General information

WASTE TO RECOVERED FUEL

COST-BENEFIT ANALYSIS

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Waste to Recovered Fuel
Cost-Benefit Analysis

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0 EXECUTIVE SUMMARY

Recovered Fuel is a fuel of uniform quality that meets public user-oriented specifications. It is prepared from selected pre- and post-use, non-hazardous combustible waste in a dedicated process applying a quality assurance system. (Definition given in THERMIE report Fuel and Energy Recovery, DIS-1375-97-FI)

0.1 Introduction

Integrated Resource and Waste Management (IRWM), implemented in a spirit of shared responsibility, is an important means to reach a sustainable society. The maximum benefit should be extracted from primary natural resources and wastes that cannot be prevented. Although there are on-going efforts to continuously improve efficiency within all industrial sectors, the dependency on fossil fuels, especially on coal, is expected to prevail in modern society.

Despite successful prevention, waste will always be produced as a result of human activities. Waste is subject to detailed EU regulation setting binding targets for recovery, including recycling. Inorganic waste materials like glass and metals can be recovered as material in thermal processes. Organic combustible materials like wood, paper, board, plastics and rubber can be recovered both as material and as a fuel to be used for the production of heat and electricity.

The objective of this study is to evaluate the overall effects of different recovery options for non-hazardous combustible waste on national welfare, by means of Cost-Benefit Analysis. The study compares (a) dedicated incineration of mixed MSW with Energy Recovery and (b) Fuel Recovery for substituting fossil fuel in a co-combustion process to (c) direct landfill. It is acknowledged that the Commission has contracted a separate study on re-use and material recovery of packaging waste in the Union.

The present study is part of the project Waste to Recovered Fuel, which is co-funded by the ENERGIE Programme of the 5th FP of the European Commission and by an industrial consortium representing all stakeholders (contract NNE5-1999-533).

0.2 Cost-Benefit Analysis

Cost-Benefit Analysis (CBA) can be used for the assessment of sustainable integrated resource and waste management. In this study it is based on a dedicated computer model developed by GUA, Austria. The *system identification* defines boundary limits for material and energy balances. It includes all relevant waste management operations, as well as all primary production processes, which may be utilised for recovery purposes. The *functional unit* used in this CBA is Euro per person and year.

Internal costs are defined as fixed and variable direct costs related to the processes. External costs are defined as costs of all direct and indirect environmental and social impacts related to the operation. Emissions are translated into monetary units by applying the principle of *averting costs*. These are defined as (known) process costs, necessary to reduce emissions to a specified level. The processes applied are those reducing the relevant emissions most cost-efficiently.

The CBA calculation gives the total system costs, internal and external, of an analysed recovery scenario, including the avoided costs of the corresponding substituted primary production processes.

The Cost-Benefit Balance (CBB), the difference in cost between the baseline scenario and an analysed scenario, is the final result of CBA. A positive figure means an overall cost benefit compared to the baseline scenario. Comparison of several CBBs advises on the most economic solution.

0.3 Basic assumptions and scenarios

In this CBA the *analysed scenario* identifies the detailed input and output parameters of a specific system. 45 separate data combinations are analysed in the study.

Fixed parameters are: number of citizens (500,000), number of households (200,000), fraction of multi-family houses (50 %), fraction of single family houses (50 %), amount of combustible waste from industry and trade (100 kg/person/year), size of MSW incinerator (150,000 t/year), energy efficiency at co-combustion (same as for primary fuel), free access to deliver electricity to the grid and sufficient solid fuel consumption to be substituted by recovered fuel.

Variable parameters (low, medium, high) are: amount of MSW per person, share of bio-waste, share of packaging waste, efficiency of separate collection, collection system used, energy recovery efficiency at MSW incineration, cost level of labour and investments as well as demand of district or process heat. These are combined to form three Model Regions, basically representing the situation in South, Central and North Europe.

The Energy Recovery case assumes a modern MSW incineration plant equipped with different energy conversion systems where the energy produced substitutes energy from primary sources, i.e. coal (I-coal), fossil natural gas (I-gas) or a European mix of primary energy sources (I-mix). Electricity efficiency in condensing mode is 25 % based on the lower heating value of input fuel. Overall energy efficiency for production of combined heat and power (CHP) is 80 % (up to 100 % for a plant with flue gas condensation).

The Fuel Recovery case includes three basic processes for the production of recovered fuel from selected non-hazardous combustible waste, i.e. low yield in the form of fluff (FP-1), medium yield in the form of soft pellets (FP-2) or high yield in the form of hard pellets (FP-3). The storable fuel may be used in four different combustion technologies, i.e. Cement Kiln (CK), Circulating Fluidised Bed (CFB), Pulverised Coal (PC) or in gasification with consequent combustion of the gas in PC (gasPC). All operations are “state of the art” fulfilling European legislation. Energy efficiencies are assumed to be unchanged for a reasonable range of 5 – 30 % primary fuel substitution.

The *Baseline Scenario* is the reference that does not contain the studied fuel and energy recovery processes. It is direct landfilling of all wastes not being recycled as in the analysed recovery scenarios. The landfill operation fulfils the technical requirements of the Landfill Directive and is equipped with energy recovery from landfill gas. The examination period of landfilling is 10,000 years, since also long term effects are considered in the CBA.

The averting costs used for air- and water pollutants[1] are evaluated by the Institute of Public Finance and Infrastructure Policy at the Vienna University of Technology. They are derived from the averting costs quoted in recent scientific literature. The costs applied for Hg and Pb emissions are proportionate to the averting costs of Cd according to their toxicity for humans.

0.4 Results

From the 45 analysed data combinations 5 principal scenarios are selected for presentation here. Data for the baseline, landfill and incineration scenarios as well as for primary processes are derived from the GUA data bank. Data for the fuel recovery scenarios, low, medium and high yield, are acquired from the operations of Essent Milieu VAM in the Netherlands, Trienekens AG in Germany and Ewapower in Finland respectively.

The mass balances (figure 1) show the diversion of combustible waste from landfill. For the scenarios involving incineration only process ashes are landfilled. The high yield fuel preparation, combined with organic recovery of biowaste, and consequent landfilling of rejects, meets the Landfill Directive targets.

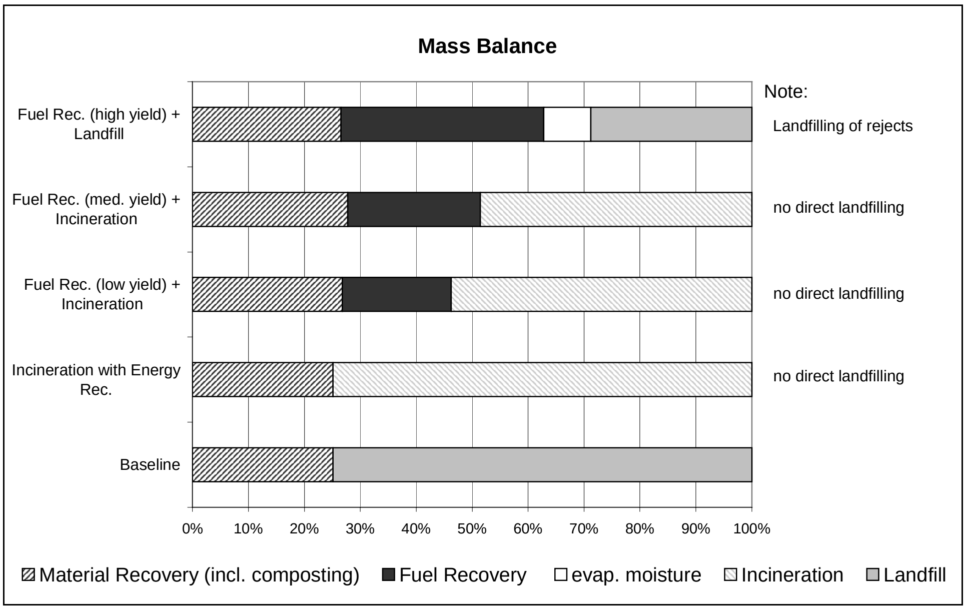

Figure 1: Mass balances of selected scenarios.

The energy balances give the amounts of electricity and heat produced. The amount of electricity varies significantly amongst the cases (figure 2).

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[1] air pollutants: $CO_{2\ bio}$, $CO_{2\ foss}$, CH_4, CO, SO_2, HCl, NO_x, NMVOC, Dust, CFC, Cd, Hg, Pb; water pollutants: COD, NH_4, Cd, Hg, Pb.

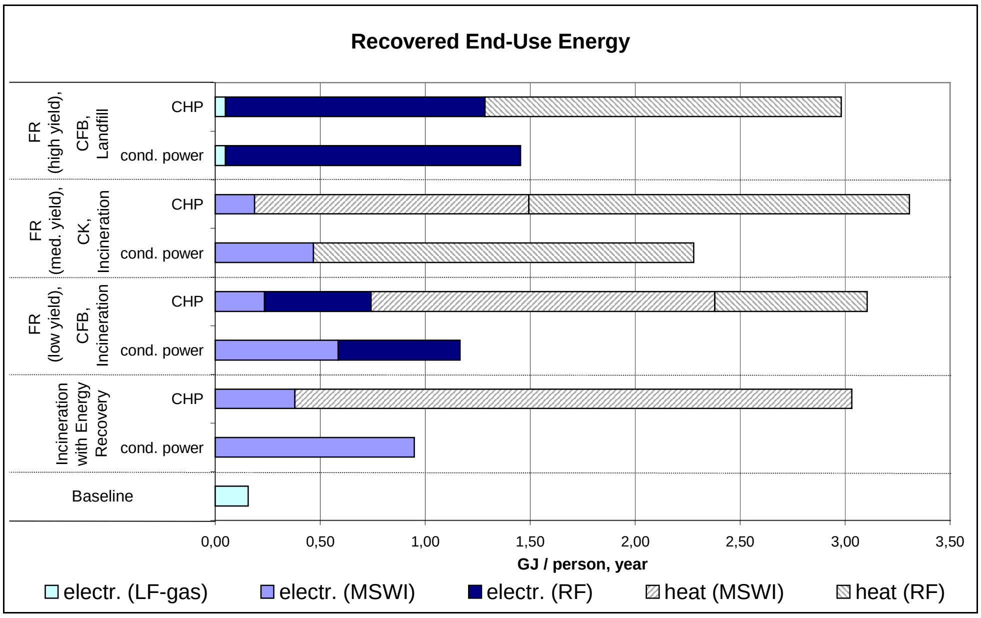

Figure 2: Production of end-use energy in selected scenarios

Regarding emissions of greenhouse gases (Global Warming Potential, GWP, figure 3) Energy Recovery and Fuel Recovery save 50 - 300 kg CO_2 equivalents per person and year. This corresponds to 20 - 50% of the total GWP of substituted primary production. In comparison with the baseline scenario, direct landfilling, as much as 250 - 500 kg CO_2 equivalents can be saved. The main reduction of greenhouse gases results from the substitution of fossil fuels (fossil CO_2 emissions) and from the diversion of biodegradable waste from landfill (CH_4 emissions).

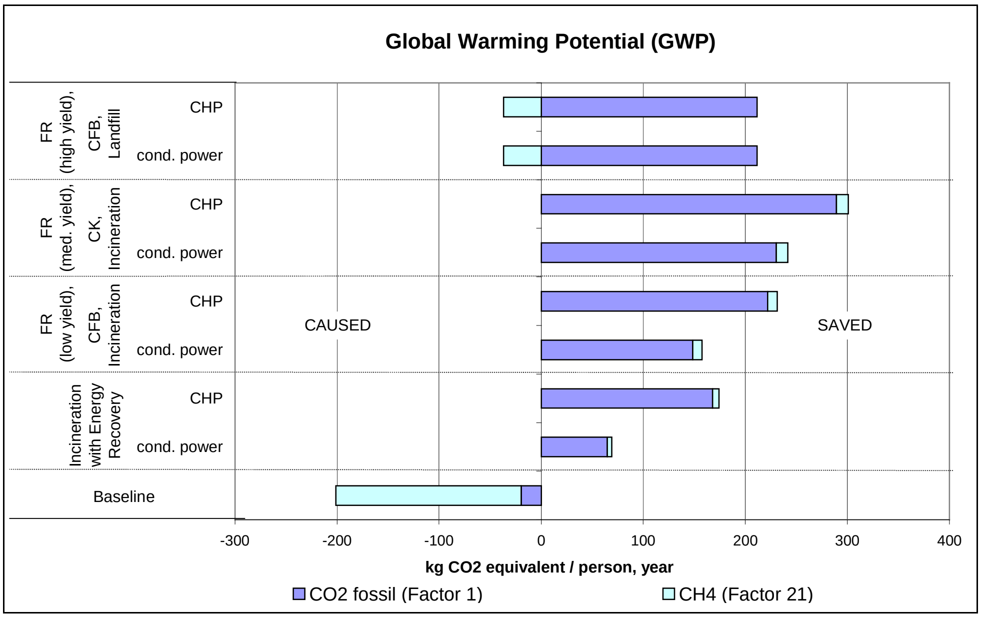

Figure 3: Global warming potential for selected scenarios

The final macro economic benefit (figure 4) is highly influenced by the total amount of energy produced. The model does not distinguish between the production of electricity and heat. Most favourable is the substitution of coal. Condensing power (electricity only) from dedicated MSW incineration, which substitutes electricity from fossil gas, does not give a macro economic benefit.

