

UNCERTAINTIES AND SENSITIVITIES IN LCAs FOR WASTE MANAGEMENT SYSTEMS

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- What kind of uncertainties do we have?
- Where does uncertainty come from?
- Does uncertainty in LCA of Waste Management Systems matter?
- How do deal with uncertainty
- How can we use sensitivity to deal with uncertainty?
- What can be learnt?

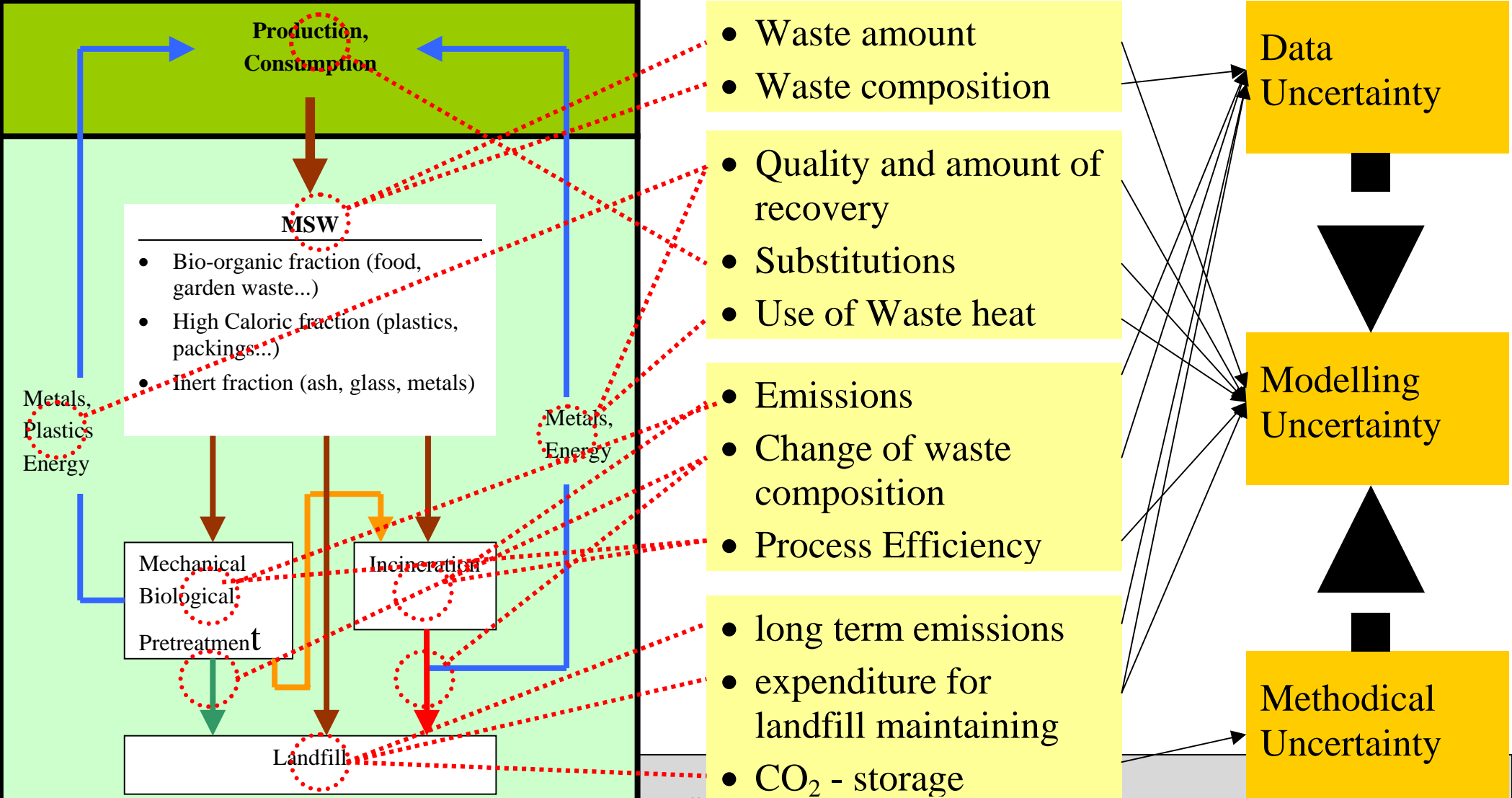


CHARACTERIZATION OF UNCERTAINTIES

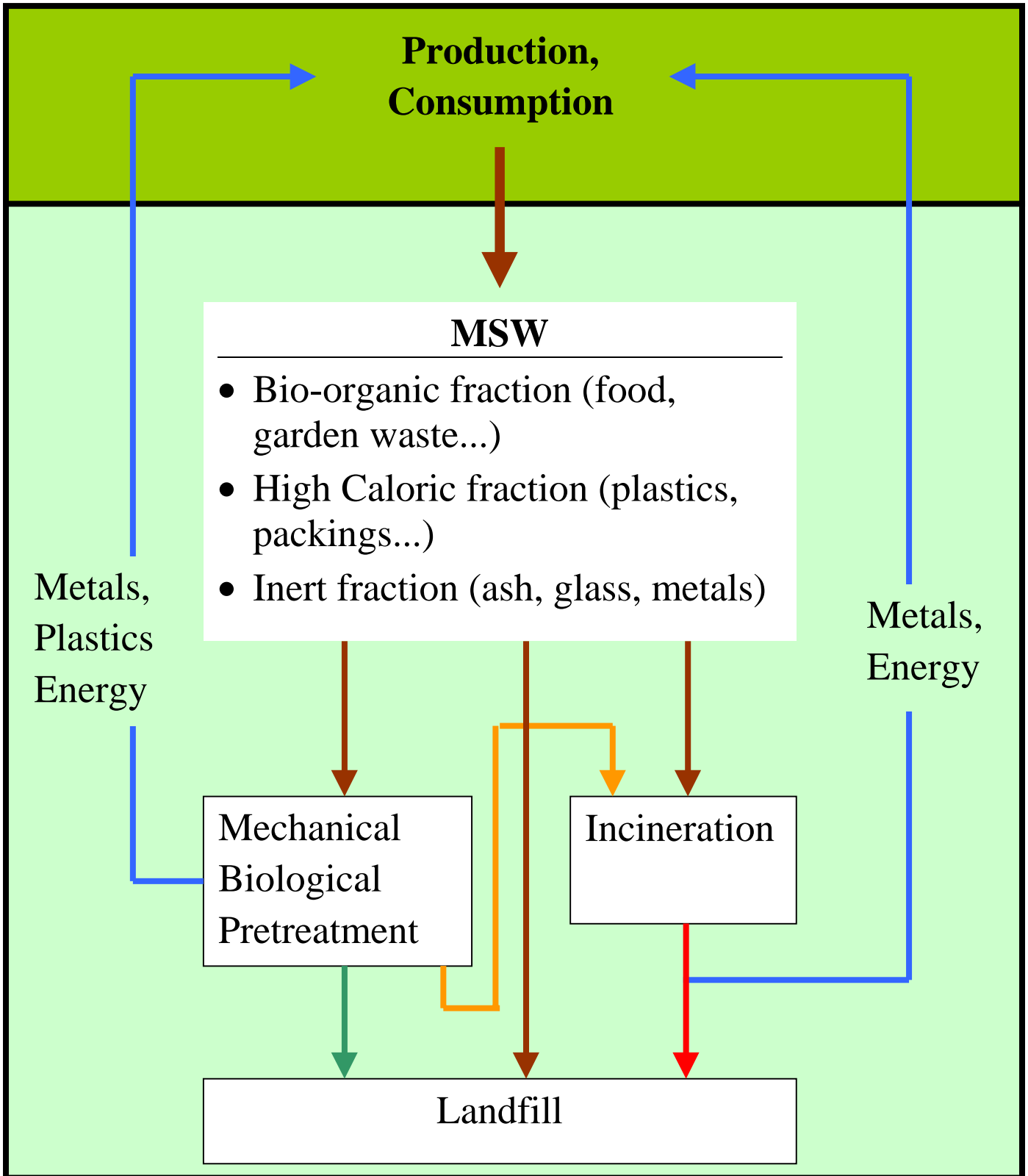
	Data Uncertainty	Modeling Uncertainty	Methodical Uncertainty
<u>Source of Uncertainty</u>	Availability or quality of data	Fuzzy system or scenario definition	Lack of methods and standards
<u>Consequence</u>	reduced quality of the LCA study	reduced significance of the results	reduced estimation and credibility of the LCA approach
<u>Who must take care</u>	LCA practitioners	LCA clients	LCA developers
<u>Solution</u>	Data quality management, not always possible,	Scenario analysis (requires a flexible LCA model)	Mediation Standardization
<u>Expenditure</u>	expensive	modest	time consuming



