CREEA: MFA and waste accounts

- **Method**: Physical supply-use tables, and
- **Case results**: waste tables

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Brussels 25th March 2014

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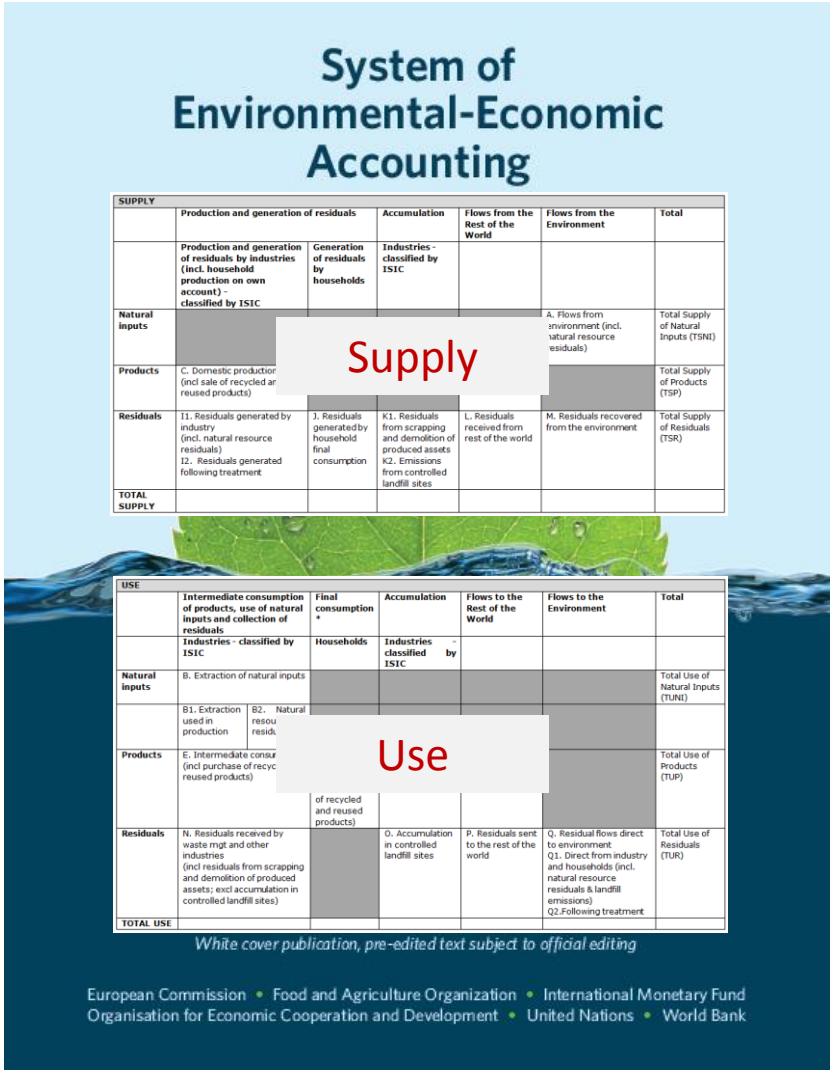
CREEA

SEVENTH FRAMEWORK PROGRAMME

2.0 LCA consultants

Physical Material supply-use tables (PSUT)

- Defined in System of Environmental-Economic Accounts (SEEA2012)



PSUT:

- **Consistent accounting framework:**
  - Economic/Physical flows
  - Same concepts and classifications
  - Supply-use framework
- **Types of flows:**
  - Resources
  - Products
  - Residuals (emissions&waste)
- **Types of activities:**
  - Industries
  - Households
  - Accumulation
  - Import/export