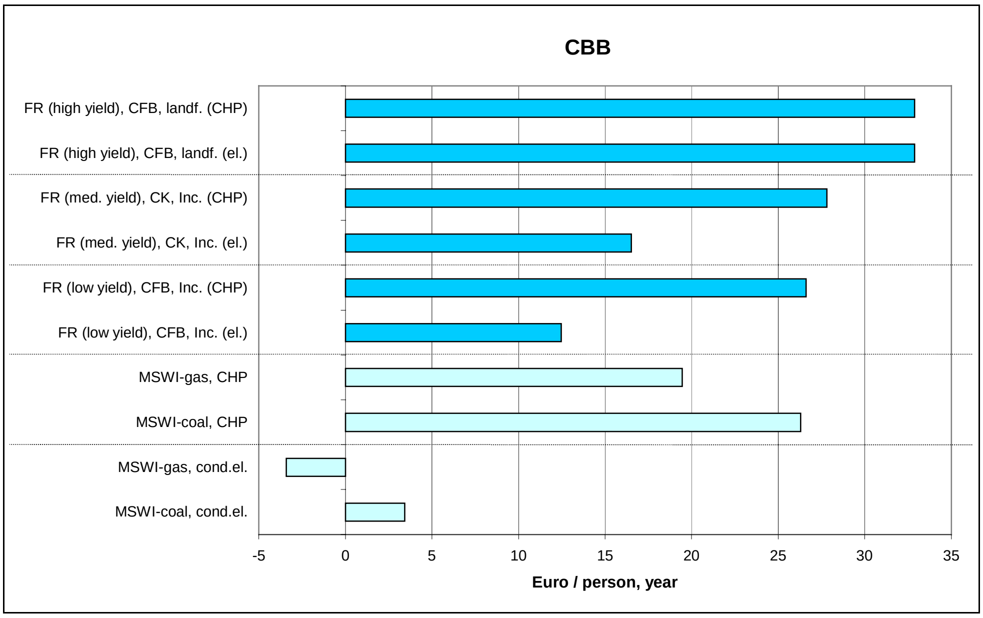

Figure 4: Cost-Benefit Balance of selected scenarios compared to landfill.

The study shows clearly that the internal costs of direct landfilling are lower than the internal costs of any recovery operation. However, when including external costs the results change, and both Energy Recovery and Fuel Recovery show a benefit for the Society in the order of 5 – 30 Euro per person and year. This is mainly due to averting costs for emissions from landfill and to averting costs for fossil CO_2 emissions, saved through energy and fuel recovery. 50 % of the combustibles in MSW is considered to be of biogenic origin.

The study shows even better results for high yield fuel preparation for co-combustion in pulverised coal power plant. However, the economy of fuel pulverisation technology is not yet proven for recovered fuels in general, so these results are not as valid as those for cement kiln and fluidised bed combustion.

0.5 Conclusions

The cost-benefit analysis undertaken concentrates on the management of residual waste from households and commercial/industrial facilities after secondary materials have been separated for eco-efficient recycling.

Averaged over all scenarios and regional conditions investigated (45 data sets), the annual economic benefit that can be achieved for the national welfare is in the order of 15 - 40 Euro/person. The study shows that fuel and energy recovery can save 2 - 5 GJ/person (= 50 - 125 kg of oil equivalent). This corresponds to some 10 % of the solid fuel consumption and to 2 - 4 % of total fossil fuel consumption in Europe. It is a significant contribution to the Kyoto targets.

The main conclusions of the CBA are:

- All recovery scenarios show a significant reduction of greenhouse gas emissions, carbon dioxide and methane, compared to the baseline scenario, landfilling. The reduction is proportionate to the diversion of combustible waste from landfill and yield of recovered fuel.
- All the recovery options studied give an economic benefit to the Society, except the one where electricity generated by waste incineration substitutes electricity generated by a gas fired power plant.
- The more Recovered Fuel that can be diverted to energy production, the higher the benefit. The fuel recovery options are generally a little better than the incineration options with energy recovery.
- Fuel recovery is especially well suited in sparsely populated regions where relatively small decentralised fuel production plants can deliver recovered fuel to existing power plants or plants for production of material products.
- For larger cities or regions with an existing incineration plant, a combination of fuel recovery combined with direct incineration with energy recovery seems to be a preferred option.

0.6 Discussion

For practical reasons, the Cost-Benefit analysis is based on average available data processed by a dedicated computer model that builds on previous experience and work of GUA.

A sensitivity analysis (figure 5) based on “medium assumptions” (averaged over all Model Regions investigated) shows how the results of this CBB are influenced by variation of with input parameters.

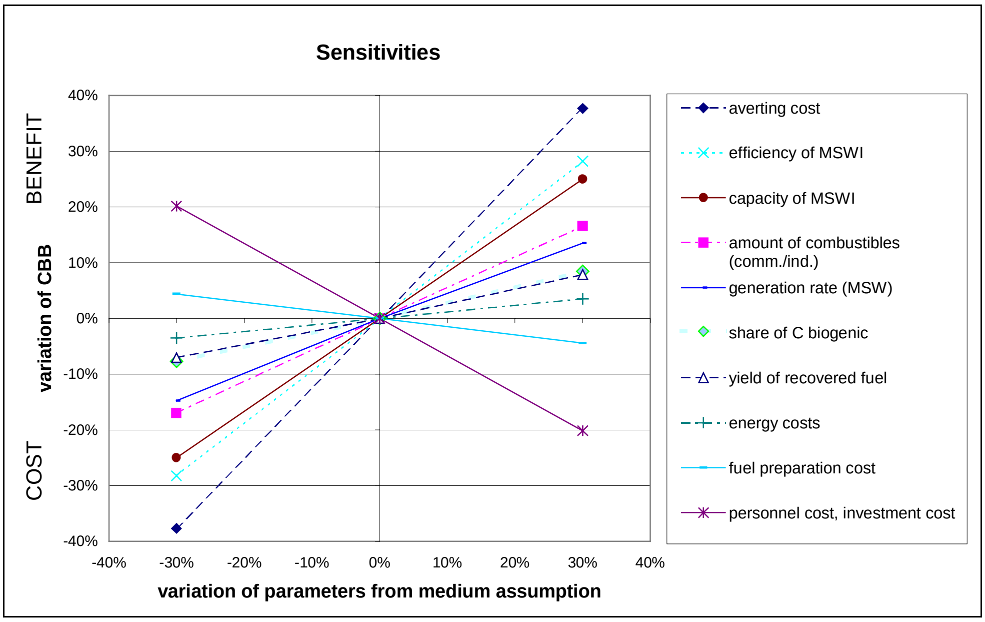

Figure 5: Sensitivity of CBB

The significance of input parameters to the results can be grouped in the following order:

1. The (external) averting costs have the greatest influence on the results. They affect landfilling the most, because of the long calculation period, 10,000 years, without discounting. A calculation period of 100 years for landfilling roughly reduces the results by one third, but does not change the overall conclusions or affect the internal ranking of the analysed recovery scenarios.
2. The energy efficiency and size of the MSW incinerator. The influence of (direct) labour and investment costs are also high. It is noted that Fuel Recovery in general is a decentralised option involving smaller units, more job opportunities and less investment compared to dedicated MSW mass burn facilities.
3. The amount of waste and especially the amount of non-recyclable combustible waste. This makes Fuel Recovery a favoured option in industrialised regions.
4. The share of biogenic carbon in combustible waste and the yield of recovered fuel have a less significant influence on the results.
5. The (direct) costs of primary energy sources and of recovered fuel production affect the results only to a minor degree.

1 Introduction and Objective

Sustainable Development and Growth can be achieved in a concept of Integrated Resource and Waste Management (IRWM) implemented in a spirit of shared responsibility. The efficiency of primary production processes and the resulting products shall be continuously improved. Waste shall be used as a resource as far as economically sensible. This is also underlined as priorities in the European Waste Strategy – prevention, recovery and safe final disposal.

Organic natural resources are used for energy and material products alike. Despite improvements of efficiency in all sectors, the dependency on fossil fuels, especially on coal, will prevail in modern society. Waste management is developing rapidly in the direction of segregation and separate treatment of waste fractions, e.g. bio-waste, combustible waste and inert waste.

Inorganic waste materials like glass and metals can be recovered as material in thermal processes. Organic materials like wood, paper, board, plastics and rubber can be recovered as material or energy. Although the latter replaces primary fossil fuels in production processes it is perceived to be a secondary ranked option - an opinion which is supported by many limited Life Cycle Analyses.

The objective of this study is to evaluate the overall effects of different recovery options for combustible waste on national welfare, by means of Cost-Benefit Analysis. The study is limited to energy recovery and fuel recovery (supplemented by organic recovery) compared to landfill disposal as illustrated in figure 1. It is part of the project Waste to Recovered Fuel, which is co-funded by the 5th Framework Programme of the European Commission and an industrial consortium representing all stakeholders involved. It is acknowledged that the Commission has contracted a separate study on re-use and material recovery of packaging waste in the Union.

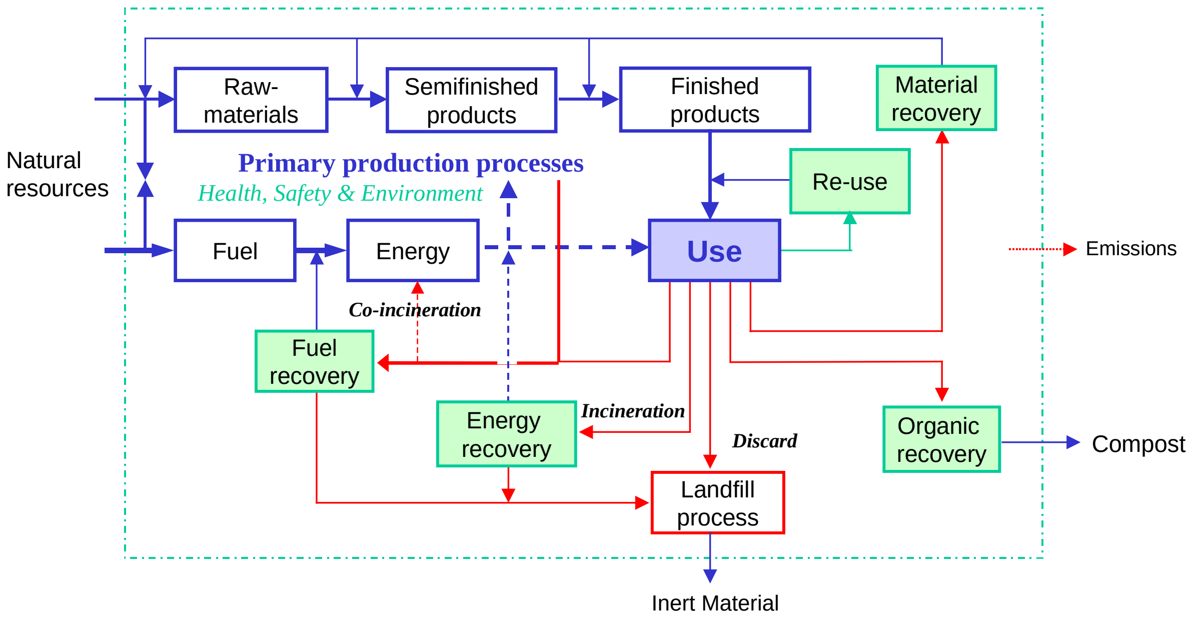

Figure 6: System boundaries for Integrated Resource and Waste Management

2 THE METHOD OF COST-BENEFIT ANALYSIS

Cost-benefit analysis (CBA) represents a helpful tool in yielding clear results for complex multi-faceted issues. It provides objective and reliable indicators which are comprehensive and equitable. This provides an opportunity for consensus between all stakeholders involved and for better legislation through better dialogue. Richard D. Morgenstern, a former leading official of the EPA in Washington DC, once stated: "Economic analysis may be the worst approach to environmental policy making except for all the others that have been tried."

The method of CBA is able to connect ecological aspects with business economy in comparable units. All relevant environmental externalities are transformed into monetary units as far as possible. This considerably facilitates the calculation of an integrated result.

Effects that cannot be expressed in monetary units are at least described adequately with respect to their relevance and are integrated beside the results of CBA into the final weighing considerations of a decision making process.

The methodology of CBA applied to this study has been developed by two Austrian institutions, the private consulting company GUA and the Institute of Public Finance and Infrastructure Policy at the Vienna University of Technology. The cost-benefit analysis of GUA-IFIP represents a coherent methodology which can purposefully be applied to various problems in practice.

The realisation of the CBA applied to this study is divided into several steps.