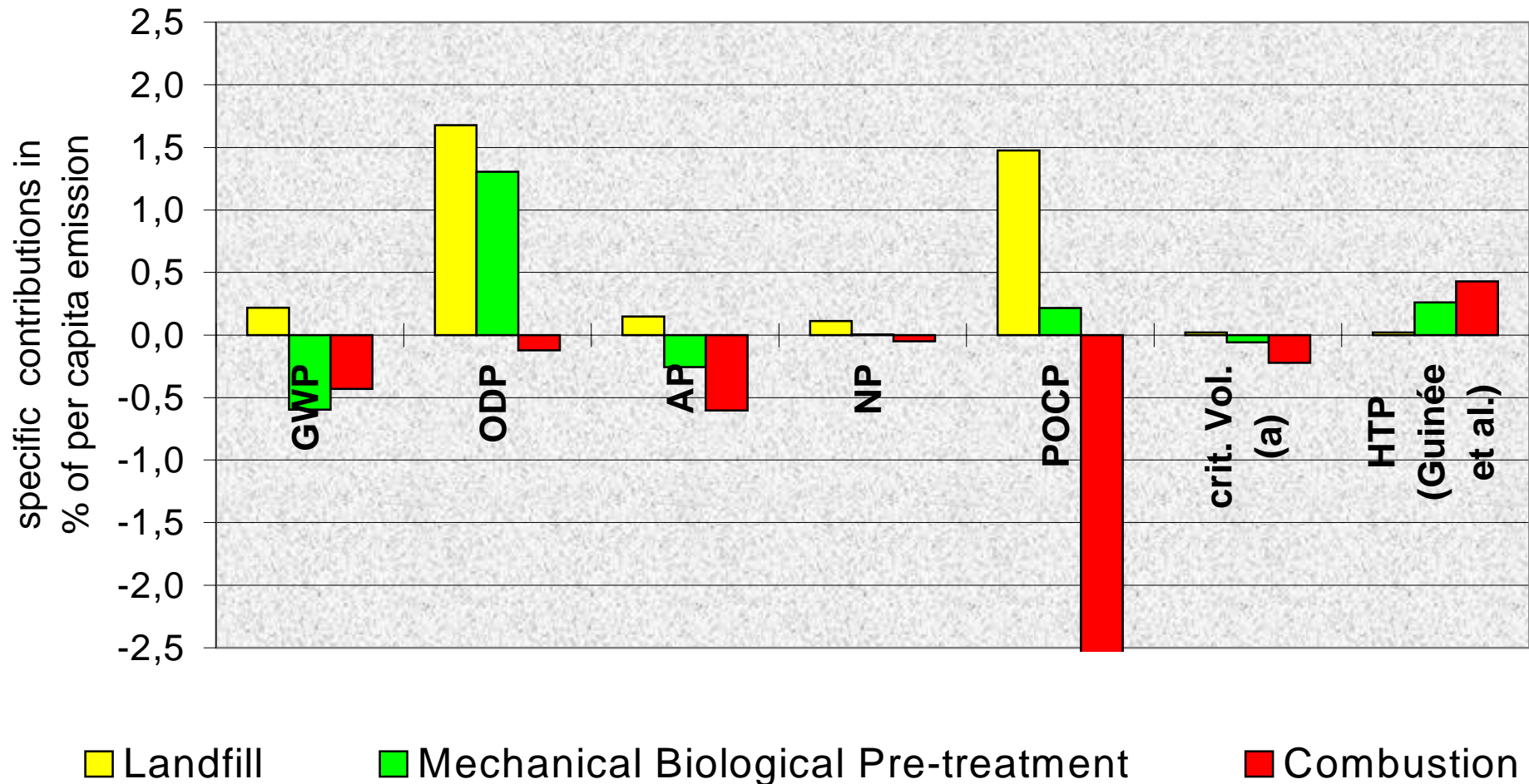
UNCERTAINTIES RELATING TO WASTE MANAGEMENT SYSTEMS