Beyond SEEA2012 in the CREEA-project

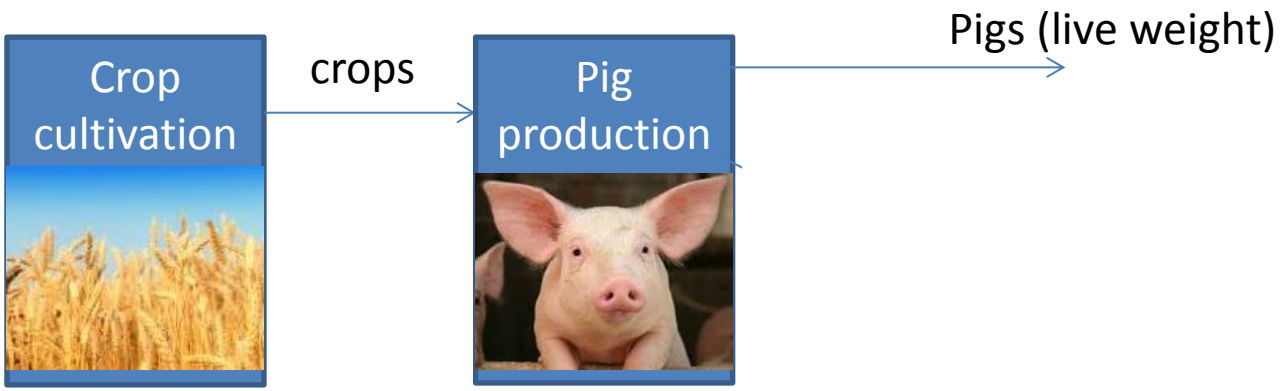
Terminology, concepts and classification

- New definitions: Distinction between products and materials for treatment
- Waste: Subset of materials for treatment
- Materials for treatment: High level of detail:
  - Most Materials for treatment can be disposed of by recycling/incineration/landfill
  - 35 waste treatment industries (reuse, recycling, incin. biogas, landfill...)
  - 18 different waste fractions

Beyond SEEA2012 in the CREEA-project

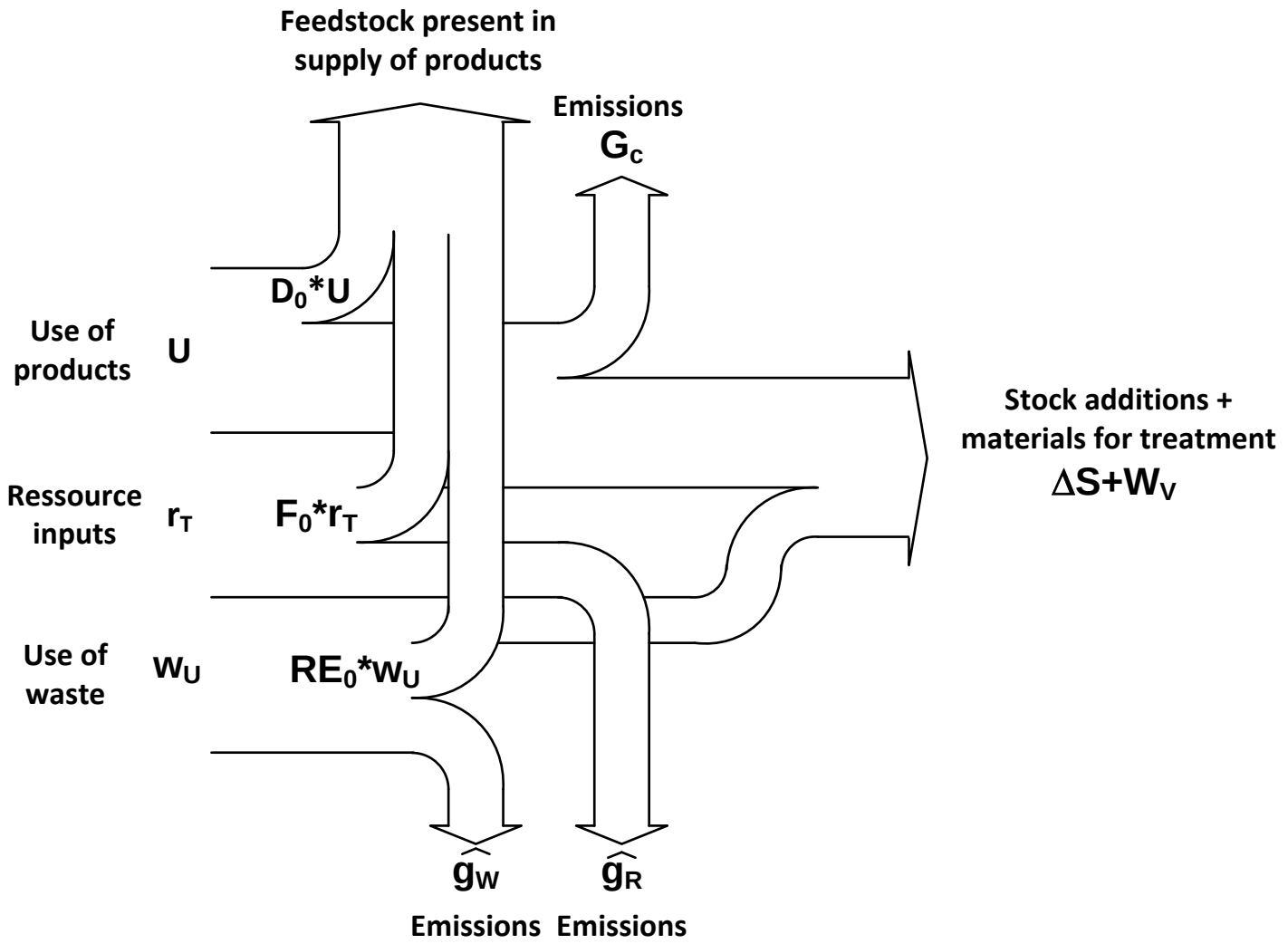
Model for accounting framework (SUT)