- identification of the system
- definition of model regions
- definition of scenarios
- calculation of the cost-benefit balance (CBB)
- presentation of results
- sensitivity analyses
- conclusions

3 SYSTEM IDENTIFICATION

The first step of cost-benefit analysis is a clear identification of the system to be investigated.

The objective of CBA (as part of the project Waste to Recovered Fuel) is to identify the macro economic role of fuel and energy recovery within the concept of integrated resource and waste management. For the system identification this means that the particular outline of an integrated resource and waste management system has to be described comprehensively. Within IRWM, however, CBA concentrates on the investigation of the integrated waste management system. According to the terminology of CBA the integrated waste management system is also named the "analysed system".

The system identification focuses on the processes which are part of the analysed system (integrated waste management system). In addition, processes which are in interaction with the analysed system are identified also. Such processes are so called "primary processes" and "substituted processes". Primary processes and substituted processes, which can be saved, are summarised in the system of substituted primary production.

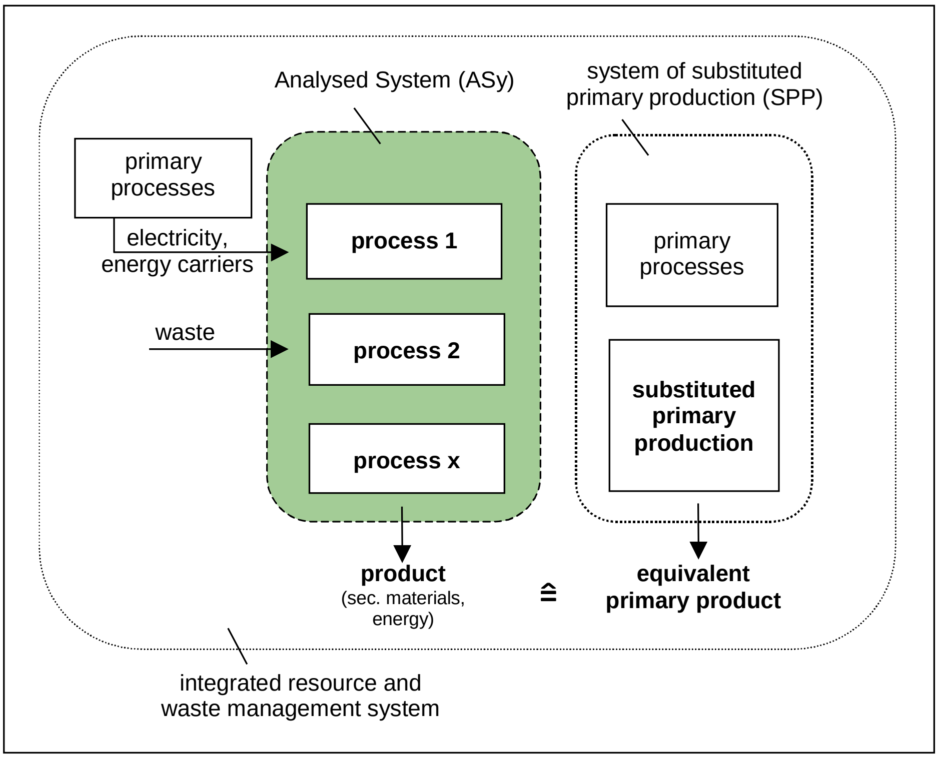

Figure 7: System Identification

3.1 Analysed System

The analysed system includes the production of recovered fuel from non-hazardous waste from households, industry, and commerce as well as its application in co-combustion processes. In addition, the system deals with recycling processes, MSW incineration, and landfilling.

It is important to include all processes into the analysed system which are linked with preparation and use of waste derived fuel. This is the prerequisite to carry out a meaningful cost-benefit analysis.

As input materials into the analysed system serve MSW generated in households as well as combustibles from commerce and industry presently disposed of in landfills.

Regarding MSW, the calculation model (which has been set up to carry out the cost-benefit analysis) distinguishes between the separately collected fractions glass, metals, bio-waste, paper, plastics, and the remaining MSW.

In case of separate collection, the fractions glass, metals, bio-waste, paper and plastics are directed to material and organic recycling respectively. What kind of fractions are collected separately in fact depends on the outline of the integrated waste management system applied (see chapter 4 below).

MSW, which is not directed to recycling, becomes part of residual MSW (grey waste). In the calculation model there is a dynamic interaction considered to vary the share between recycling on the one hand and treatment as residual MSW on the other hand.

Waste inputs from commerce and industry are restricted to fractions showing high heating values (combustibles). Such fractions are residual commercial waste mainly made up of paper and plastics and production specific industrial waste. These fractions mainly require a lower level of preparation in order to be directed to co-combustion facilities.

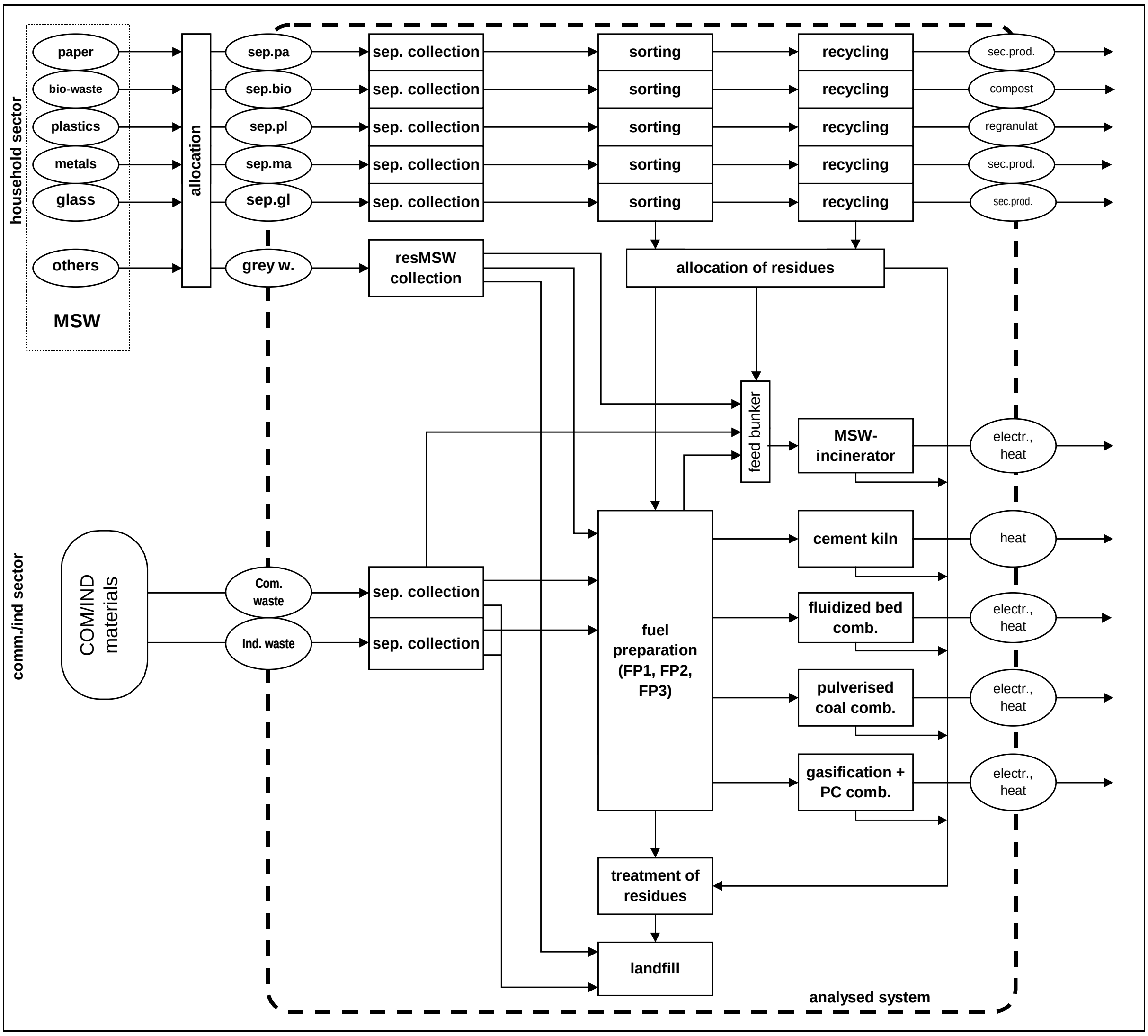

Figure 8: Outline of the analysed system

Figure 8 provides an overview of the outline of the analysed system. A more detailed outline is given in the Appendix chapter 3.

Waste, that is entering the analysed system, is assigned to different processes. Besides waste fractions which are sent to recycling (glass, paper, metals, bio-waste, plastics), waste is either disposed of in landfill or is - according to the main focus of the study - directed to fuel preparation and/or energy recovery.

The fuel preparation processes are supplied with mixed residual waste generated in households or with comm./ind. waste dominated by combustibles. The fuel preparation processes screen the wastes in order to separate combustibles from unwanted materials.

In practice, different technologies and process chains are applied for that. The most common process steps, however, are sorting (dump-and-pick recovery), shredding, sieving, metal separation and air-classification. Residues leaving the fuel preparation process are further treated and/or are disposed of in landfills.

The following fuel preparation processes are included in the analysed system:

- FP1: production of solid recovered fuel in form of fluff/pellets

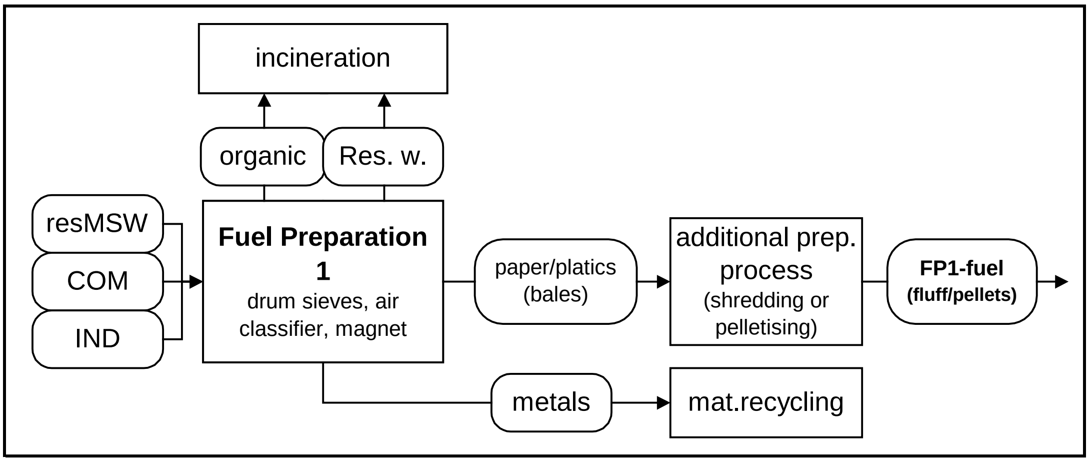

Figure 9: Material flows through fuel preparation process 1

- FP2: production of solid recovered fuel in form of soft pellets

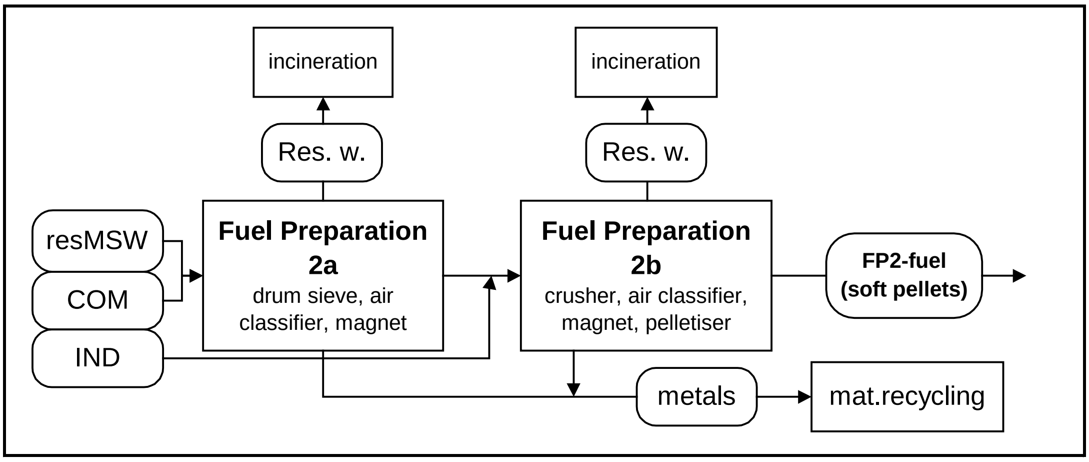

Figure 10: Material flows through fuel preparation process 2

- FP3: production of solid recovered fuel in form of hard pellets

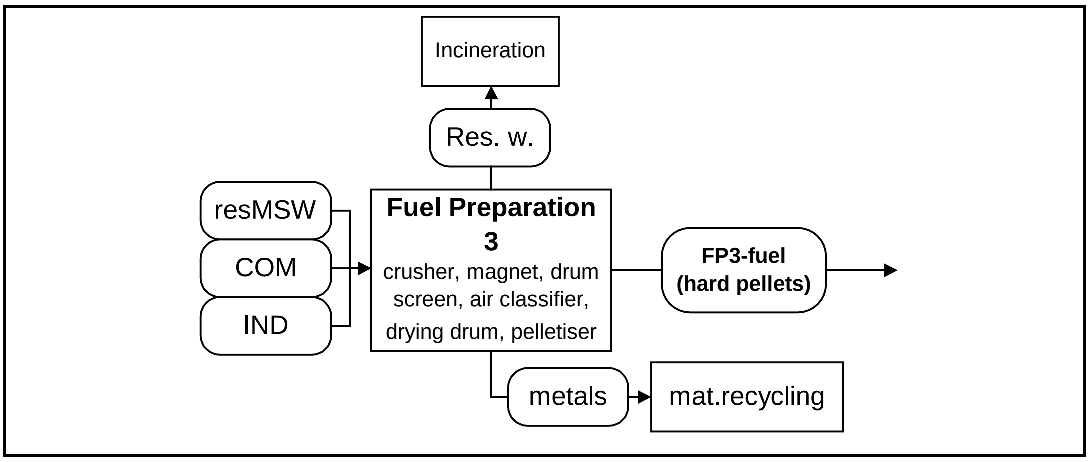

Figure 11: Material flows through fuel preparation process 3

In the calculation model recovered fuel is directed to one of four co-combustion processes:

- rotary kiln (used in the cement industry)
- circulated fluidised bed combustion
- pulverised coal combustion
- gasification and combustion in a pulverised coal combustion plant

In some cases the recovered fuel leaving the fuel preparation process requires additional preparation before it can be forwarded to a co-combustion facility. The type of preparation depends on both the prepared fuel and the co-combustion facility chosen.