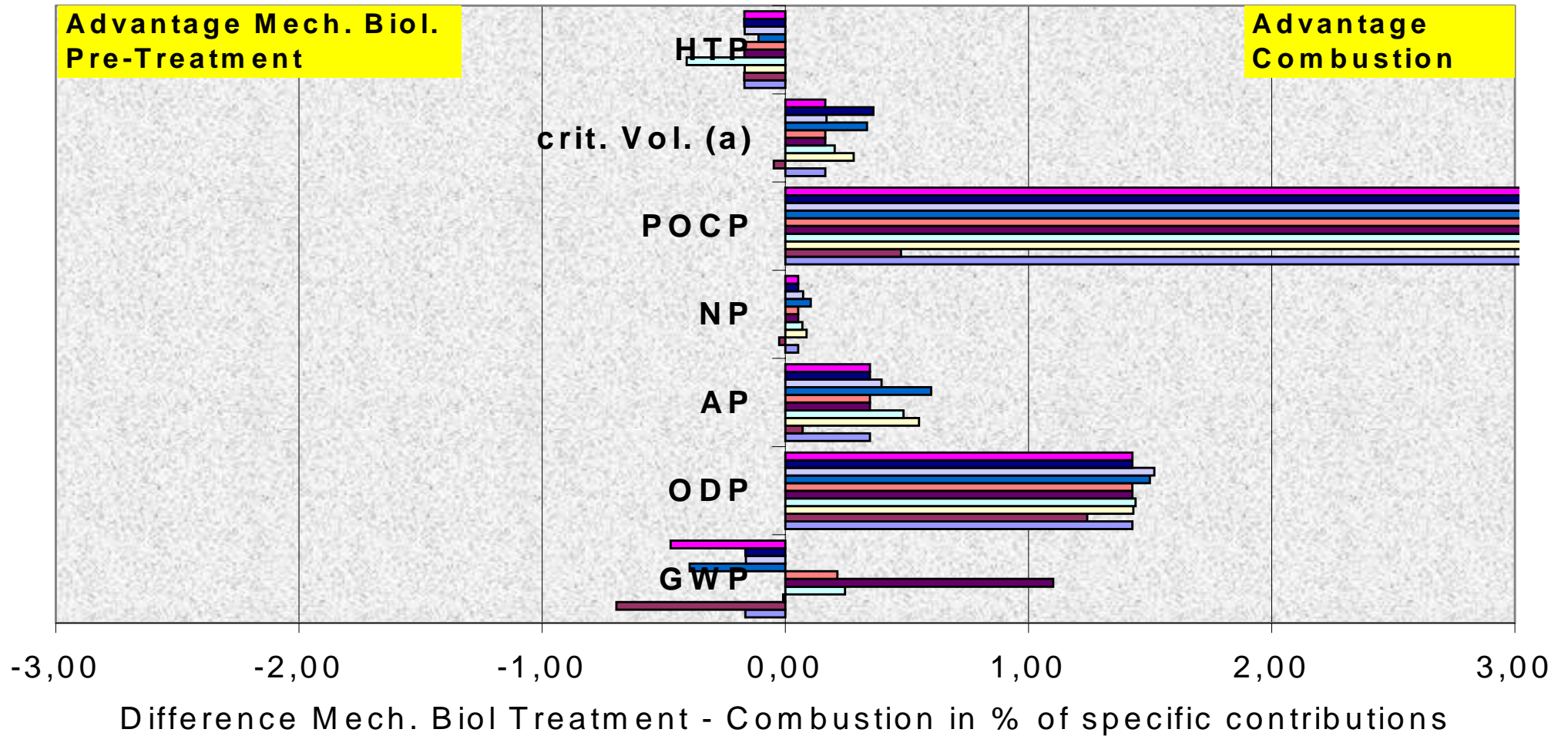
WASTE TREATMENT SYSTEMS



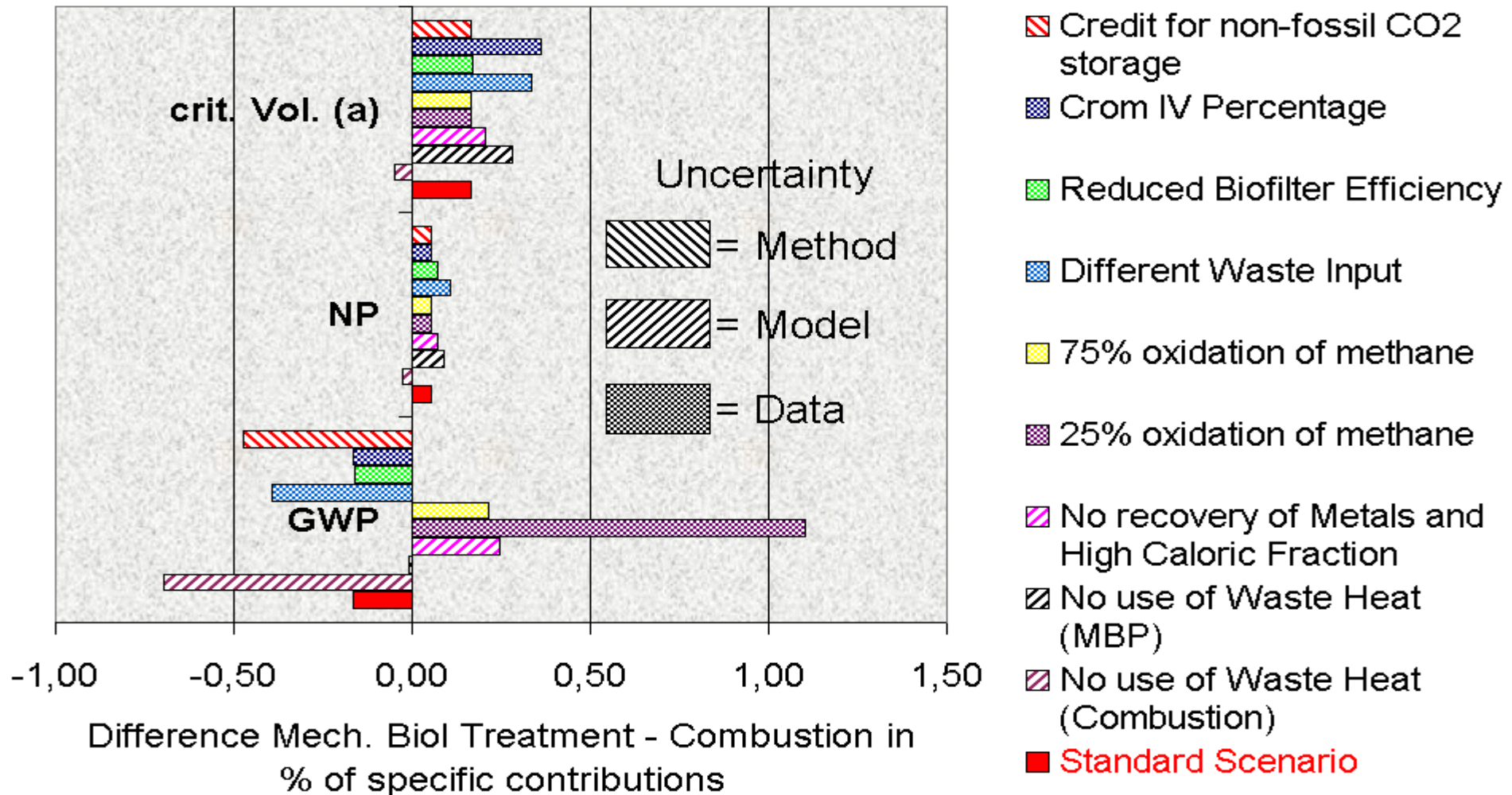