- FORWAST-model (EU FP6-project)
- Automated calculation of materials for treatment (waste flows)
- Materials for treatment flows are integrated in product supply and use tables

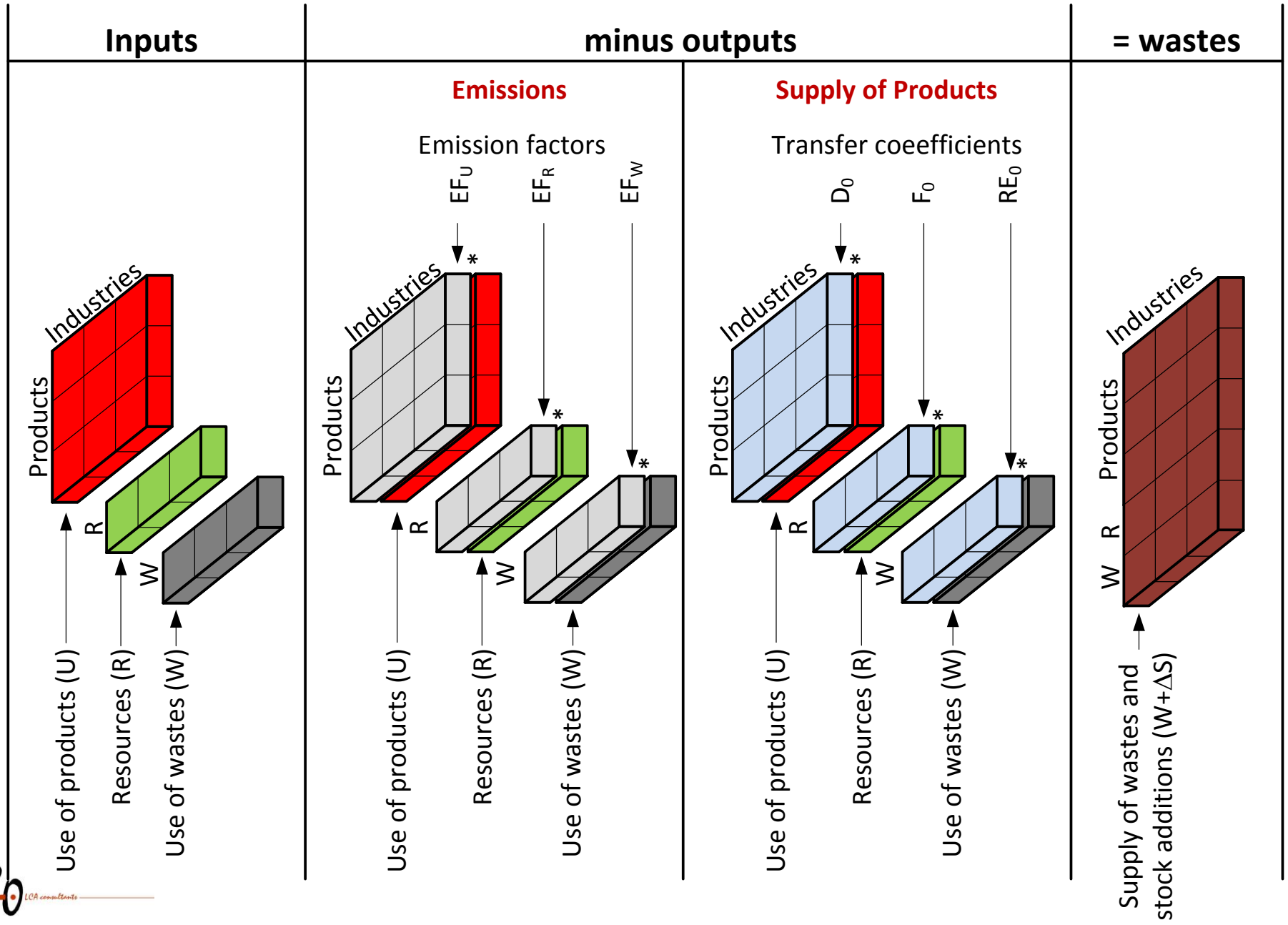


Mass balance and waste calculation

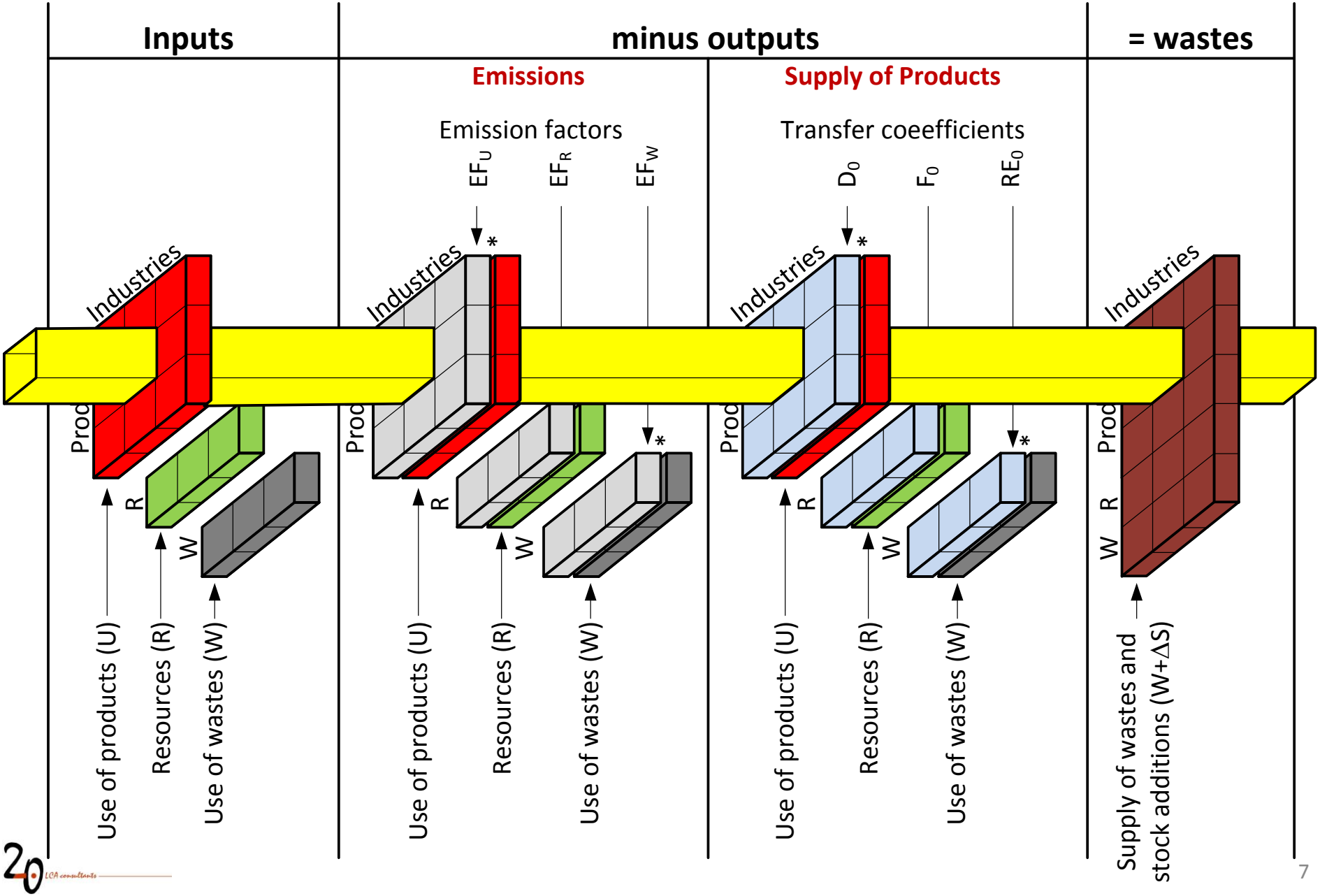
- How to calculate waste generation



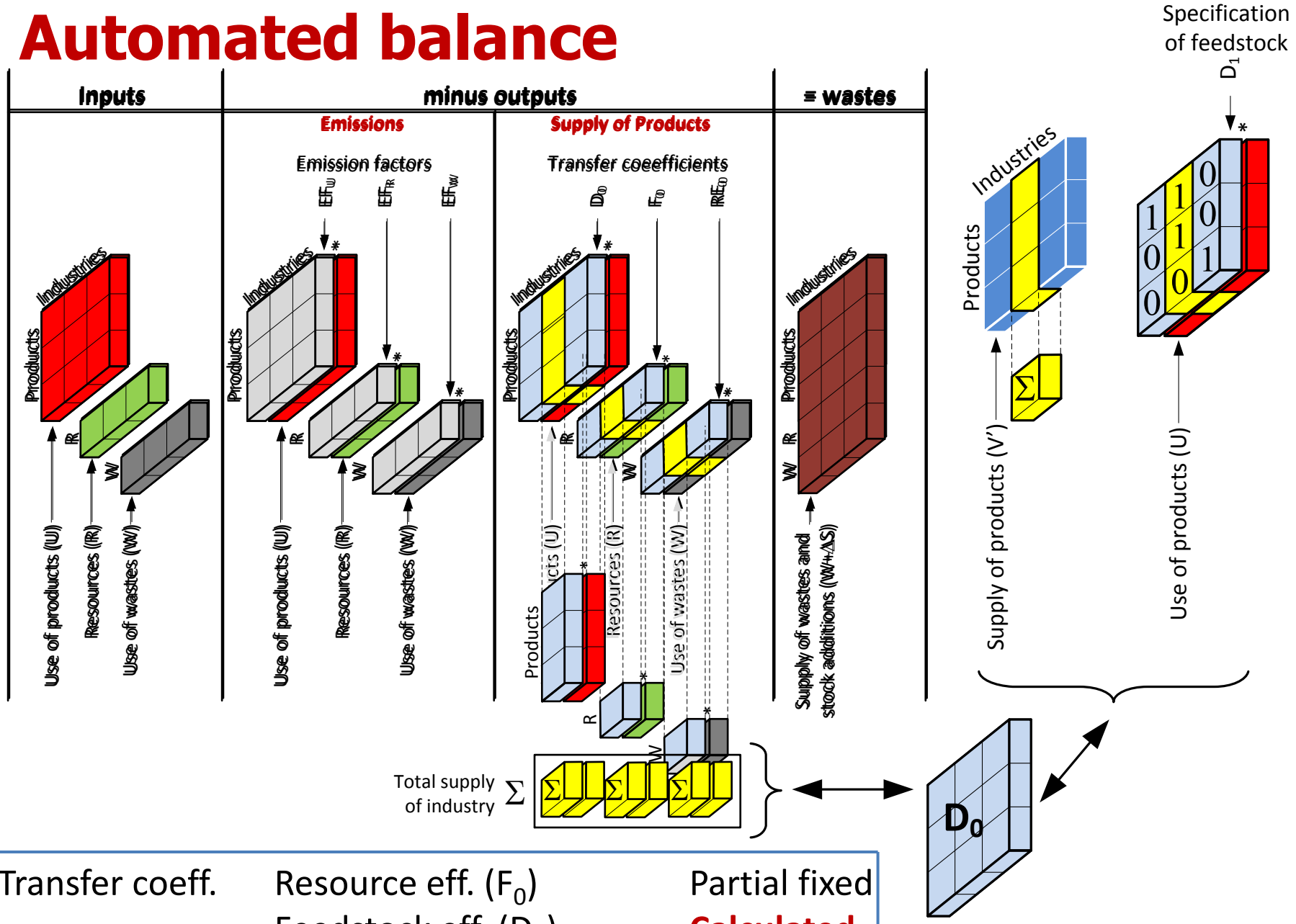