Table 1: Additional preparation processes required

fuel preparation process		**co-combustion process**			
	prepared fuel in form of	**cement kiln**	**CFB**	**PC-power plant**	**gasification+PC-power plant**
FP1	bales	shredding (fluff), covered storage	shredding (fluff), covered storage	pelletising, storage, pulverization	shredding (fluff), covered storage
FP2	soft pellets	covered storage	covered storage	covered storage	covered storage
FP3	hard pellets	covered storage, simple crushing	covered storage	covered storage, pulverisation	covered storage

The analysed system also includes waste incineration. The MSW incineration plant (MSWI) acts, on the one hand, as alternative to fuel recovery, on the other hand, it is required to ensure the final treatment of residues leaving the fuel preparation processes.

The waste incinerator as well as all other combustion facilities are modelled in accordance with the state of the art. The composition of the flue gas leaving the incineration/combustion facilities meets the EU Directive on the Incineration and Co-incineration of Waste.

The residues of the combustion processes (slag, ash) are finally disposed of in landfills. The landfills applied in the calculation model are also in accordance with the state of the art and meet the requirements stated in the EU Directive on the Landfill of Waste.

It is assumed that all processes investigated in the analysed system are working to full capacity. This is important regarding the economic analysis and the calculation of business costs[2] respectively.

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[2] Business costs are made up of annuities, operational costs and moderate profit. Annuities as well as fixed operational costs arise independent of the annual throughput. Specific process costs (Euro/ton), thus, considerably decrease the more waste can be treated.

3.2 Primary Processes

The analysed system is in interaction with so called "primary processes". Primary processes are processes which are needed before energy carriers can be used in general. Such processes include mining, extraction, refining, and transport of energy carriers (such as coal, heating oil, diesel) as well as the generation of electricity (as energy carrier).

Electricity is assumed to be generated by the processes which are forming the European electricity mix (see Table 2 below).

Table 2: European electricity mix[3]

Energy Carrier	Electricity
Hard coal	33%
Lignite	25%
Fuel oil	5%
Natural gas	21%
Nuclear power	13%
Hydro power	3%
Sum	100%

The energy carriers consumed in the analysed system basically cover the energy required to operate the processes (e.g. diesel for vehicles, co-firing with natural gas in MSWI, electricity in preparation processes). In principle, the energy carriers in the analysed system are not used as fuel in order to generate saleable energy. Regarding incineration/co-combustion, thus, the energy produced in the analysed system only results from the incineration/combustion of waste and waste recovered fuels respectively.

[3] Source: EUPROG (1997) UNIPEDE, "EUPROG 1997, Programmes and Prospects for the European Electricity Sector", Paris

3.3 Link between the Analysed System and the System of Substituted Primary Production

The materials and energy respectively, which are leaving the analysed system, are valued by the materials and energy respectively whose production/generation can be saved in the system of substituted primary production.

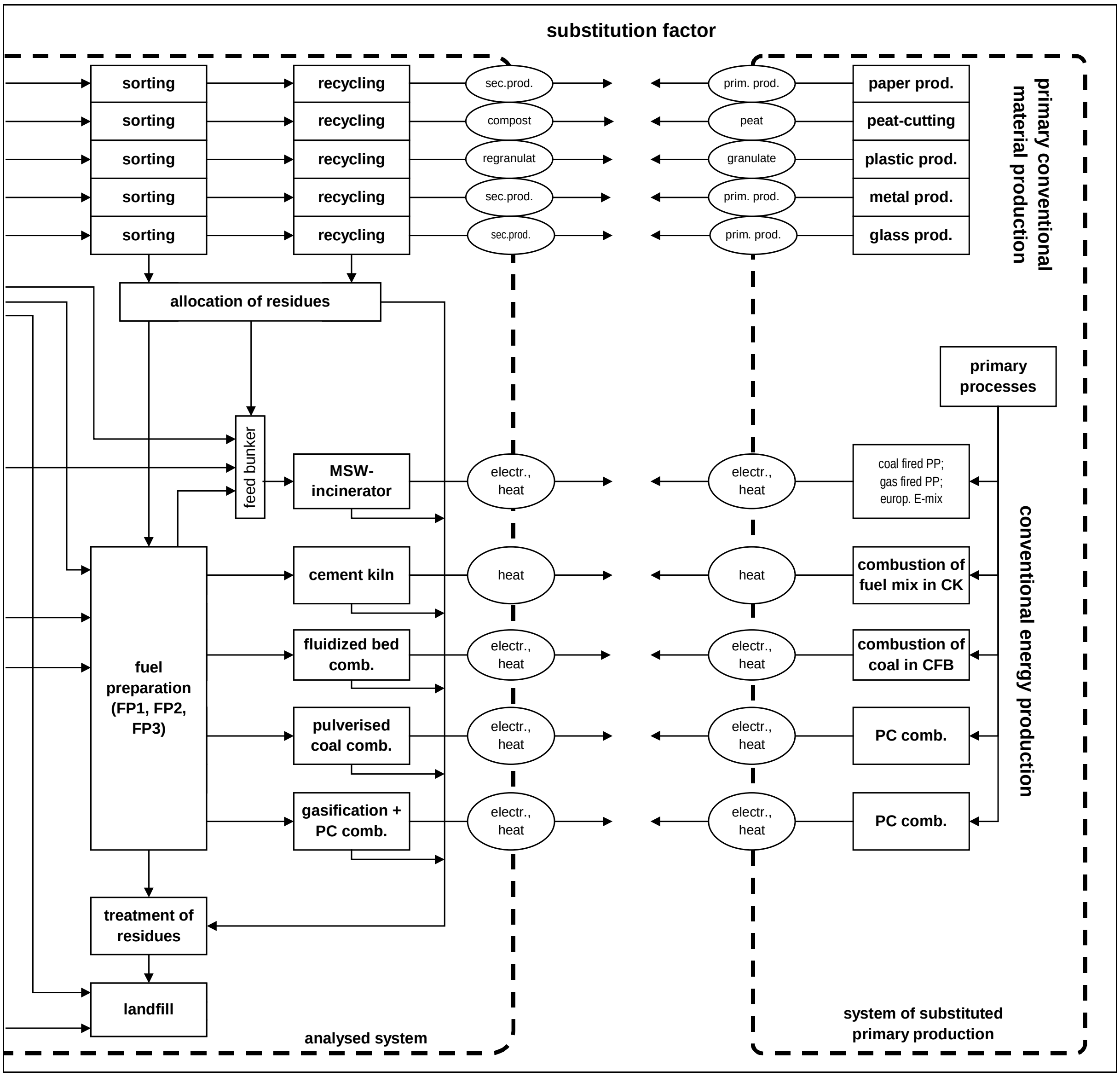

Figure 12: Link between the analysed system and the system of substituted primary production

Secondary products leaving a recycling process replace primary products which would have been produced conventionally. However, in some cases a so called "substitution factor" needs to be considered to reflect the possibly lower quality of a secondary product compared to the primary product[4].

In terms of energy production there is no difference in quality between electricity/heat generated alternatively (in the analysed system) and electricity/heat generated conventionally. In this case the substitution factor is one. The amount of energy produced in the analysed system substitutes exactly the same amount of energy produced in the system of substituted primary production.

The following conventional processes are considered in order to value the energy generated by the combustion/incineration processes applied in the analysed system. Most of the conventional processes are the same like in the analysed system. The only difference is that they are powered by conventional fuels instead of recovered fuels. For the processes in the analysed system, however, minor adaptations on the combustion facilities are required in order to guarantee appropriate handling of recovered fuels (special feeding system, additional flue gas cleaning system, monitoring units, etc.).

Table 3: Corresponding combustion processes and fuels

combustion process, recovered fuel (RF) (analysed system)	**substituted process, conventional fuel**
MSW incinerator	coal fired power plant; gas fired power plant; European energy mix
RF used in a cement kiln (CK)	energy mix used in a cement kiln.
RF used in fluidised bed combustion (CFB)	coal used in fluidised bed combustion
RF used in pulverised coal combustion (PC)	coal used in pulverised coal combustion
RF used in a gasification unit with the further use of the product gas in a pulverised coal combustion plant (gasPC)	coal used in pulverised coal combustion

In terms of co-combustion in a cement kiln an energy mix is substituted. Table 4 provides the average energy mix used in the cement kilns in the European Union as well as the mix of conventional fuels which is substituted through the use of recovered fuel.

[4] For instance, more secondary waste paper is required in order to produce new cardboard (of a defined stability) compared to the production based on primary fibres. This means that 1 kg of waste paper fibres can only substitute less than 1 kg of primary paper fibres (= 1kg x substitution factor (<1)).

Table 4: Fuel mix used and substituted in a cement kiln

	fuel-mix used in CK[5]	**substituted conventional fuel-mix through RF**
hard coal	33%	73%
lignite	7%	16%
heating oil	4%	9%
natural gas	1%	2%
petcoke[6]	43%	
alternative fuel	12%	
total	100%	100%

The amount of regular fuel that can be saved through the application of recovered fuels in co-combustion facilities is determined by the heating value of both the regular and the recovered fuel. It is assumed that the efficiency of the co-combustion facility is not affected by the type of fuel used.

The efficiency of the co-combustion process has no influence on the value of substitution and on the final result of CBA consequently. The value of substitution is determined by the saved costs and emissions linked with the use of regular fuel and not by the amount and type of end-use energy produced.

Regarding the substitution of electricity/heat generated in MSWI, it can hardly be predicted which type of conventional power plant will reduce its operation first and will be substituted by MSWI in fact. In order to consider this uncertainty most sufficiently three options of substitution have been investigated.

[5] Source: CEM Bureau, Brussels

[6] Petcoke is a by-product of the distillation of crude oil. The use of petcoke in a cement kiln is also a kind of recovery process. Petcoke is not counted as conventional fossil fuel therefor.

Table 5: Substituted processes through the operation of a MSW-incinerator

MSW-incinerator generates	**substituted process**		
	option 1	**option 2**	**option 3**
electricity only	PC power plant (pure power: μ = 43%)	gas fired power plant (pure power: μ = 58%)	European electricity mix
heat and power	PC power plant (co-generation of heat and power: μ = 90%)	gas fired power plant (co-generation of heat and power: μ = 90%)	European industrial heat and room heating mix

The three options cover the most relevant processes which are under discussion to be substituted by MSWI.

In option 1 it is assumed that coal fired power plants providing the baseline of the energy demand will reduce their operation first. This means that the energy generated by MSWI substitutes part of the operation of such power plants and especially part of the fuel load needed (substitution of coal).

In option 2 it is assumed that the energy generated in MSWI affects the medium and/or top energy demand. Here it is underlain that the feeding into the network has to be increased or reduced if the energy provided by MSWI is varying. The medium and/or top energy demand is generally covered by gas fired power plants.

In option 3 MSWI substitutes, on the one hand, the processes which are generating the European electricity mix and, on the other hand, the processes providing the industrial and room heating mix.