LCA OF WASTE MANAGEMENT SYSTEMS – STANDARD SCENARIOS



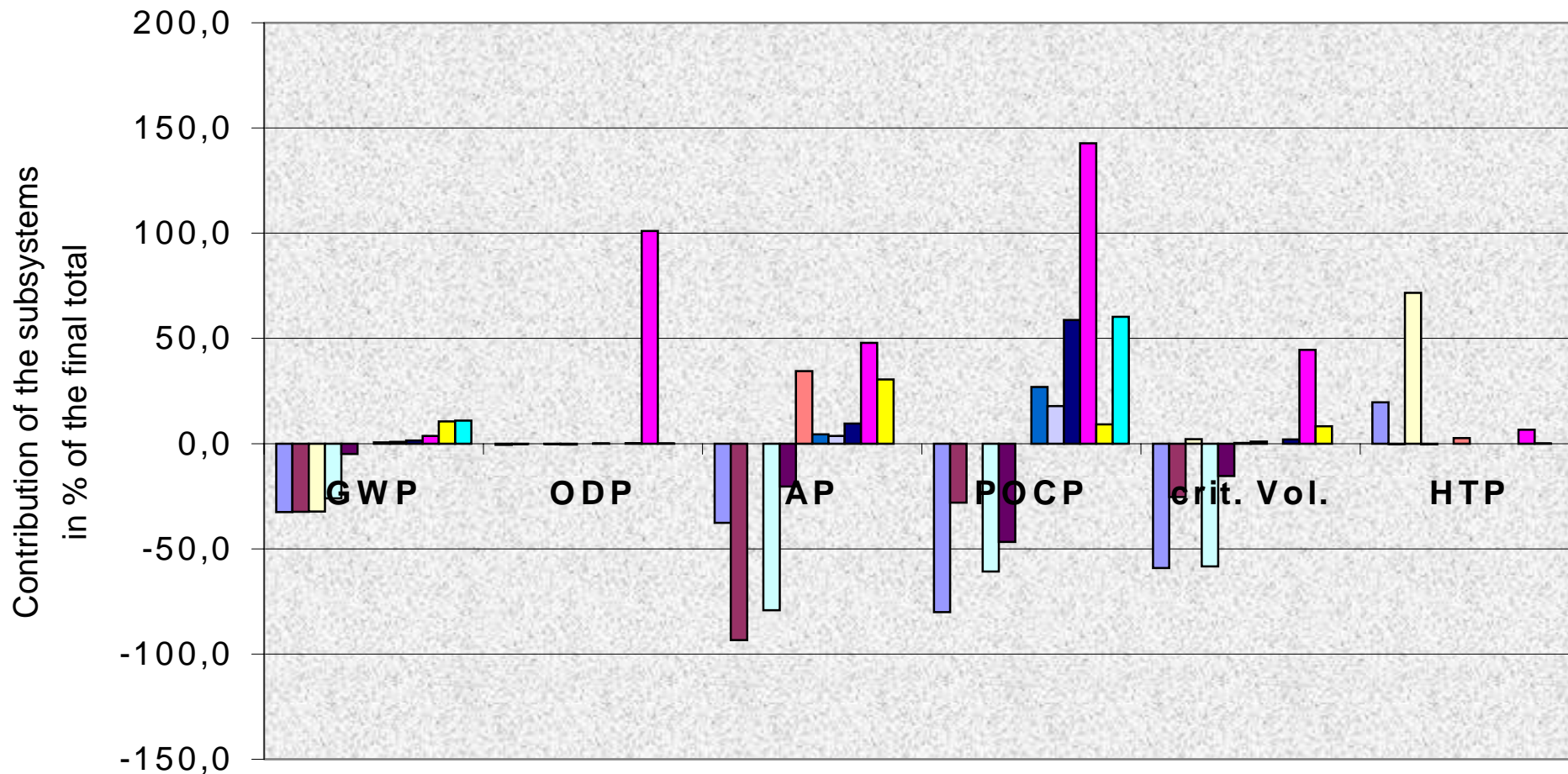
EXAMPLE OF INFLUENCE OF UNCERTAINTIES



