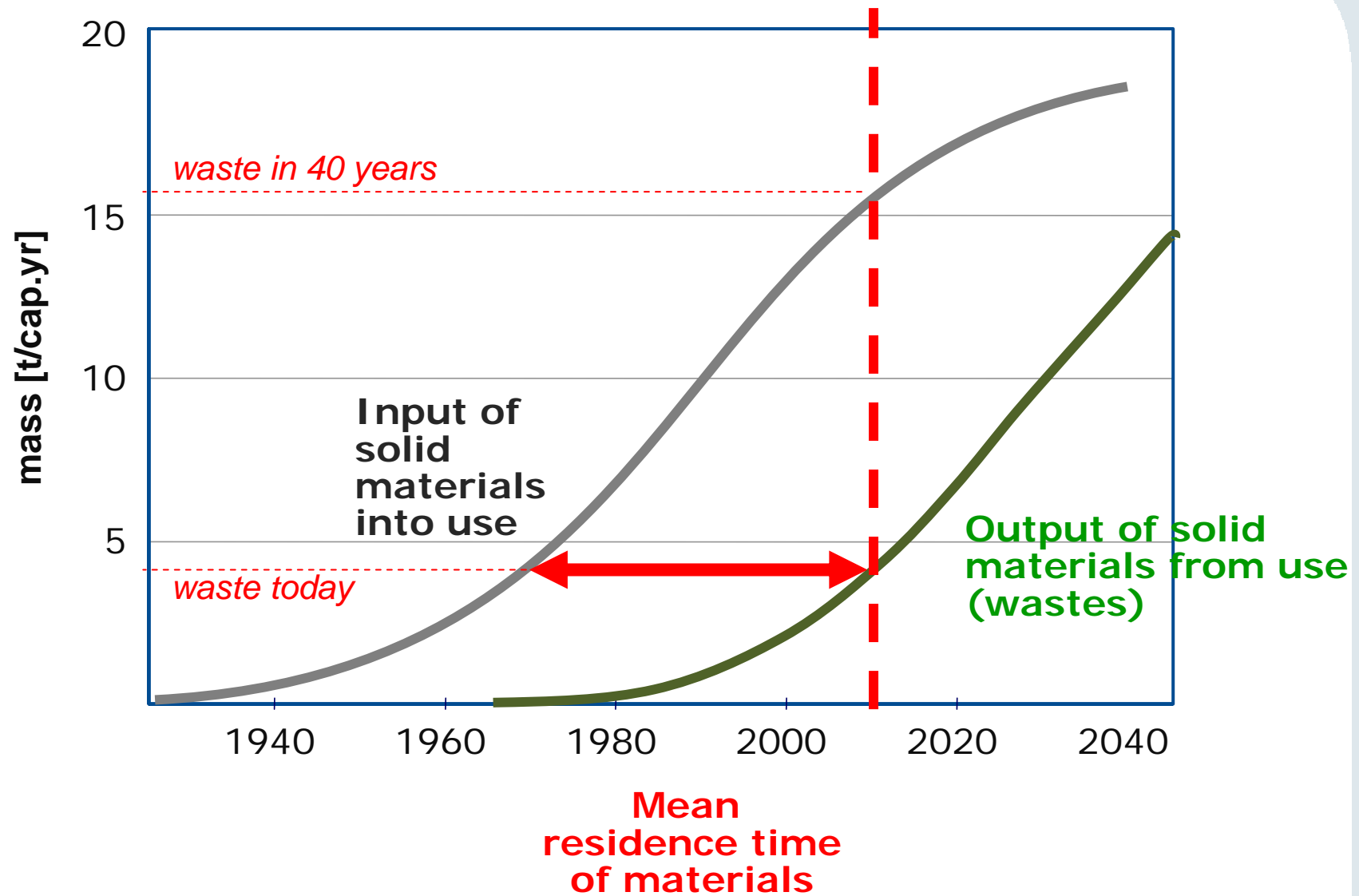
2. Reason for urban mining:
 - large anthropogenic stocks (larger than geogenic stocks?)

3. Challenges:
 - new knowledge base
 - new design for “urban mining”
 - new technologies
 - urban prospection
 - high-tech separation processes (*clean cycles!*)
 - economics of secondary versus primary resource use
 - demand for final sinks!