Organization of mass balance



Tracability of each element; origin of waste



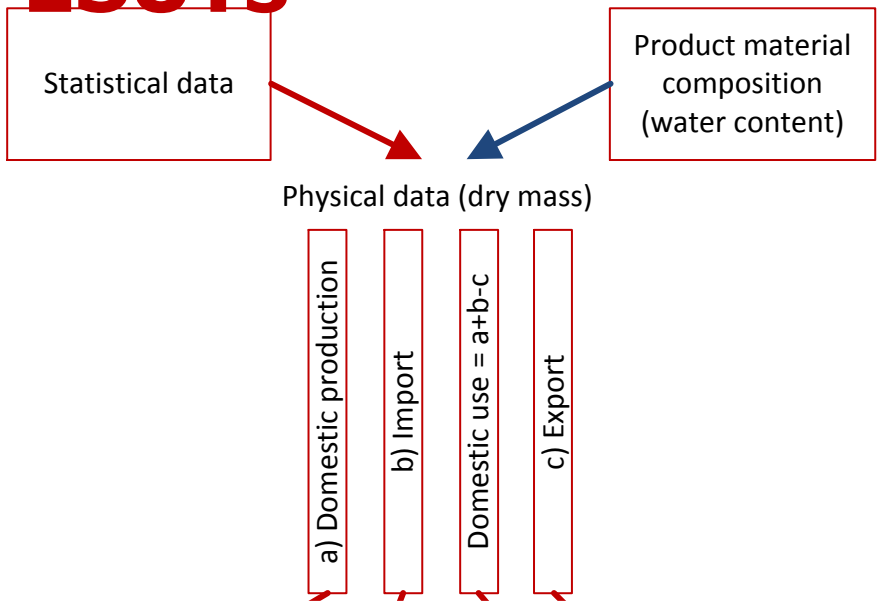
Automated balance



Transfer coeff.	Resource eff. (F_0)	Partial fixed
	Feedstock eff. (D_0)	**Calculated**
	Recycling eff. (RE_0)	Fixed

How to create PSUTs & ESUTs

- 3 steps



- Starting point
  - Dom. production
  - Import/export
  - Emission /resource factors
  - Auxiliary tables
- Draft PSUT
  - Supply and use based on MSUT
  - Parameterised emissions/resources
  - Calculated wastes and transfer coeff.
- Re-balanced PSUT
  - Optimization script
  - Negative waste and feedstock efficiencies]0;1[not allowed
  - Redistribution of use table while respecting input coefficients

PSUT conclusion (1 of 2)