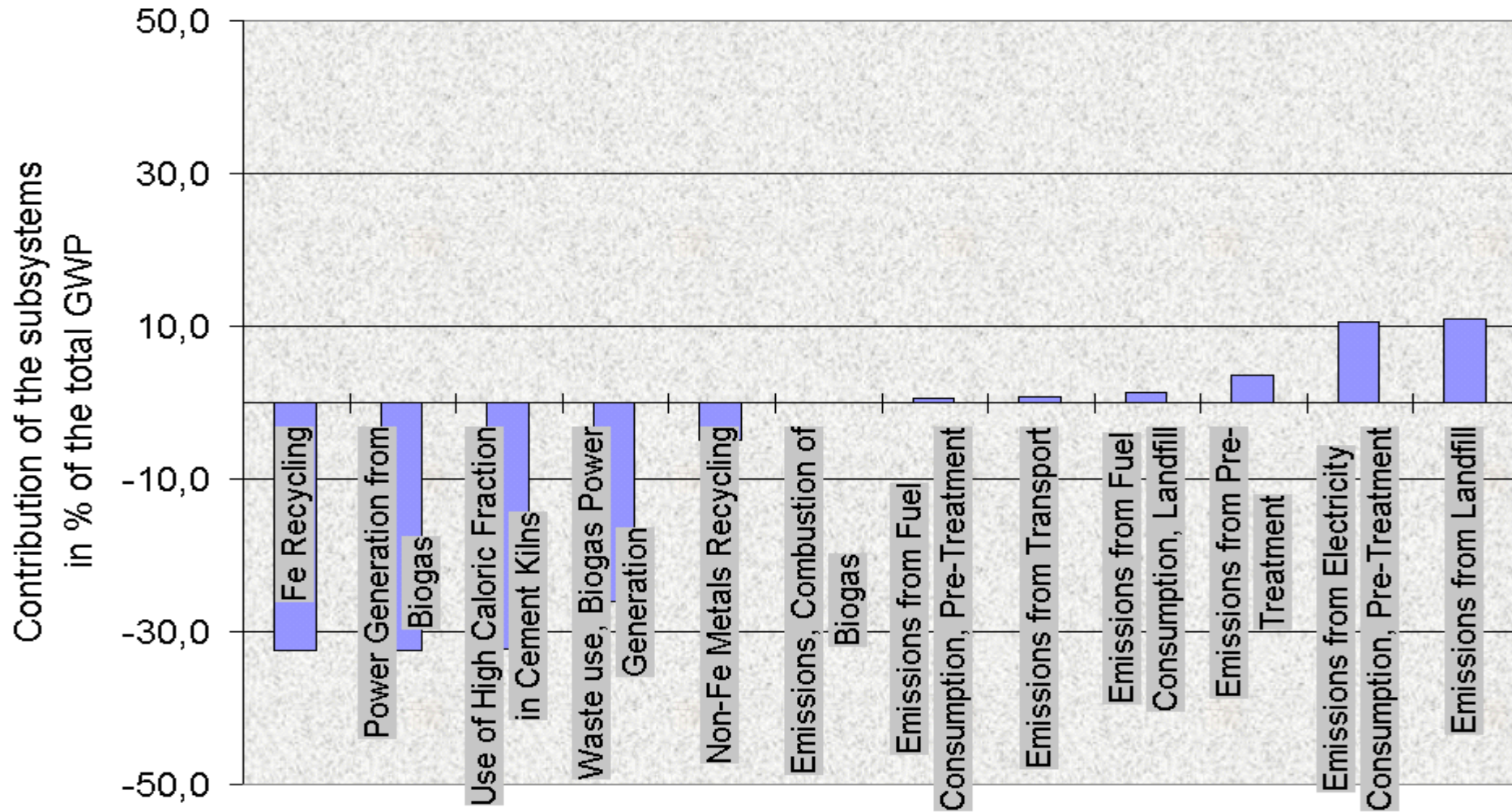
EXAMPLE OF THE INFLUENCE OF UNCERTAINTIES (continued)