Thank you

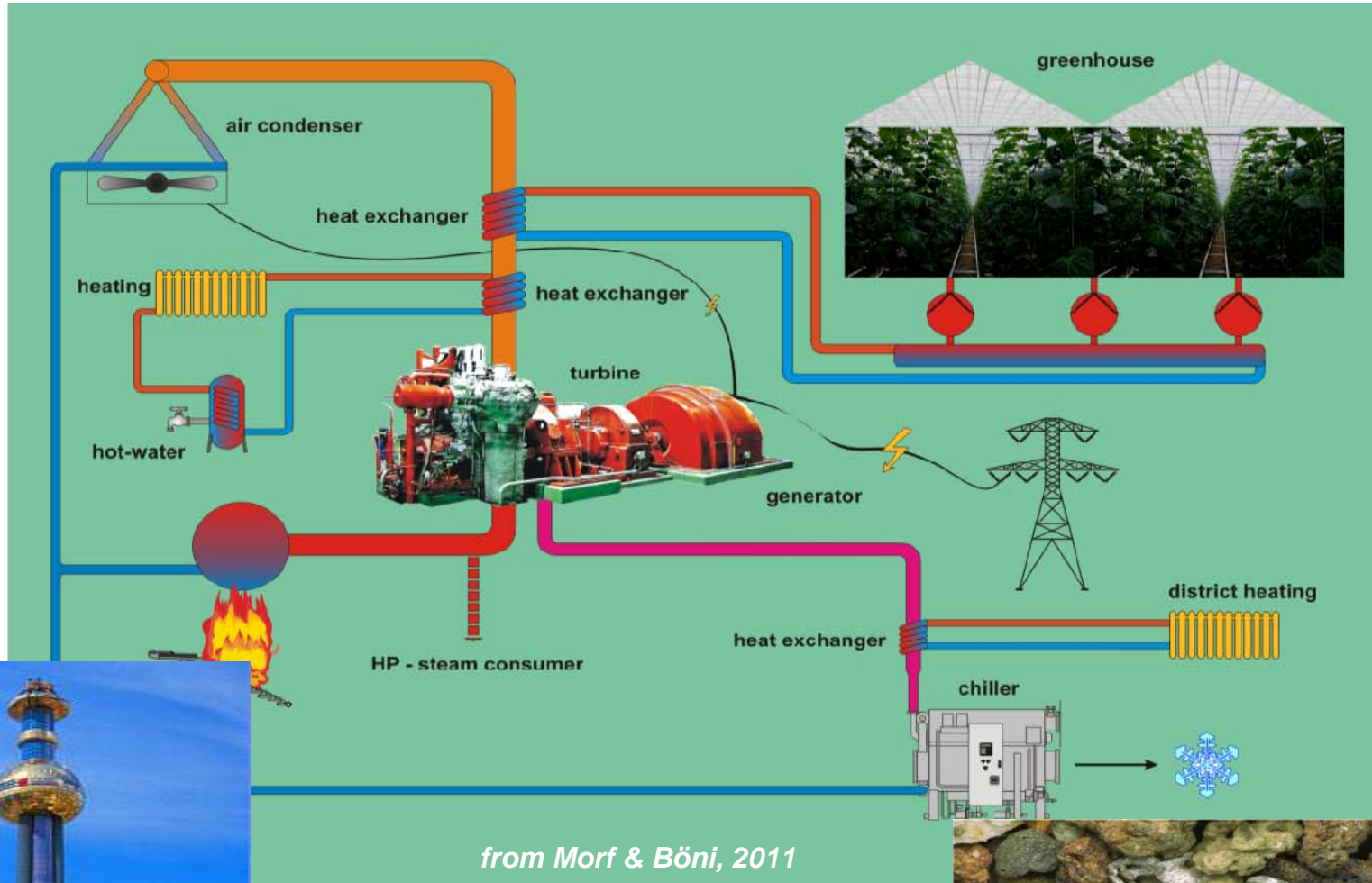


Stock dynamics and waste generation



Urban mining and re-industrializing the city

Coupling materials and energy by MSW incineration



from Morf & Böni, 2011