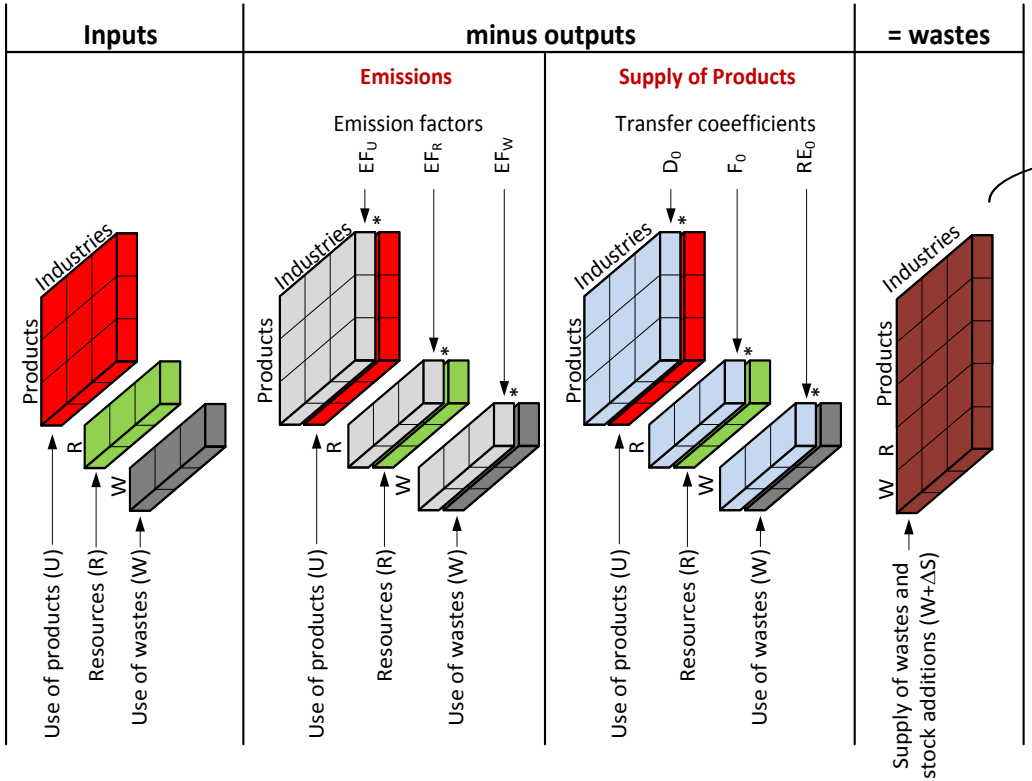
- Scope
  - PSUTs & ESUTs for 43 countries + 4 RoW regions
  - 198 products x 161 industries
  - 18 waste fractions and 35 different waste treatment activities
- Novel integration of waste flows in accounts
  - Waste = balancing item
  - Virgin production vs. recycling of materials for treatment
  - All generated waste is treated in waste treatment activity(ies)

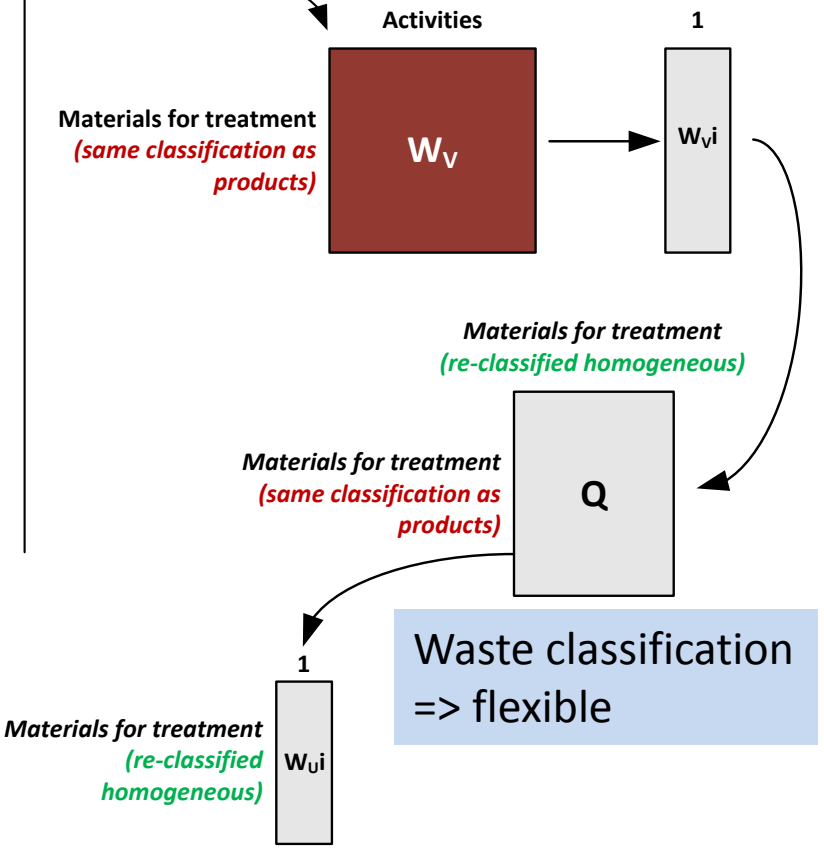
PSUT conclusion (2 of 2)

- PSUTs can be used for
  - Resource efficiency indicators; global, national, industry and product levels
  - Analysis of Unused extraction and Recycling
- New insights
  - Reveals ‘errors’ in MSUT; mass balances have a strong relationship to how real world works
- Integration of MSUT, PSUT and ESUT
  - HIOT database for:
    - Product life cycle assessment (LCA)
    - National / global production&consumption LCA
  - Allows for analysis at many levels: global, national, industry and product levels
  - Can be combined with LCA databases, e.g. ecoinvent => hybrid LCA

Case results – waste tables

- How to produce waste tables from the PSUTs?