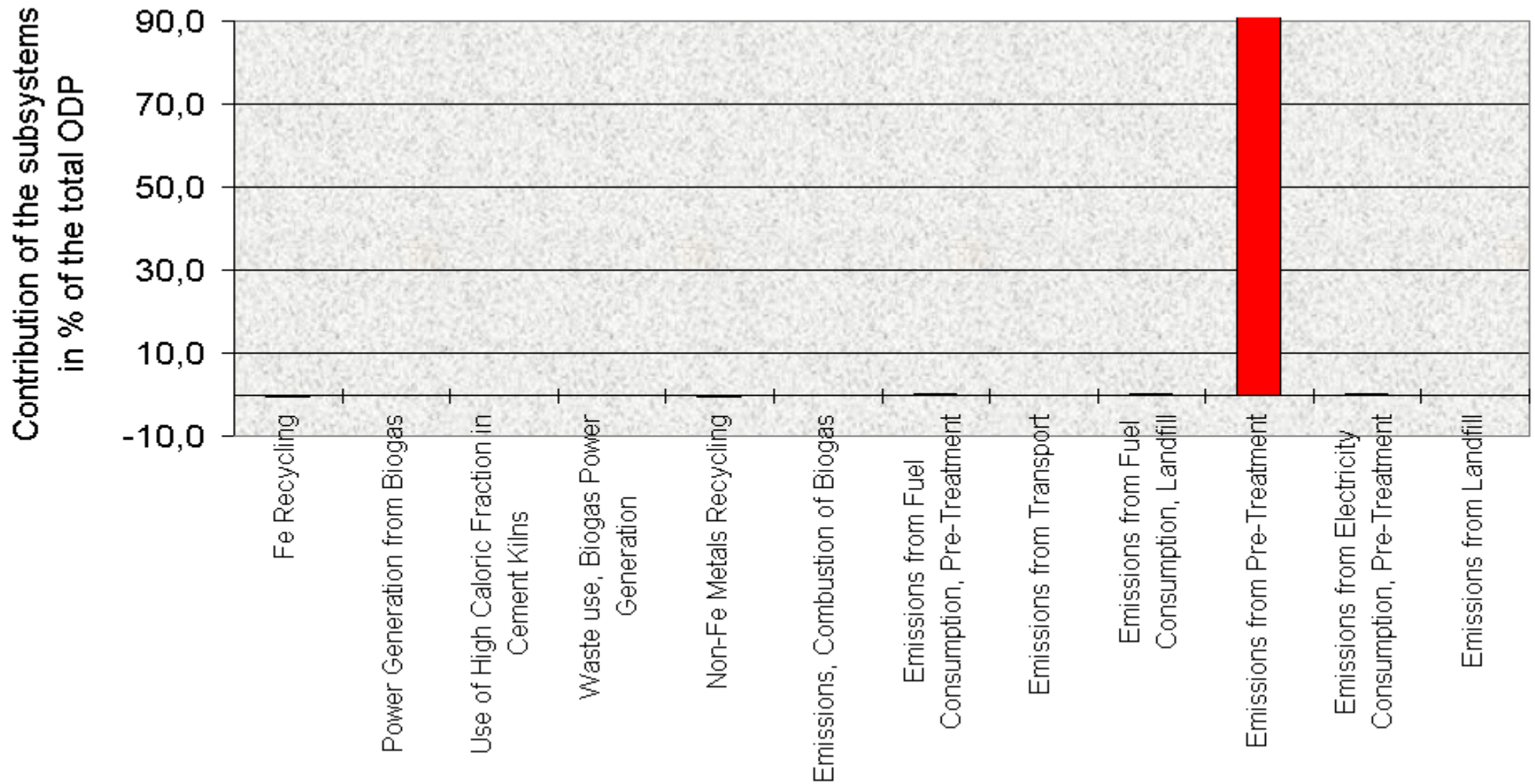
RELEVANCE OF SUBSYSTEMS



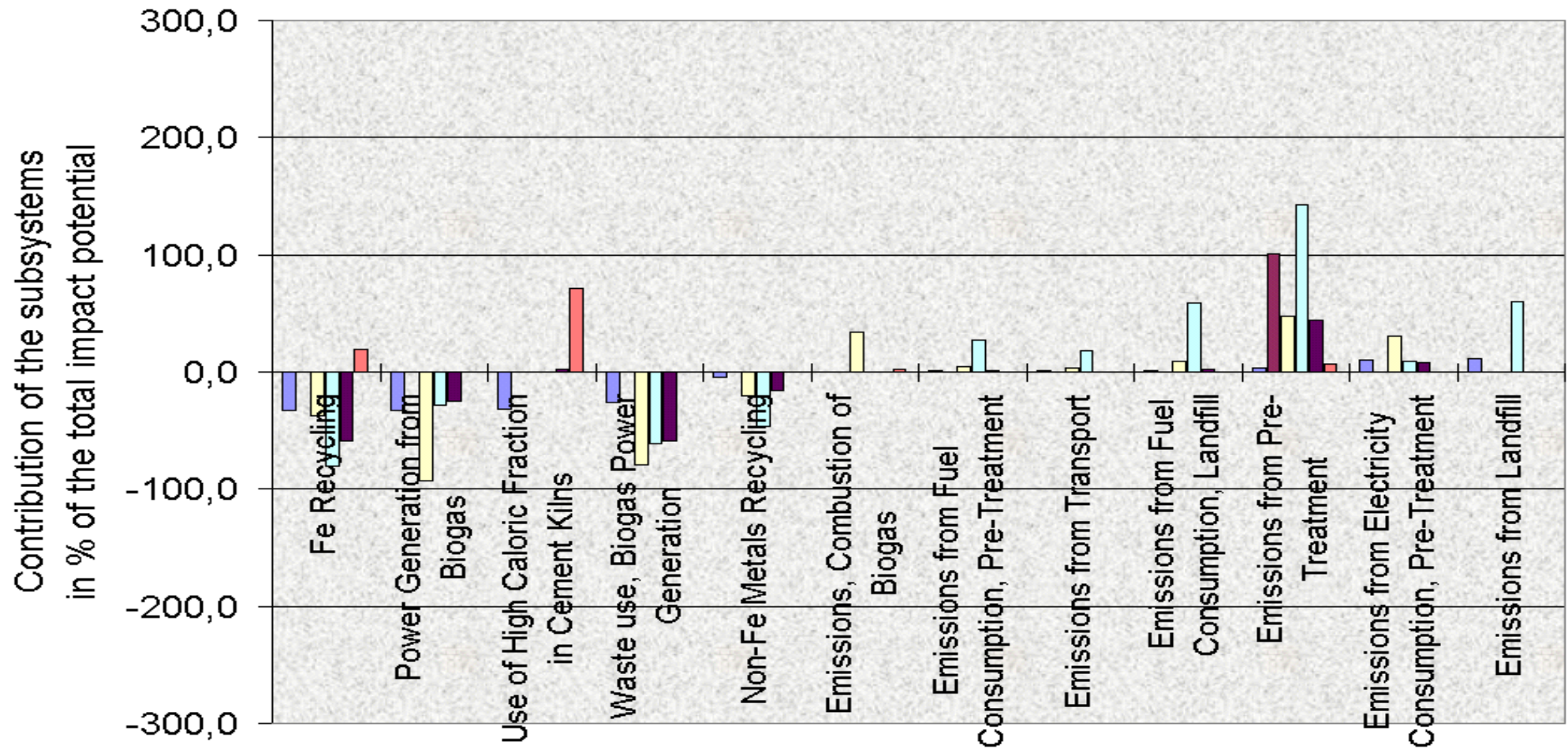
RELEVANCE OF SUBSYSTEMS - GWP



RELEVANCE OF SUBSYSTEMS - ODP



RELEVANCE OF SUBSYSTEMS (continued)