Table 6: Energy mixes assumed in the calculation model

	Electricity[7]	**Industrial Heat**[8]	**Room Heating, Hot Water**[9]
Hard coal	33%	15%	1%
Lignite	25%	7%	3%
Fuel oil	5%	11%	28%
Natural gas	21%	58%	47%
Nuclear power	13%		
Hydro power	3%		
Wood		9%	11%
Electricity			10%
Sum	100%	100%	100%

Under certain circumstances, energy generated by MSWI may not be needed at all. As a consequence, no conventional energy production can be substituted. This, for instance, would be the case for a combustion process generating energy in form of heat in a region where heat is not required (summer, no district heating, no industrial heating). In that case, the value of the energy generated becomes zero. In the CBA such circumstances are considered in the definition of a particular model region investigated (see chapter 4).

[7] Source: EUPROG (1997) UNIPEDE, "EUPROG 1997, Programmes and Prospects for the European Electricity Sector", Paris

[8] Source: Energy balance sheets 1997-1998, Eurostat 2000

[9] Source: Energy consumption in households, Eurostat 1999

The prices of the regular fuels and the values assumed for the energy mix substituted are listed in Table 7 below.

Table 7: Energy costs[10] (independent of the model region chosen)

	unit	energy costs [Euro/unit]	energy costs [Euro/GJ]
Hard Coal	t	50	1,70
Lignite	t	35	3,41
Fuel oil	l	0,20	4,82
Natural gas	m³	0,14	4,02
Electricity consumed	kWh	0,06	16,67
"value" of electricity mix substituted	kWh	0,04	11,11
"value" of room heating mix substituted	kWh	0,015	4,17
"value" of industrial heat mix substituted	kWh	0,015	4,17

The "value" of the substituted energy mixes (electricity, heat) means the benefit that can be achieved through the substitution of the processes making up these energy mixes. In principle, this value stands for the weighted business costs of all processes involved in the respective energy mix. In this study, however, there was no room to collect all data required to calculate these costs in detail. So, these "values" have mainly be oriented on market prices. The values, however, are only needed in option 3 of MSW incineration.

[10] Values result from questionnaires completed by project members in August 2000.

3.4 External Effects, Averting Costs

The processes applied in the analysed system, the primary processes as well as the processes of primary production cause external effects in form of gaseous and liquid emissions. The amount of the emissions are determined by LCA and eco-balances respectively. The emissions of incineration/combustion processes as well as from landfilling are derived from the application of specific transfer-coefficients (see Appendix chapter 4).

In order to integrate emissions into the cost-benefit analysis, emissions need to be valued in monetary units.

Literature shows a wide range of different techniques to value emissions. In principle, many of the economic valuation methods can be used to quantify the environmental effects of emissions. However, in practice existing data focus on air pollution and most of these data have been derived using a combination of different valuation techniques. Basically, two groups of methods can be distinguished: direct methods and indirect methods of valuation. The approach used by GUA is the indirect valuation of averting cost[11].

The basic idea of averting cost is quite simple. Costs which are necessary to avoid negative externalities are valued. One tries to estimate the costs which are necessary to avert the damage before it may occur. In other words, the costs for installing a filter to clean the emissions of a factory are used to determine the costs of the effects of the emissions.

Averting costs are costs which would have to be invested elsewhere in the economy to prevent the same amount of emissions. The costs are the monetary values of material flows as output from the anthroposphere to the environment via technological and structural standards. Therefore, averting costs reflect the value that society places on the abatement of emissions.

In fact, averting costs need not be determined as costs for new technologies in the same sector of the economy. They may reflect costs for the use of other, even more cost efficient technology anywhere in the economy in order to achieve the same reduction. Two different approaches can be distinguished:

- The bottom-up method determines and aggregates the savings of energy in each single sector. The averting costs are estimated for the savings of emissions by different technologies anywhere in the economy. These costs can be derived from operating and construction costs, which are necessary to achieve given standards and regulations (e.g. using investment costs; investment costs combined with external costs or the costs required for meeting the regulations; welfare costs for the obligatory installation of catalysts in cars).
- The originator of the top-down method is a politically or ethically defined target to reduce the emission. Thus, for example, the level of a tax for carbon dioxide is fixed to reach the target. The level of the tax is used to indicate the social costs of carbon dioxide emissions.

[11] The averting cost approach sometimes goes under the name of the control cost approach (cca), pollution abatement cost approach, and remediation cost approach.

GUA prefers the approach of averting costs to monetise emissions. The main reasons for this strategy are listed in the following:

- The application of averting costs is associated with only small inaccuracies, because they are derived from a great number of cost-benefit analyses which have been carried out to set emission standards.
- Results of CBA based on averting costs can be interpreted in a very practical way (e.g. "the environmental benefits of an analysed scenario can be achieved by other measures in a more efficient way" - namely by the processes where averting costs have been derived from). From this point of view the practical application of a CBA result could lead to concrete compensation measures for environmental disadvantages of a scenario with a positive cost-benefit balance.
- CBA based on averting costs represents an excellent tool to measure eco-efficiency of various options within given targets for the reduction of certain emissions. (Averting costs cannot be used to determine the targets for emission reduction.)
- The averting cost concept is used by the German Federal Agency for Statistics (Statistisches Bundesamt Deutschland) within the framework of the System for Environmental Total Accounting (Umweltgesamtrechnung - UGR) and by the United Nations for the System for Integrated Environmental and Economic Accounting.
- The application of damage costs, (i.e. the calculation of the costs of damages, like the effects on eco-systems, public health and buildings etc.) is fraught with considerable uncertainties. One of these uncertainties is that it is not single pollutants, but a combination of multiple pollutants that cause the damages. It is not (yet) known exactly which concentration of which pollutant causes which damages. On the one hand, there is a certain damage due to the impact of pollutants, on the other hand, there are the emissions of these substances. The transition of these substances from their emission source to their impact area is influenced by a large number of complex circumstances. Also, the noticeable damages are heavily dependent on a particular mix of pollutants. The division of these mixtures into single pollutants and further into the emissions of these substances is full of uncertainties and could easily lead to inaccurate conclusions. All these uncertainties and morally questionable assumptions[12] can be avoided by using the averting cost method directly.

In close co-operation with the Institute of Public Finance and Infrastructure Policy at the Vienna University of Technology a comprehensive review of the averting costs quoted in recent literature has been undertaken. In some cases, however, given assumptions have been adapted and additional calculations have been carried out. As a conclusion, Table 8 and Table 9 below show the averting costs used in the cost-benefit analysis in hand.

[12] For instance, in literature there is the aspect of the "value of statistical life". Some studies even differentiate the value of lives in the so called first world from those of the third world.

Table 8: Averting costs of air pollutants

Pollutant - Air	Averting costs in EURO/t
$CO_{2\ biog}$ (1)	0
$CO_{2\ foss}$ (2)	63
CH_4 (3)	1,328
CO (3)	76
SO_2 (2)	2,544
HCl (4)	6,100
NO_x as NO_2 (2)	2,035
NMVOC (5)	2,035
Dust (2)	509
CFC (6)	252,907
Cd (7)	1,780,484
Hg (8)	35,610
Pb (8)	35,610

(1) Valuation of $CO_{2\ biog}$, which is emitted from renewable energy sources like wood, can remain undone.

(2) BALANDYNOWICZ et al., 1995

(3) FRITSCHE et al., 1992

(4) COWI, 2000

(5) TEUFEL et al., 1991

(6) GUA et al., 2000

(7) KLEPPER et al, 1995

(8) Equivalents of heavy metals analogous to: http://www.ecosite.co.uk/depart/backinfo/sandmb.html, retrieved on 27. 07. 2000; converted to heavy metal equivalent Cd=50, Pb=1, Hg=1

Table 9: Averting costs of water pollutants

Pollutant - Water	Averting costs in EURO/t
COD (1)	712
NH_4 (1)	1,108
Cd (1)	356,104
Hg (1)	1,780,523
Pb (1)	71,221

(1) GUA et al., 2000

The averting costs listed in the tables above are multiplied by the emissions of the processes in the analysed system as well as by the emissions of the primary and substituted processes.

In general, the emissions of the processes occur immediately with the processing of the waste. This, however, is not the case regarding the process “landfill”. Here, the emissions observed depend mainly on the examination period chosen. For the study in hand, it has been decided to choose an examination period of 10,000 years. This long period guarantees that even long term effects of landfilling are built into the cost-benefit analysis. In a sensitivity analysis, however, an examination period of 100 years has been investigated also (see chapter 8 below).

It has also been decided that the external costs resulting from landfilling are not discounted along the time axis. The external effects from landfilling should not be played down only because they are appearing in distant future.

Emissions for which there are no averting cost available but which are also relevant in the environmental discussion are presented in form of “normal” emission rates (kg/a). Such emissions are PCDD/F and Zn as air pollutants as well as Cl^- and Zn as water pollutants.

There are no externalities assumed for solids leaving recycling/co-combustion processes (such as sec. materials, clinker[13], gypsum[13]). Fly ash and bottom ash resulting from combustion/incineration processes, however, are directed to landfill and are contributing to the externalities in the air and water path of landfilling consequently.

[13] One assumption for co-combustion has been that the quality of by-products is not deteriorated.

4 MODEL REGIONS

The outline of integrated waste management systems operated within the EU is very heterogeneous. The waste management systems differ between numerous parameters. Parameters, which are variable within the EU and which are relevant regarding the cost-benefit analysis, can be listed as follows:

- waste generation and composition
- level of recycling/recovery
- cost level (personnel/investment)
- saleability of energy

For the study in hand it was initially intended to define three different model regions based on actual waste management systems in North, Centre and South of Europe. By means of that, the respective differences within the EU should be demonstrated. By trying to define these regions in detail, however, it has been realised that it is almost impossible to identify waste management systems which can be called typical for North, Centre or South of Europe. As a consequence, the definition of the model regions finally applied in the study is not linked to an actual geographic background but is rather based on so called "virtual" model regions.

The virtual model regions mirror three different structural conditions for integrated waste management systems basically representing the situation in South, Central and North of Europe.

The parameters describing the virtual model regions can be divided into fixed parameters and variable parameters.

Fixed parameters are made up of parameters which describe the type of settlement of the model regions defined. These parameters are equal for every model region.

For the study in hand it has been decided to pick a city of 500,000 inhabitants as the type of settlement investigated. The fixed parameters describing that type of settlement are provided below.

fixed parameters:

- number of inhabitants: 500,000
- number of households: 200,000
- distribution of inhabitants: Down Town (mainly multi family houses): 50%
  Suburb (mainly single family houses): 50%
- amount of combustibles from commerce: 65 kg/person
- amount of combustibles from industry: 35 kg/person
- capacity of MSW-incinerator: 150,000 t/a

• type of energy generation substituted by the MSW-incinerator in case of incinerating residues from fuel preparation processes:	PC power plant
• saleability of electricity:	no restrictions
• efficiency of co-combustion plants:	CFB: 35% electric; 50% thermal (CHP); 40% (cond. power)
	PC power pl.: 30% elec.; 55% th. (CHP); 43% (cond. power)

By basing the model regions on the same type of settlement the comparison between the model regions can considerably be facilitated.

The variable parameters deal with parameters which characterise and influence the outline of the waste management system identified. Such parameters are - on the level of material streams:

- the amount of waste generated,
- the waste composition,
- the collection system used;

and on the level of economics:

- the business cost of the waste management processes,
- and the saleability of heat.

Table 10: Variable parameters of Model Region 1, 2, and 3

	Model region 1 **"South"** (city of 500,000 inh.)	**Model region 2** **"Central"** (city of 500,000 inh.)	**Model region 3** **"North"** (city of 500,000 inh.)
MSW[14] generation [kg/Inh]	300	350	400
MSW[14] composition	high organic, low packaging (paper, plastics)	medium organic and packaging (paper, plastics)	low organic, high packaging (paper, plastics)
separate collection system	glass, paper, bio-waste	glass, paper, metals, plastics, bio-waste	glass, paper, metals, bio-waste
cost level	low	medium	high
personnel cost factor	0.4	1	1.3
investment cost factor	0.8	1	1.3
saleability of heat generated in MSWI	no heat saleable (no district heating system installed)	heat saleable during the whole year (district heating system installed)	heat saleable during the whole year (district heating system installed)

The parameters of waste generation and waste composition will additionally be varied by means of sensitivity analyses. In sensitivity analyses the parameters are changed within a given range and the influence on the cost-benefit balance - the result of the cost-benefit analysis - is evaluated.

The figures concerning the amount of waste generated as well as the waste composition are based on investigations undertaken by EEA (2000), OECD/Eurostat (1992, 1994, 1996, 1998), and TN SOFRES (2000). The wide variability of the data has been summarised in forming three sets of waste generation and waste composition. The sets chosen mirror the ranges of the figures reported[15].

[14] "daily household and commercial waste": waste collected on a traditional basis (bagged wastes, i.e., mixed waste collected from households and other sources every day, every week, every two weeks etc.) and separately collected fractions, including packaging, such as paper, cardboard, glass, metal/plastic packaging and food waste from households and other sources. Other sources include commercial and institutional activities that generate waste similar to that generated by households. Generally, these wastes are produced from the daily or routine activity of households and businesses and do not include items such as bulky wastes that are generated on an intermittent basis. (Definition used by EEA and ETC/W).

[15] Extremely high or low figures reported for some Member States have been neglected. It is rather likely that those figures are based on different definitions of MSW as used in the study.

