

Status and Perspective of
Application of Material Flow Analysis (MFA)

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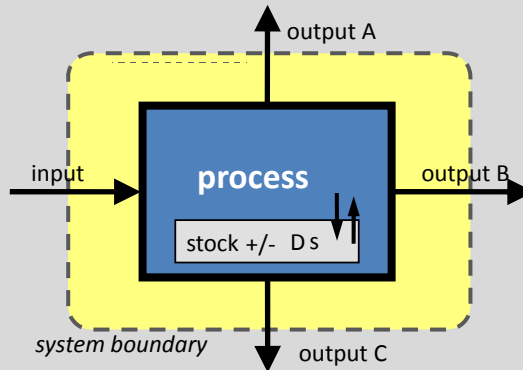


Cities: high turn-over of materials and energy

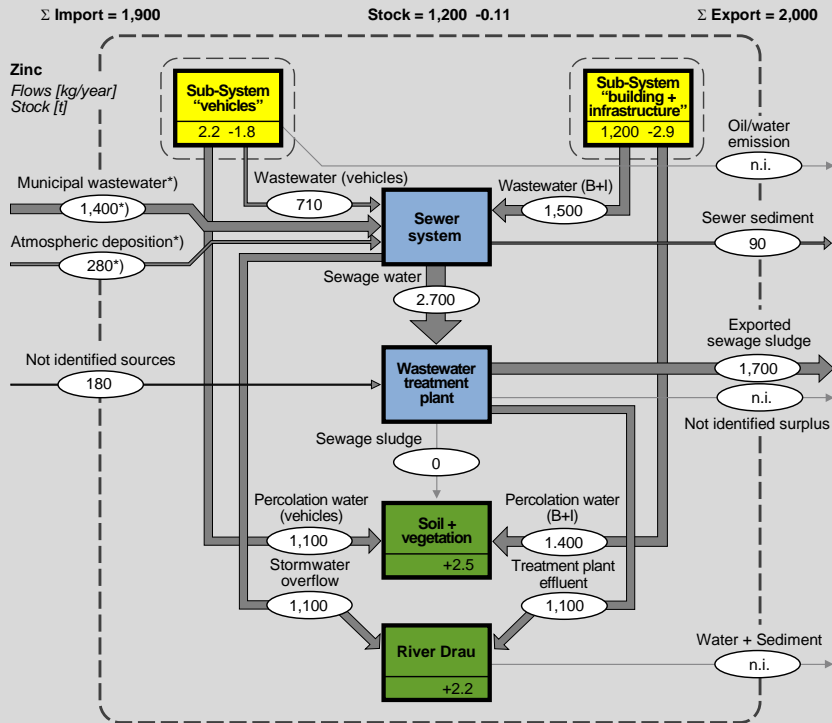


Goals for sustainable urban metabolism

- Provide affordable service to the citizens
 - Conserve resources
 - Protect the environment
 - consider the need of future generations
- > **Material Flow Analysis (MFA) supports decision regarding these goals**