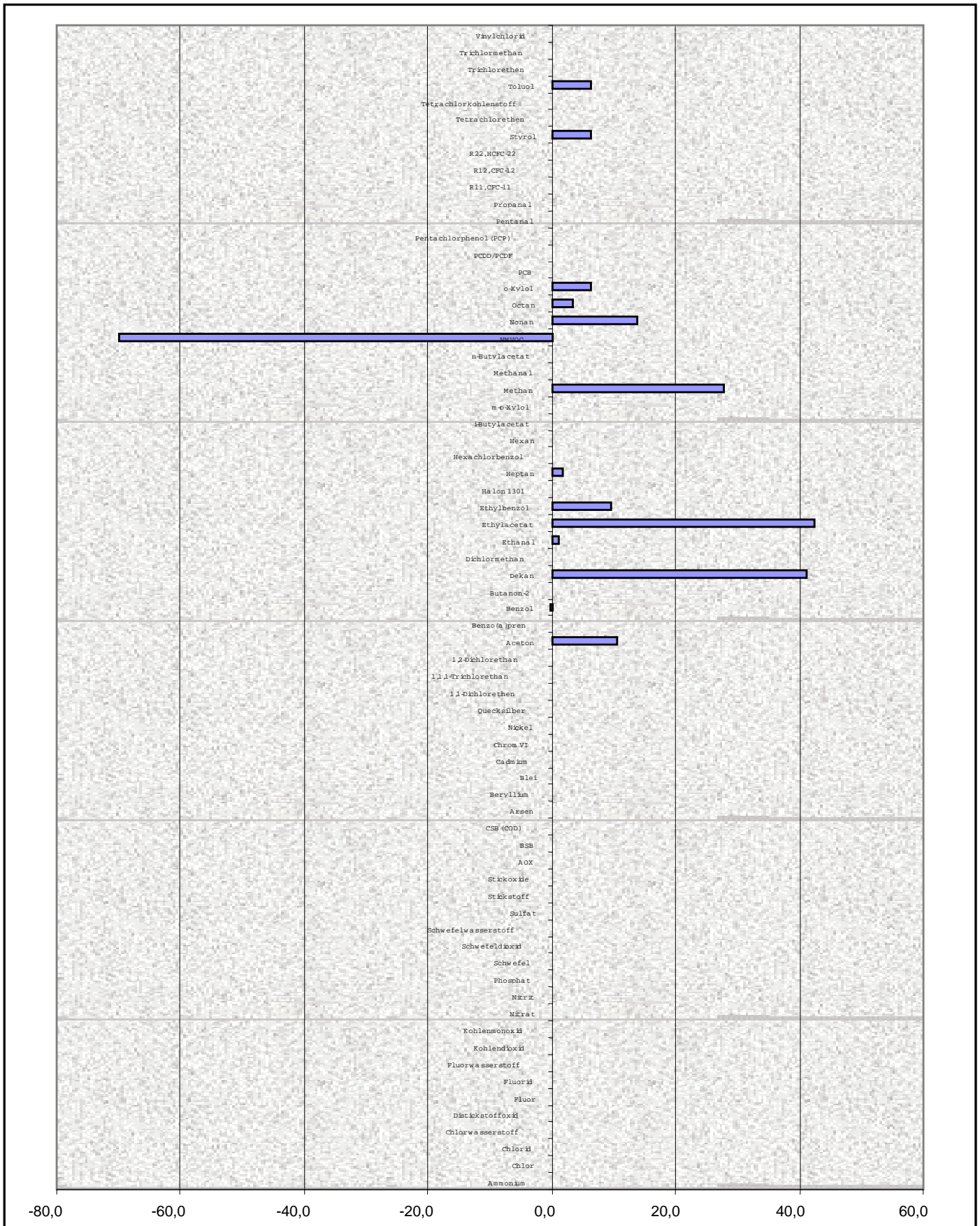


RELEVANCE OF SINGLE ELEMENTS - GWP

	Vinylchlorid		
	Trichlormethan		
	Trichlorethen		
	Toluol		
	Tetrachlorkohlenstoff		
	Tetrachlorethen		
	Styrol		
	R22, HCFC-22		R 12
	R12, CFC-12		R 12
	R11, CFC-11		R 12
	Propanal		
	Pentanal		
	Pentachlorphenol (PCP)		
	PCDD/PCDF		
	PCB		
	o-Xylol		
	Octan		
	Nonan		
	NMVOC		
	n-Butylacetat		
	Methanal		
	Methan		CH ₄
	m-p-Xylol		
	i-Butylacetat		
	Hexan		
	Hexachlorbenzol		
	Heptan		
	Halon 1301		
	Ethylbenzol		
	Ethylacetat		
	Ethanal		
	Dichlormethan		
	Dekan		
	Butanon-2		
	Benzol		
	Benzo(a)pyren		
	Aceton		
	1,2-Dichlorethan		
	1,1,1-Trichlorethan		
	1,1-Dichlorethen		
	Quecksilber		
	Nickel		
	Chrom VI		
	Cadmium		
	Blei		
	Beryllium		
	Arsen		
	CSB (COD)		
	BSS		
	AOX		
	Stickoxide		
	Stickstoff		
	Sulfat		
	Schwefelwasserstoff		
	Schwefeldioxid		
	Schwefel		
	Phosphat		
	Nitrit		
	Nitrat		
	Kohlenmonoxid		
	Kohlendioxid		CO ₂
	Fluorwasserstoff		
	Fluorid		
	Fluor		



RELEVANCE OF SINGLE EMISSIONS - POCP



CONCLUSIONS

- In LCAs of Waste Management Systems different types of uncertainty may occur.
- Each type of uncertainty needs a specific analytic approach.
- Uncertainty has a dominating influence on the results, therefore uncertainty does matter.
- To assess the quality and meaningfulness of the LCA results the influence of uncertainty must be checked and controlled by intensive sensitivity analysis.
- This requires a flexible structure of the software tool which should allow to analyze all data inputs, model assumptions and subsystems with respect to the influence on the overall results.
- Uncertainty does not necessarily reduce the quality of the LCA. Often it just reflects a fuzzy problem definition.