The following tables present the composition of MSW as well as the composition of commercial and industrial waste applied in the three model regions. It is assumed that the composition of commercial and industrial waste is the same in every model region.

Table 11: Composition of MSW in Model Region 1, 2, and 3

Waste Composition	**Model region 1 "South"**	**Model region 2 "Central"**	**Model region 3 "North"**
	high organic, low packaging (paper, plastics)	medium organic, medium packaging	low organic, high packaging (paper, plastics)
Paper/cardboard (packaging)	4%	7%	11%
Paper/cardboard (non-packaging)	15%	18%	19%
Composites (packaging)	2%	3%	4%
Composites (others)	4%	5%	5%
Textiles	3%	3%	3%
Wood, leather, rubber	2%	2%	2%
Bio-waste (kitchen-type)	35%	24%	18%
Bio-waste (garden-type)	14%	10%	8%
Plastics (packaging)	4%	7%	11%
Plastics (non-packaging)	2%	2%	2%
Metals (packaging)	2%	3%	3%
Metals (others)	1%	1%	1%
Glass (packaging)	5%	6%	6%
Glass (non-packaging)	1%	1%	1%
Mineral materials	7%	8%	8%
	100%	100%	100%

Table 12: Composition of commercial and industrial waste

Waste Composition	Commercial Waste	Industrial Waste
Paper/cardboard (packaging)	30%	50%
Paper/cardboard (non-packaging)	0%	0%
Composites (packaging)	0%	0%
Composites (others)	5%	30%
Textiles	5%	0%
Wood, leather, rubber	13%	0%
Bio-waste (kitchen-type)	0%	0%
Bio-waste (garden-type)	7%	0%
Plastics (packaging)	10%	0%
Plastics (non-packaging)	18%	20%
Metals (packaging)	0%	0%
Metals (others)	5%	0%
Glass (packaging)	0%	0%
Glass (non-packaging)	2%	0%
Mineral materials	5%	0%
	100%	100%

The model regions are also different concerning the level of the separate collection system installed.

The separate collection systems mentioned in Table 10 above should mirror the different status of separate collection within the EU. It can be assumed that glass, paper, and biowaste will be collected separately all over the European Union in the near future. Metals, plastics and biowaste, however, will be separated only in a few Member States. This situation has been taken into account in the definition of the separate collection systems in three model regions.

The following table shows the outline of the different separate collection systems as well as the inclusion quotas assumed.

Table 13: Collection systems applied in three Model Regions (BS...Bring System; KSC...Kerb Side Collection)

Model Region	collection fraction	system	container	inh./collection point[16]	inclusion quota
1 "South"	glass	BS	iglo 1.5 m³	1000	35%
	paper	BS	iglo 3.0 m³	1000	30%
	metals	-	-	-	-
	plastics	-	-	-	-
	biowaste	KSC	-	-	30%
2 "Central"	glass	KSC	120 l	6	85%
	paper	KSC	240 l	6	70%
	metals	KSC	120 l	6	50%
	plastics	KSC	120 l (bag)	6	40%
	biowaste	KSC	120 l	6	60%
3 "North"	glass	BS	iglo 1.5 m³	700	60%
	paper	BS	iglo 3.0 m³	700	50%
	metals	BS	1,100 l	700	30%
	plastics	-	-	-	-
	biowaste	KSC	120 l	6	40%

The figures describing the outline of the collection system (size of container, inh./collection point) are averaged from data provided by several Project Members. The respective inclusion quotas are derived from reports given by CEPI[17], FEVE[18], ACRE[19] and ETC/W[20].

The cost levels regarding investment and personnel cost applied in the model regions are based on experiences made through various projects undertaken within the EU. The cost levels will also be addressed to sensitivity analyses.

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[16] In case of kerbside collection the number of inhabitants per collection point represents the average number of persons per building.

[17] Confederation of European Paper Industries

[18] Federation Europeenne du Verre d'Emballage

[19] Aluminium Can Recycling Europe

[20] European Topic Centre on Waste

In terms of the saleability of electricity, it is assumed that the electricity generated in a MSW incinerator is saleable in each model region. The heat generated, however, is only saleable in Model Region 2 and 3. In Model Region 1 it is assumed that there is no need for district heating or industrial process heat respectively. In this case the MSW incinerator is operated in the mode of condensing power. In Model Region 3 it is assumed that the total energy produced can be sold. This is possible if the incinerator is situated near the end-consumer and a well designed district heating system can be operated all over the year.

Table 14 presents the efficiency values assumed for the generation of heat and power in a MSW incineration plant. Furthermore, it lists the share of room heating and industrial heat on the amount of heat produced.

Table 14: Efficiency values and distribution of the heat produced in a MSW incinerator

	Model region 1 "South"	**Model region 2 "Central"**	**Model region 3 "North"**
electric efficiency	25%	10%[21]	20%[22]
thermal efficiency		70%[21]	80%[22]
share of room heating		70%	100%
share of industrial heat		30%	0%

[21] 400 °C steam temperature, back pressure turbine

[22] 500 °C steam temperature, back pressure turbine, flue gas condensation

5 SCENARIOS

The calculation of the cost-benefit balance - the result of the cost-benefit analysis (see chapter 6 also) - is carried out by means of scenarios. A scenario describes a specific combination of waste management methods in the analysed system.

For the calculation of the cost-benefit balance it is necessary to distinguish between a so called “baseline scenario” and an “analysed scenario”.

The baseline scenario represents the basis where the variations investigated in the analysed system are referred to. Waste management measures in the analysed system which are not changed in CBA are also part of the baseline scenario. In the study in hand such measure is the level of separate collection in the respective model region. The influence of recycling on the cost-benefit balance is not the main interest of the study. So, the level of recycling will be kept constant for all scenarios investigated in a model region.

As there are three model regions investigated there are also three baseline scenarios required, one for each model region.

The baseline scenarios applied are outlined as follows:

- present state of material recycling of paper, plastics, metals, glass, and organics separated at households in the model region
- “state of the art” landfilling of the remaining MSW (grey waste) as well as of the combustibles from commerce and industry

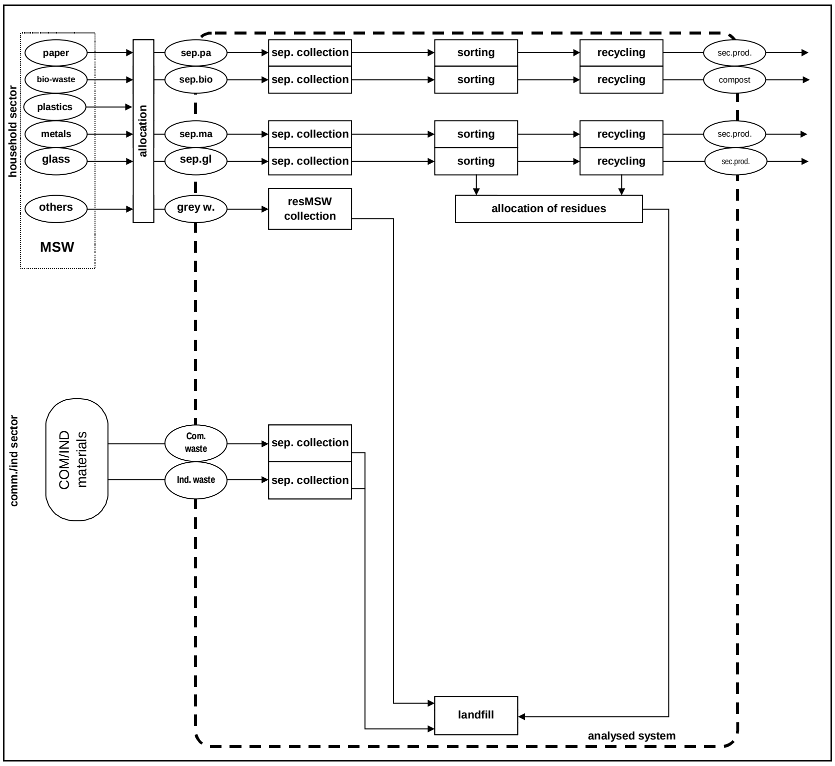

Figure 13: Example: Outline of the baseline scenario in Model Region 3

The analysed scenarios describe specific conditions in the analysed system different from the situation in the baseline scenario.

By means of the analysed scenarios the welfare macro economic role of energy and fuel recovery within an integrated resource and waste management system is described. It can be shown how residual wastes are preferably managed in order to achieve the most advantageous results for the national economy.

In the analysed scenarios MSW-incineration (with three options of substitution) as well as three fuel preparation processes (FP1-FP3) connected with four co-combustion processes (cement kiln, CFB, PC, gasification) are investigated. In total, 45 separate data combinations are analysed.

The analysed scenarios are basically divided into two scenario groups;

- incineration (and energy recovery) in a MSW incinerator and
- fuel recovery and co-combustion in industrial co-combustion plants.

The following table lists the scenarios which are investigated in each model region.

Table 15: Overview of the scenarios investigated

scenario		residual, com., ind. waste goes to	co-combustion of prepared fuel in	substitution of	abbreviation of scenario
baseline scenario		landfill (according to Landfill Directive)			**BS**
analysed scenarios	**incineration**	MSW incinerator[23]		coal fired power p.	**I-coal**
				gas fired power p.	**I-gas**
				energy mix	**I-mix**
	fuel recovery	fuel preparation 1[24] (fluff or pellets)	cement kiln[25]	fuel-mix	**FP1-CK**
			CFB[26]	coal	**FP1-CFB**
			PC power plant[27]	coal	**FP1-PC**
			gasification[28] and PC power plant	coal	**FP1-gasPC**
		fuel preparation 2[29] (soft pellets)	cement kiln	fuel-mix	**FP2-CK**
			CFB	coal	**FP2-CFB**
			PC power plant	coal	**FP2-PC**
			gasification and PC power plant	coal	**FP2-gasPC**
		fuel preparation 3[30] (hard pellets)	cement kiln	fuel-mix	**FP3-CK**
			CFB	coal	**FP3-CFB**
			PC power plant	coal	**FP3-PC**
			gasification and PC power plant	coal	**FP3-gasPC**

[23] source: resume of data collected from MSW incinerator Spittelau, Vienna, from MSW incinerator Wels, and from a planned MSW incinerator in Lower Austria cross-checked with other published data.

[24] source: ESSENT Milieu, Netherlands

[25] source: resume of data collected from Scoribel, Belgium; Forschungsinstitut der Zementindustrie, Germany; and operators of cement kilns in Austria

[26] source: resume of data collected from Foster Wheeler, Finland; and RVL, Austria

[27] source: resume of data collected from ELSAM, Denmark; and APME (2000)

[28] source: LAHDEN LÄMPÖVOIMA, Finland

[29] source: Trienekens, Germany

[30] source: Ewapower, Finland

6 Calculation of the Cost-Benefit Balance

The calculation of the cost-benefit balance (CBB) is carried out in two steps.

As a first step the internal as well as the external effects of a scenario are determined.

Internal effects are those which are caused intentionally (e.g. investment costs for mechanical equipment). They are easy to quantify as they are considered in the cost-accounting of the processes investigated. They are already presented in monetary units as "internal costs".

Internal cost can also be addressed as "business cost". For the study in hand, internal costs (business cost) are defined as direct fixed and variable monetary costs related to processes, including normal industrial depreciation for investments as well as a moderate business profit (5%).

External effects, however, are effects which are caused unintentionally and which are not considered in the cost-accounting of the enterprises (e.g. emissions of pollutants). In order to integrate these effects into the cost-benefit analysis they need to be transferred into monetary values ("external costs"). The transfer of external effects into external costs is undertaken by means of applying the principle of averting costs (see chapter 3.4 above).