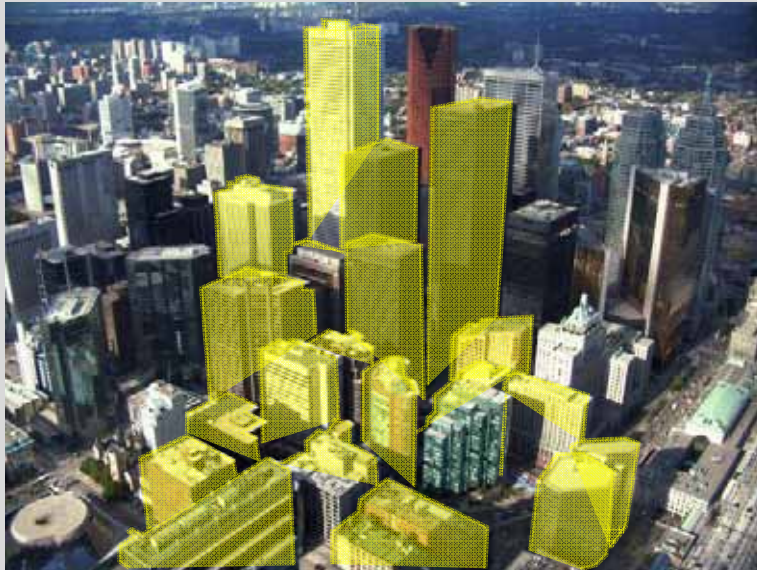


MFA allows modeling of complex systems



* ... other diffuse zinc emissions

Cities as material stocks, accumulating resources

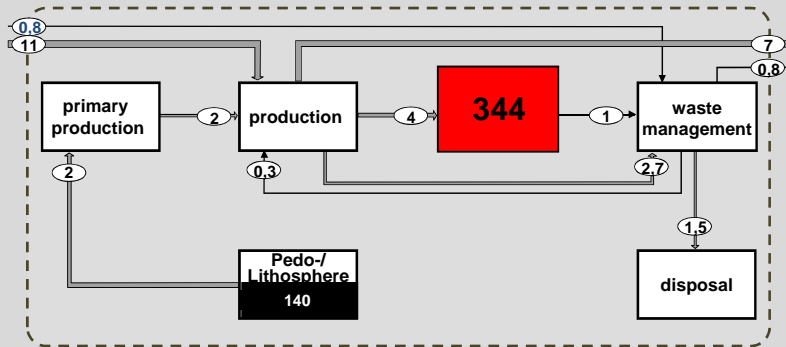


From natural resources to man made resources

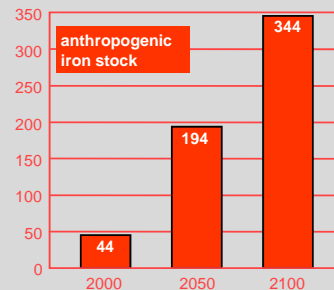
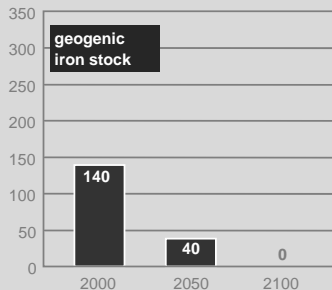
$\Sigma_{import} \sim 11$

Stock = 184 + 3,2

$\Sigma_{export} \sim 7,8$



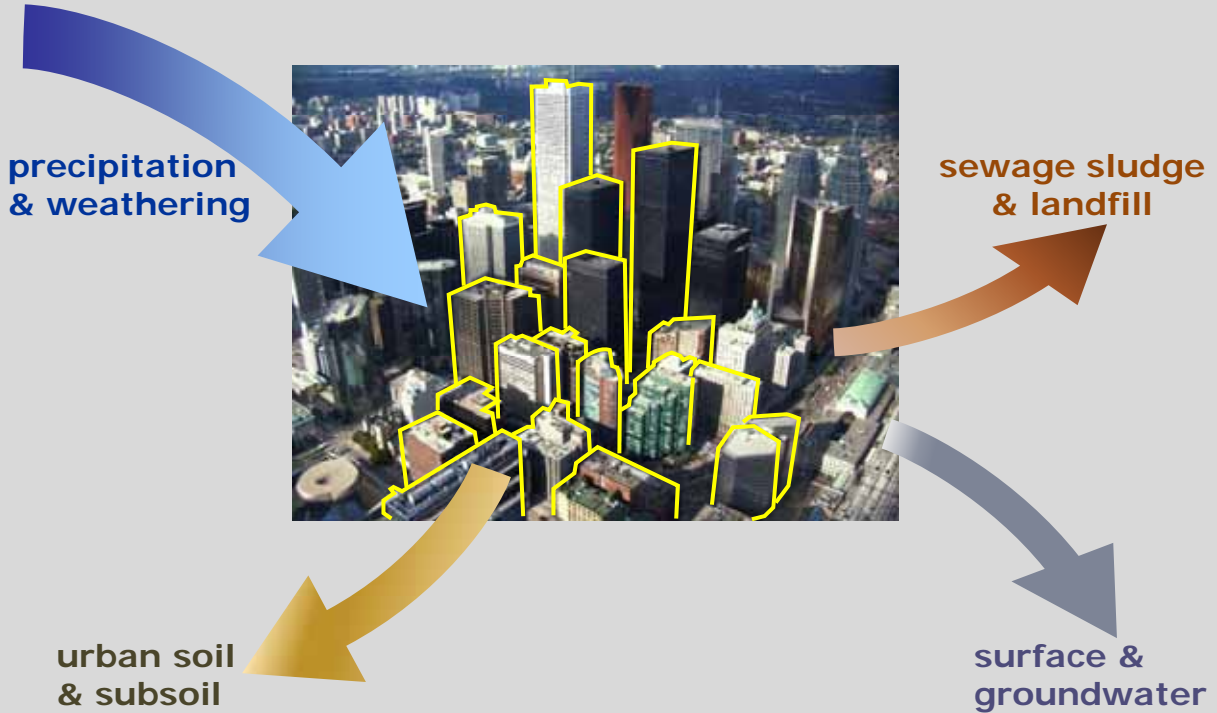
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The city surface: protecting the urban stock