Case results – NL waste accounts

- Waste supply use tables (aggregated)

Calculated from mass balance

Based on waste statistics

The rest (non-registered / accumulation)

Waste fraction	Supply	Use - registered	Use - non-registered
Food	7,392,666	7,392,666	0
Manure	2,903,341	2,903,341	0
Textile	968,083	387,413	580,670
Wood	3,458,295	1,592,592	1,865,703
Paper	6,850,103	4,170,366	2,679,737
Plastics	2,115,184	699,153	1,416,030
Glass	1,339,102	1,339,102	148,363
Ashes	2,904,213	1,262,575	1,641,638
Steel	2,037,483	1,625,015	412,467
Precious metals	130,294	53,417	76,877
Aluminium	1,204,076	493,639	710,437
Lead	105,078	53,006	52,071
Copper	198,520	81,388	117,132
Non ferrous	223,148	91,485	131,663
Construction	31,382,437	31,382,437	0
Oil_haz	12,623,235	2,711,527	9,911,708
Sewage	6,505,546	4,491,491	1,771,738

Sum is gross (incl. waste of waste)

Case results – NL waste accounts

- Waste supply table: Who generates waste?

Waste fraction	Agriculture, fishery	Extraction	Manufacturing industries	Construction	Electricity, gas, heat and water	Services and waste treatment	Household/ government	Import
Food	1%	0%	32%	0%	0%	11%	56%	0%
Manure	100%	0%	0%	0%	0%	0%	0%	0%
Textile	1%	0%	5%	0%	0%	8%	86%	0%
Wood	4%	0%	19%	9%	1%	24%	43%	0%
Paper	0%	0%	31%	1%	0%	39%	29%	0%
Plastics	2%	0%	15%	6%	1%	25%	51%	0%
Glass	5%	0%	19%	3%	0%	23%	50%	0%
Ashes	0%	0%	2%	0%	25%	71%	2%	0%
Steel	1%	1%	54%	10%	1%	16%	17%	0%
Precious metals	0%	0%	40%	5%	0%	11%	42%	0%
Aluminium	2%	1%	50%	7%	1%	15%	24%	0%
Lead	0%	0%	88%	1%	0%	5%	5%	0%
Copper	1%	1%	50%	10%	1%	16%	22%	0%
Non ferrous	1%	1%	56%	7%	2%	13%	20%	0%
Construction	1%	3%	13%	8%	0%	16%	59%	0%
Oil_haz	7%	0%	55%	1%	3%	11%	23%	0%
Sewage	1%	0%	5%	0%	0%	60%	33%	0%

Case results – NL waste accounts

Non-registered / Accumulation

- Waste use table: How is waste treated?

Waste fraction	Manure treatment	Recycling	Incineration	Landfill	Composting	Biogasification	Waste water	Export	Non-registered
Food			17%	2%	58%	1%	3%		20%
Manure	100%								
Textile			29%	3%					68%
Wood		26%	14%	3%		0%			58%
Paper		32%	21%	2%					45%
Plastics		14%	11%	4%					71%
Glass		100%							0%
Ashes		34%		7%					58%
Steel		66%	7%	4%					23%
Precious metals			22%	11%					67%
Aluminium			22%	11%					67%
Lead		16%	18%	9%					56%
Copper			22%	11%					67%
Non ferrous			22%	11%					67%
Construction		100%							0%
Oil_haz			7%	10%					83%
Sewage			10%	5%		3%	37%		45%

CREEA waste tables as official accounts

Can CREEA waste tables be used as official accounts?

- Currently => No! what goes in comes out
  - CREEA is a mass harvest of statistical data => errors
  - Different statistics report different data
- Outlook => Yes
  - The current approach is the right one!
  - National agencies need to verify input data