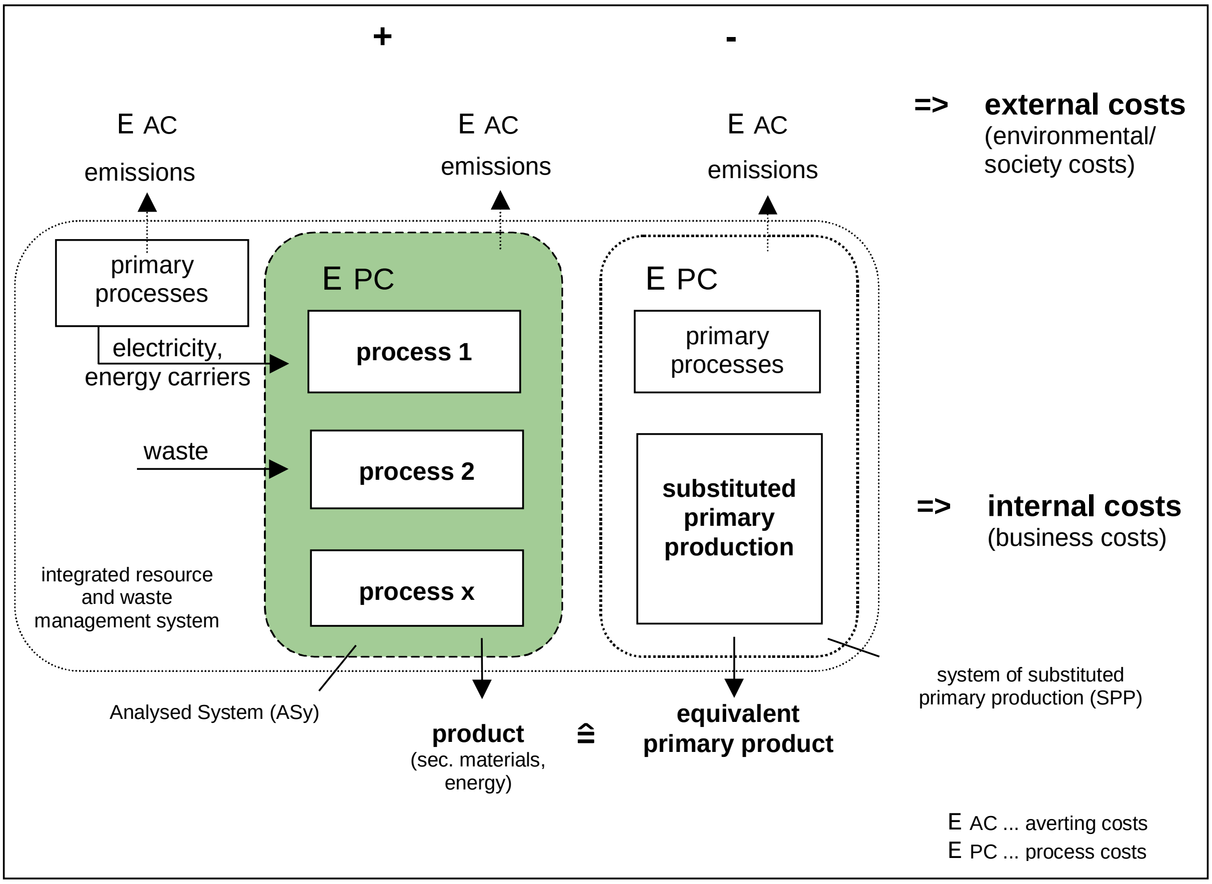

Figure 14: Internal and external costs

In the cost-benefit analysis the internal as well as the external costs of the processes saved represent the value of the products leaving the analysed system.

By adding the process costs of the processes in the analysed system and by subtracting the costs of the primary processes saved the internal costs of a scenario can be calculated. The external costs of a scenario are calculated in the same way (averting costs of the analysed system minus averting costs of primary production).

As a second step the analysed scenario is compared with the baseline scenario. The internal as well as the external costs of the analysed scenario are subtracted from the respective costs of the baseline scenario. Finally, the sum of the two "deltas" is forming the cost-benefit balance, the result of the cost-benefit analysis.

The cost-benefit balance represents the difference between the analysed scenario and the baseline scenario. A positive sign means that the analysed scenario is "better" than the baseline scenario. In this case the (internal or external) costs of the baseline scenario are higher than the costs of the analysed scenario. These positive "difference-costs" can also be addressed as "benefits".

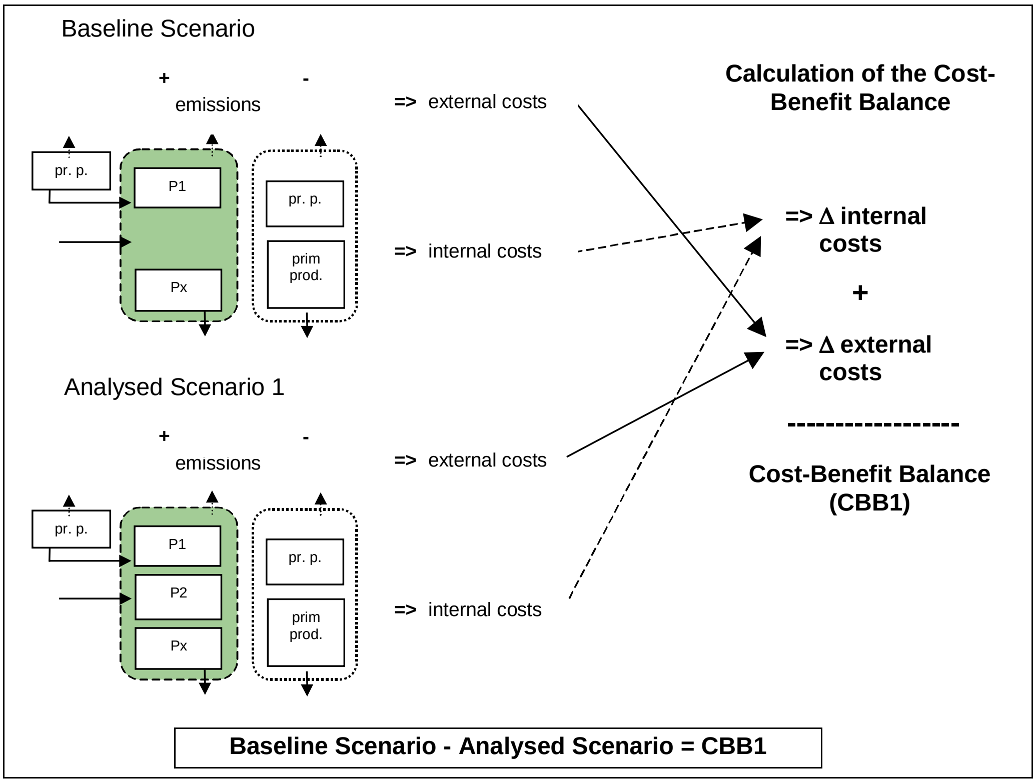

Figure 15: Calculation of the Cost-Benefit Balance

The procedure of calculating the difference has been applied in order to be able to concentrate the analysis on the changes between the analysed scenario and the baseline scenario. In this way, the result of the CBA is not influenced by conditions which are the same in both the analysed and the baseline scenario. The results are solely referred to the differences which are basically the interest of the cost-benefit-analysis undertaken.

7 Results of the Cost-Benefit Analysis

In the following the results of the cost-benefit analysis are presented. The results are structured according to the model regions investigated. In the beginning of each sub-chapter the outline of the respective model region is shortly summarised again.

7.1 Model Region 1 ("South")

Model Region 1 symbolises a region with rather low waste generation rates (300 kg/Inh.). The composition of the waste is characterised by a high share of organics and a low share of plastics and paper. The separate collection system installed deals with separate collection of glass, paper and biowaste. The cost level regarding investment and personnel is low. Energy generated in the MSW incinerator can only be sold in form of electricity.

7.1.1 Recovered Fuels

Table 16 below provides an overview of the amount and composition of the recovered fuels produced in Model Region 1.

Table 16: Recovered fuels in Model Region 1

	fluff - FP1	pellets - FP1	soft pellets - FP2	hard pellets - FP3
amount [kg/Inh.]	80,6	62,6	89,9	142
amount [MJ/Inh.]	1.264	1.299	1.627	2.777
heating value [MJ/kg]	15,7	20,8	18,1	19,6
water content	25%	4%	16%	4%
Composition*				
C [%dm]	52,8%	44,7%	50,9%	40,6%
N [%dm]	0,55%	0,43%	0,41%	0,58%
S [%dm]	0,24%	0,21%	0,22%	0,24%
Cl [%dm]	0,70%	0,73%	0,73%	0,70%
Cd [mg/kg dm]	5	6	6	5
Hg [mg/kg dm]	0,49	0,27	0,31	0,45
Pb [mg/kg dm]	130	130	131	136

* The composition of recovered fuels is calculated on the basis of substance groups. Measurements undertaken in the field are more accurate. Producers of recovered fuels reported that the quality of recovered fuel is generally higher than shown in the table.

It can be seen that the fuel preparation process FP3 shows the highest productivity in terms of fuel preparation. In the FP3 process about 35% of the waste input can be used for the production of recovered fuel. This is almost two times the amount produced in the FP1 process which shows the lowest yield of fuel preparation.

The residuals of fuel preparation are directed to the MSW incinerator throughout. Metals, which are separated in the fuel preparation processes and in the incinerator respectively, are forwarded to material recycling (see good balance in the Appendix).

The chemical composition as well as the heating value are calculated on the basis of chemical analyses undertaken for different "substance groups" (e.g. paper, plastics, glass, etc.). In the calculation model the substance groups represent the smallest calculation unit where the calculation of all good streams is based upon. They are used to describe the composition of MSW as well as of commercial and industrial waste. Accordingly, recovered fuels (as output stream of preparation processes) are a mixture of substance groups also.

The results regarding the chemical composition of recovered fuels depend on the chemical composition fixed for the different substance groups[31]. Actual measurements carried out in the field of course give more accurate results. In fact, the measurements reported for Cl - the most important parameter in terms of co-combustion - are for example in the order of 0.5%. Thus, the values calculated in the model on the basis of substance groups can only be interpreted as a rough estimate.

[31] The chemical composition of the substance groups is presented in the appendix.

7.1.2 Internal Costs/Benefits compared to Landfill

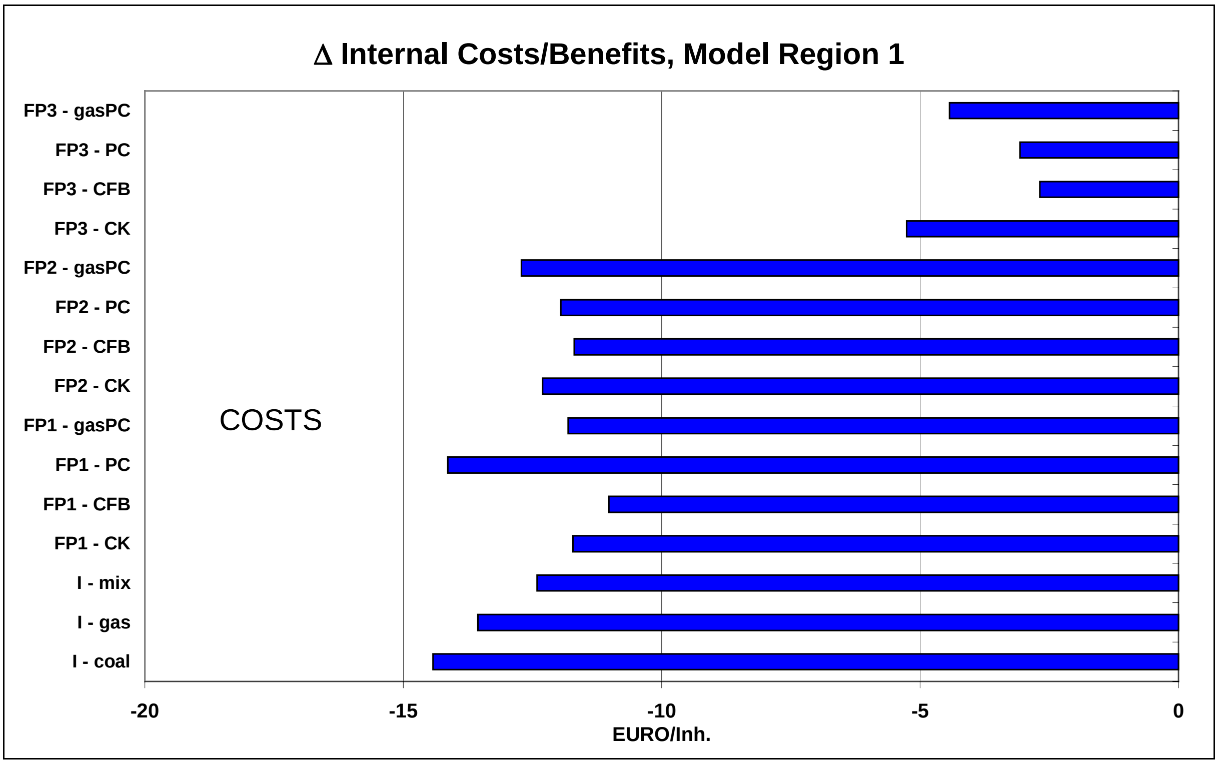

Figure 16: Internal costs/benefits of Model Region 1

Figure 16 shows the internal costs of the analysed scenarios in comparison with the baseline scenario[32].

It can be seen that all analysed scenarios show a negative sign. This means that the internal costs of the scenarios are higher than the respective costs of the baseline scenario.

In this case the benefits of saved primary energy production and fuel costs respectively are not high enough to compensate the costs in the analysed system. So, the costs arising in the analysed scenarios can not fall below the costs of the baseline scenario. This, however, would be the prerequisite for changing the sign and becoming a benefit consequently.

The incineration scenarios basically achieve the most negative results. The main reason is that in Model Region 1 the energy generated in the incinerator can only be sold in form of electricity. So, only small benefits arise from waste incineration.

This also affects the results of the FP1 and FP2 scenarios. Here, only a rather small share of waste directed to fuel preparation can finally be separated as recovered fuel. The remaining rest, which amounts to about 75% of the total input, is also directed to the waste incinerator (see good balance in the Appendix). As a consequence, the FP 1 and FP2 scenarios behave to a very large extent like “pure” incineration scenarios.