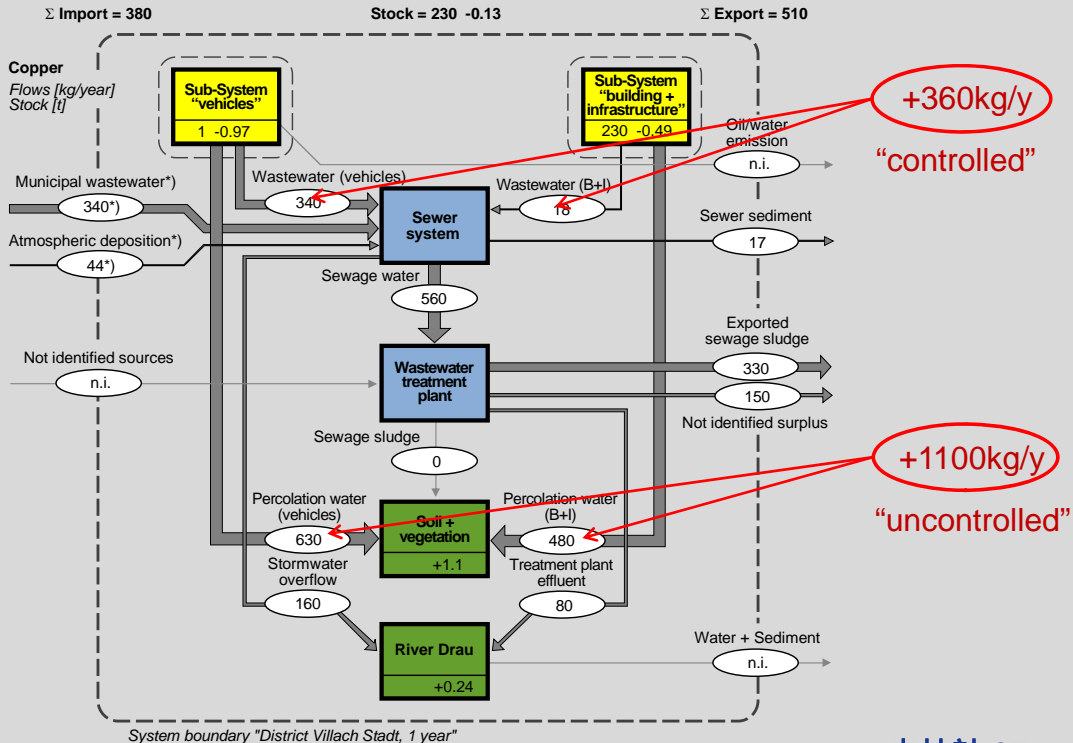
Flows from surfaces - what is the best sink?



What is an „urban surface“?



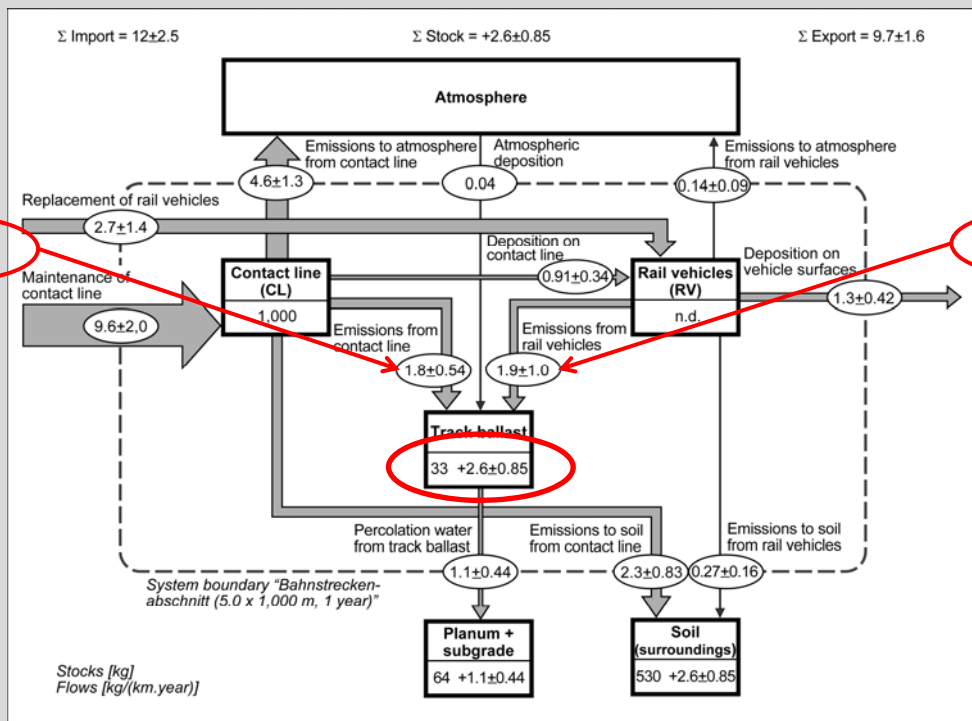
Copper emissions from urban surfaces



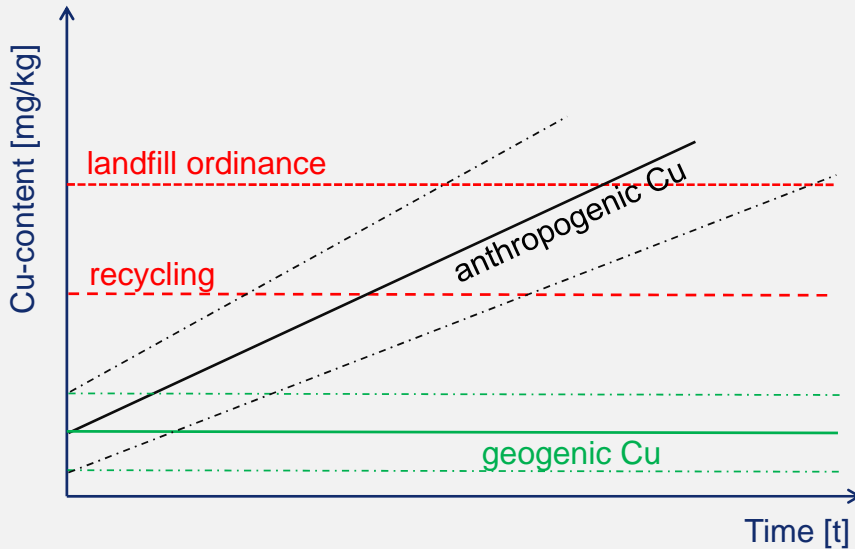
Railroad gravel contains too much copper – why?



MFA of Copper use for railroad transportation



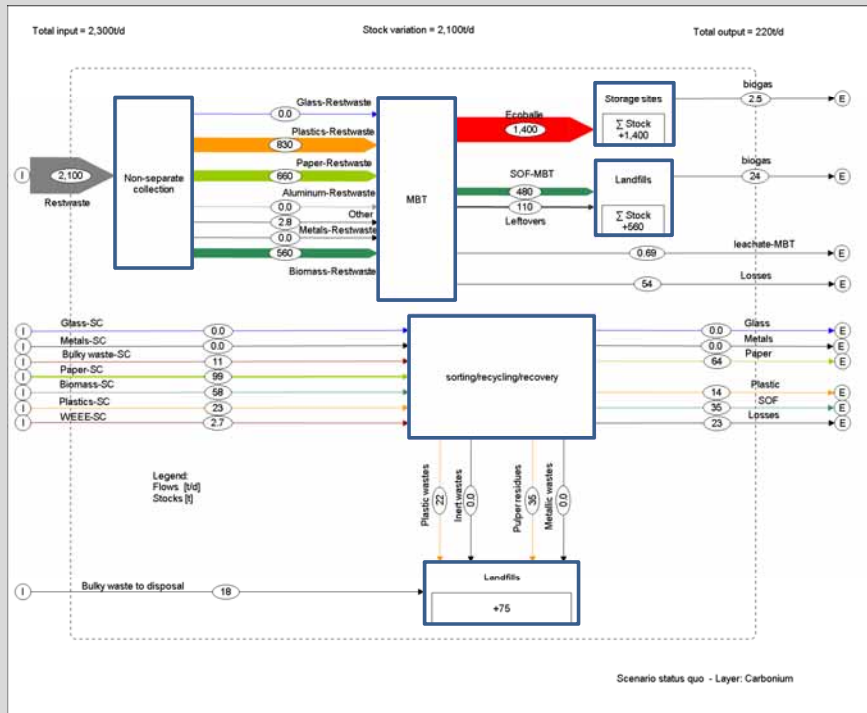
Copper in gravel from railroad



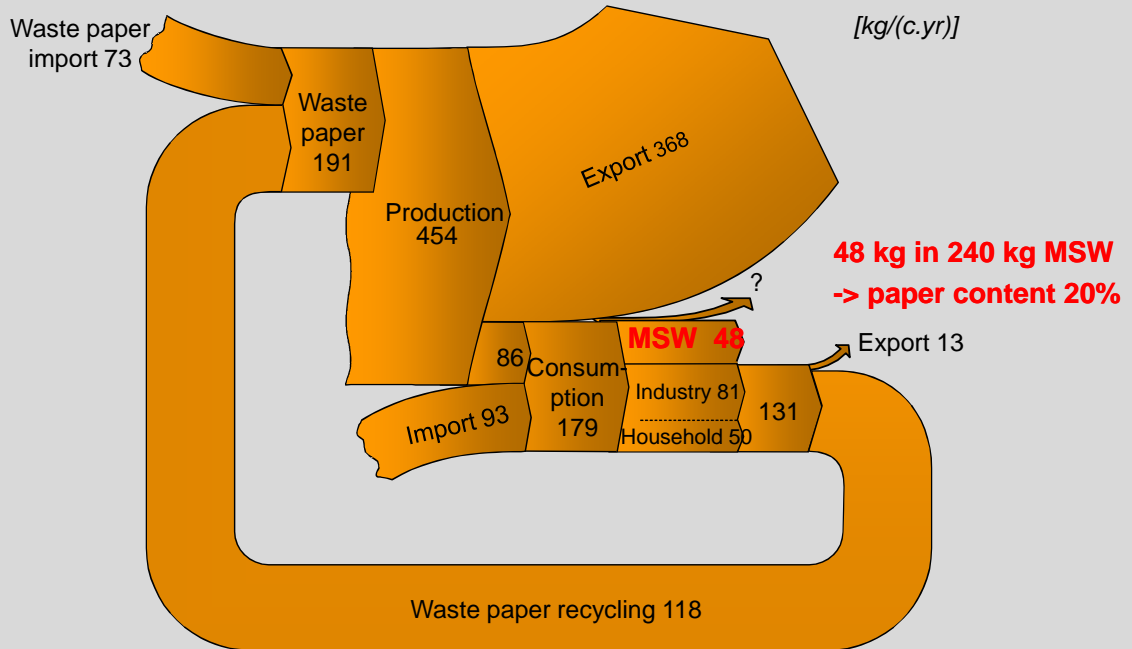
Cities as flow-through reactors



Modelling of waste management by MFA

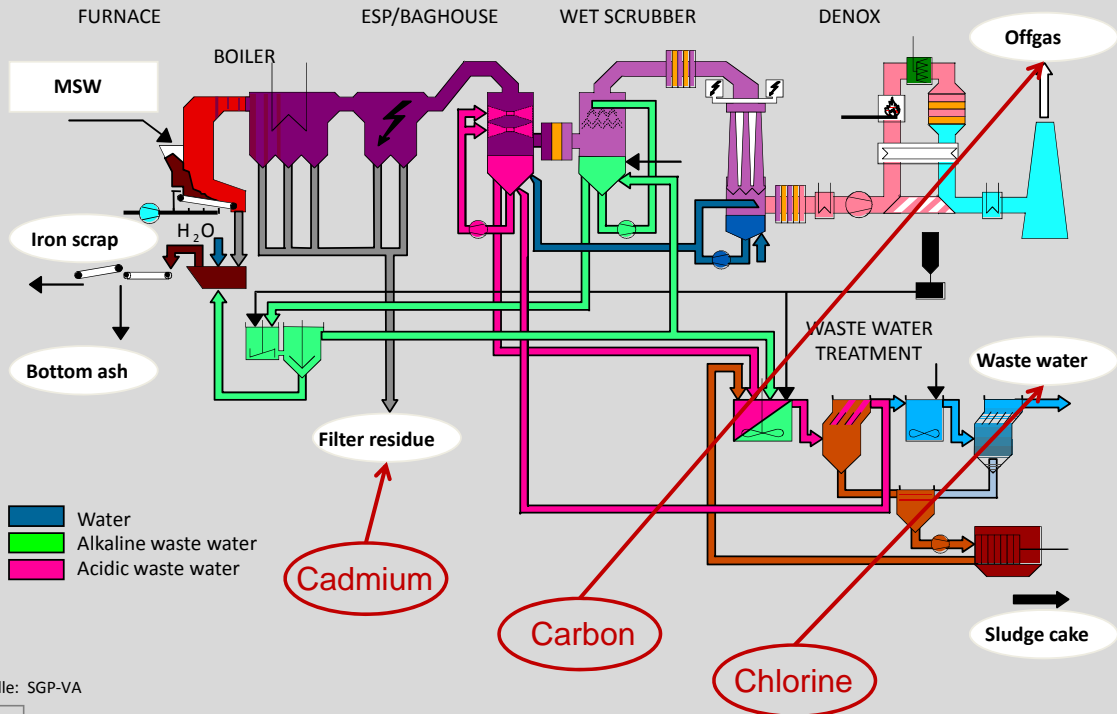


MFA of paper to assess waste composition



Data: Austrian Paper Industry, 1996

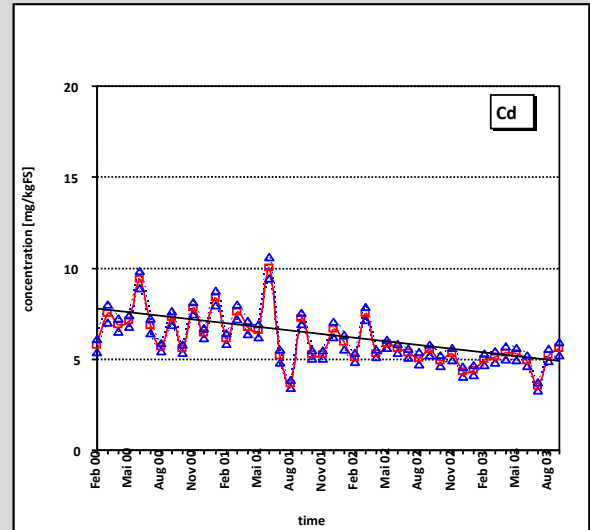
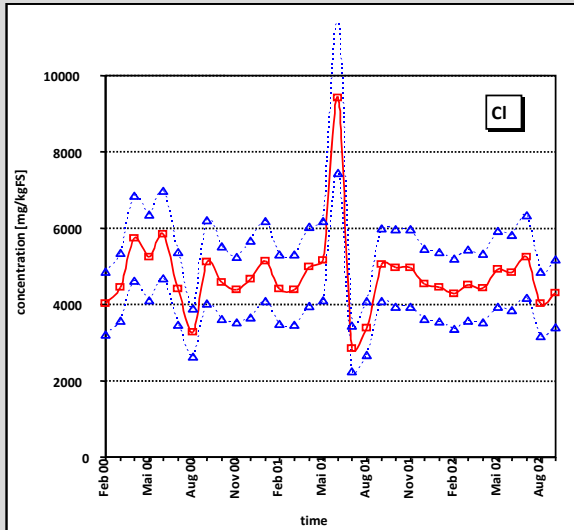
MFA of waste incineration to analyse waste composition



Quelle: SGP-VA

MFA of waste incineration to analyse waste composition

Monthly mean values of Cl and Cd in MSW determined over 2 ½ years in MSW incinerators



Source: Morf et al. 2003/2004

Systematic application of MFA for waste management

Goals:

- improving waste management practice
- better knowledge base for waste management:

1. Austrian Standard ONORM S 2096 “MFA- Application in waste management”
 2. Software STAN (freeware) for easy MFA
 3. Routine waste analysis by MFA on selected incinerators
 4. MFA as a mandatory requirement for certification of MSW companies
-
5. Link all relevant information
 - > new knowledge base e.g. for waste management plan

Conclusions

Vision and objective: long-term resource availability
long-term environmental protection

MFA is instrumental for this vision because it

- 1. is a rigid, transparent, and objective method to model and visualize material flows including uncertainty**
- 2. facilitates understanding and public acceptance of decisions**
- 3. is a key decision support tool for resource management, environmental management, and waste management**
- 4. is indispensable to establish knowledge bases for resources and waste management**
- 5. needs to be standardized in order to fully exploit its potential**

Thank you



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