[32] The baseline scenario is represented in the “zero-line”

Within the incineration scenarios the mix-scenario achieves the best results followed by the gas-scenario and the coal-scenario. This means that under the circumstances given in Model Region 1 (esp. cost levels for labour and investment) and under the energy costs assumed the generation of power in a coal fired power plant represents the cheapest solution. Thus, the savings achieved are lowest when this type of power plant is substituted.

In case of the FP1-scenarios the paper/plastic fraction separated in a first separation step requires further treatment before it can be sent to co-combustion. The type of treatment depends on the co-combustion process chosen. The most costly treatment is required before the fuel can be directed to a PC power plant. Here, the material needs to be pelletised and further pulverised. The additional costs linked with the pelletising/pulverisation are the reason why the FP1-PC scenario achieves the most negative internal costs within the FP1 scenarios.

With the exception of the FP1-PC scenario the FP1 scenarios achieve slightly better results than the FP2 scenarios. The reason for that are the higher process costs of the FP2 process caused by the two step approach of fuel preparation. Although the FP2 process shows a higher yield of fuel preparation, the saved costs for regular fuels are not high enough to bring the internal costs of the FP2 scenarios below the internal costs of the FP1 scenarios.

The FP3 scenarios achieve the lowest internal costs. This results from the high yield of fuel preparation combined with appropriate preparation costs. On this conditions, the substitution of regular fuels significantly reduces the business cost of fuel preparation.

As regards the co-combustion options, it is very hard to identify a hierarchy among the options investigated. A rather expensive option, however, is the treatment of prepared fuel in a gasifier with the further combustion of the product gas in a PC power plant. The investments in a gasifier are much higher than the investments required to adjust the other co-combustion facilities for the use of recovered fuel. The higher internal costs of the FP1-PC and the FP3-CK scenarios compared to the gasPC scenarios result from the additional preparation steps required before the recovered fuel can be fed into the co-combustion process (FP1-PC: pelletising of fluff; FP3-CK: simple crushing of pellets).

In practice, the most economic co-combustion process is identified by including regional circumstances into the decision making process. Thus, the macro-economic hierarchy - based on same conditions for all co-combustion options - might easily be overruled by regional circumstances (existing plants, transport distances, etc.).

The identification of a hierarchy among the co-combustion options steps into the background anyway. As Figure 16 shows, the type of co-combustion process chosen has only a minor effect on the final result of the internal costs. The internal costs are mainly dominated by the type of fuel preparation process applied (see significant difference between FP3 scenarios and FP1 and FP2 scenarios respectively).

7.1.3 External Costs/Benefits compared to Landfill

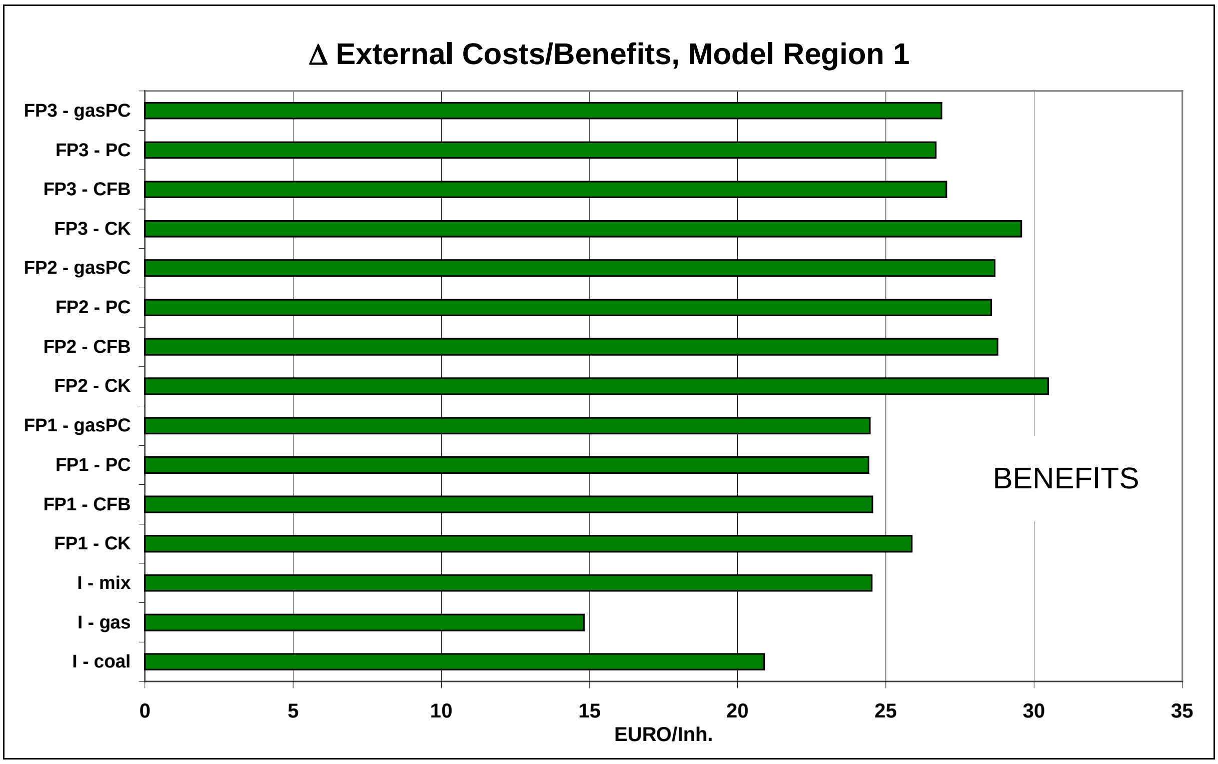

Figure 17: External costs/benefits of Model Region 1

The external effects of the analysed scenarios are much lower than the external effects of the baseline scenario. This means that - from the environmental point of view - fuel and energy recovery is better than the alternative of untreated landfilling. A clear external benefit can be achieved consequently.

Within the analysed scenarios, the external benefits of scenario I-gas are the lowest.

Under the conditions of Model Region 1 (generation of electricity only) the required operation of a gas fired power plant causes lower emissions than a MSW incinerator. Thus, the substitution of a gas fired power plant by MSWI can not contribute to additional environmental benefits but leads to additional external costs. This is also the case in terms of the substitution of a PC power plant and the processes forming the energy mix. Here, however, the difference between the emissions of the MSWI and the emissions of the substituted processes (PC power plant, mix-processes) are much smaller[33].

The high external benefits of all incineration scenarios result solely from the lower emissions of the whole process chain (including the negative effects of substitution) compared to the far higher external costs of landfilling (baseline scenario).

[33] The emissions of the substituted processes (gas fired power plan, PC power plant and mix-processes) also include the emissions which are connected with the mining, extraction, refining, and transport of the energy carriers used (emissions of primary processes, see above).

The FP1 scenarios achieve smaller external benefits compared to the FP2 or FP3 scenarios. The reasons are, on the one hand, the lower amount of FP1-fuel produced and, thus, a higher share of incineration in the FP1 scenarios linked with rather small benefits achieved for substitution (only electricity can be sold) and, on the other hand, the lower heating value of FP1-fuel. The combination of both a smaller amount of RF and a lower heating value mean that the total energy input into co-combustion facilities is considerably below the energy input achieved in the FP2 and FP3 scenarios respectively. A smaller amount of regular fuels (and emissions) can be substituted consequently.

The FP2 scenarios achieve the highest external benefits. This is remarkable because in the FP2 scenarios less fuel can be recovered and less emissions can be saved through substitution compared to the FP3 scenarios. However, the FP3 preparation process itself emits more emissions than the FP2 process. This is because in the pelletising process of FP3 a considerable amount of fuel oil is used for the production of hard pellets. The external benefits achieved through co-combustion of FP3-fuel (additionally linked with a higher heating value of FP3-fuel) can only slightly overcompensate the emissions caused by the use of fuel oil. Moreover, the heating value of the remaining rest, which goes to incineration, is far below the heating value of the residuals of the FP2 process. So, in the incinerator additional co-firing with natural gas is required and a much smaller amount of electricity can be produced. This also contributes to lower external benefits of the FP3 scenarios.

The CK-scenarios achieve the highest benefits within the FP scenarios. The reason for that is the substitution of a mixture of conventional fuels in the cement kiln compared to the substitution of hard coal in the other co-combustion options. The mixture is dominated by hard coal, however, 25% of the mixture are made up of heating oil and lignite (see Table 4). The benefits resulting from the substitution of this mixture are higher than the benefits connected with the exclusive combustion of hard coal. Thus, the CK-scenarios can achieve higher external benefits for the same energy input than the other co-combustion scenarios where solely hard coal is substituted.

In general, the external effects are mainly (> 50%) made up of the benefits that can be achieved through the diversion of waste from landfill (baseline scenario). In the CBA, all external effects of landfilling which will occur within the examination period of 10,000 years are taken into account. This means that almost all carbon (~ 90%) which is disposed of in landfill is finally converted into CO_2 and CH_4 respectively.

The external benefits of the analysed scenarios are dominated by saved CH_4, CO_2 as well as saved water emissions. This means that the analysed scenarios (including the reducing effects of the primary processes substituted) cause less CO_2, CH_4, and water emissions than the baseline scenario.

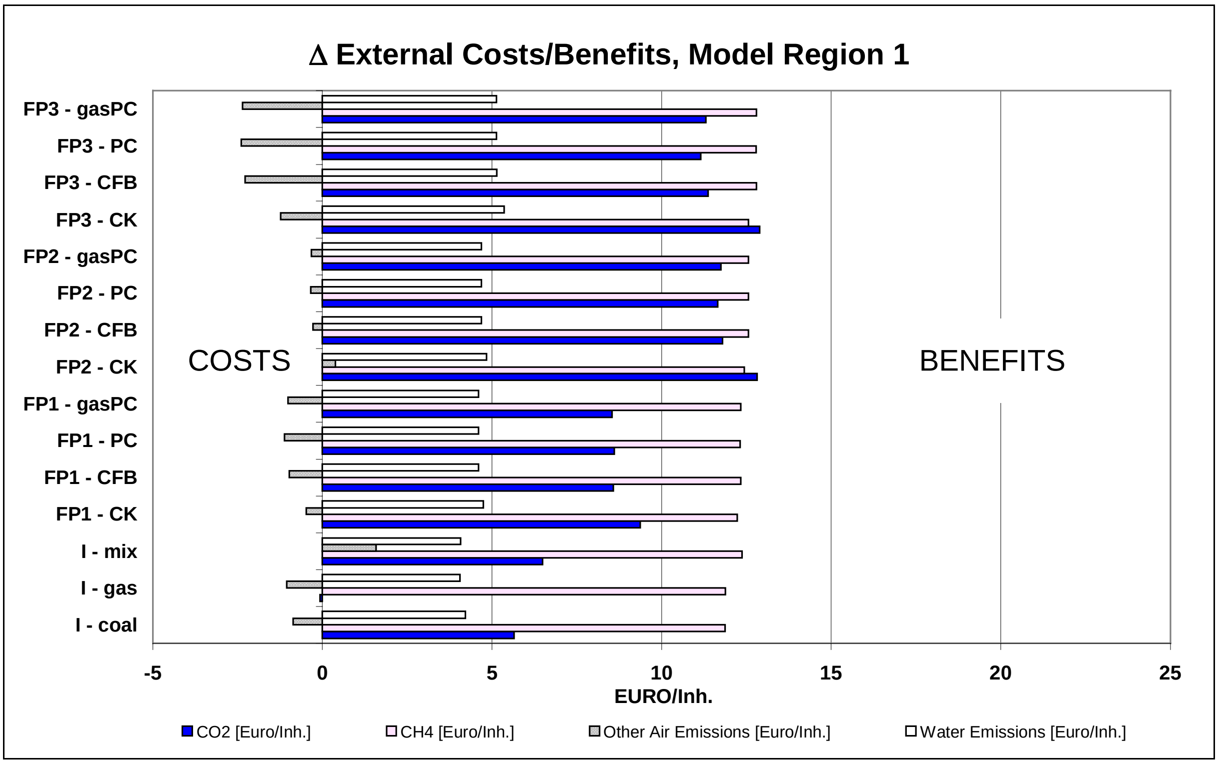

Figure 18: Distribution of external costs/benefits in Model Region 1

Figure 18 shows the distribution of the external costs/benefits among the most important emission streams.

It can be seen that the most important emission stream is the emission of CH_4. CH_4 emissions result almost exclusively from landfilling (> 95%).

The landfill assumed in the calculation model is equipped with a gas collection system. The gas collection system allows to gather 50% of the landfill gas. The collected landfill gas is combusted (with energy recovery) in specially designed gas-engines. Moreover, it is assumed that the landfill is covered with an oxidising surface which leads to a further reduction of CH_4 emissions (-50%).

This means that the external benefits connected with CH_4 emissions from landfill would become even higher if a lower technical standard of landfilling should be applied.

7.1.4 Cost-Benefit Balance compared to Landfill

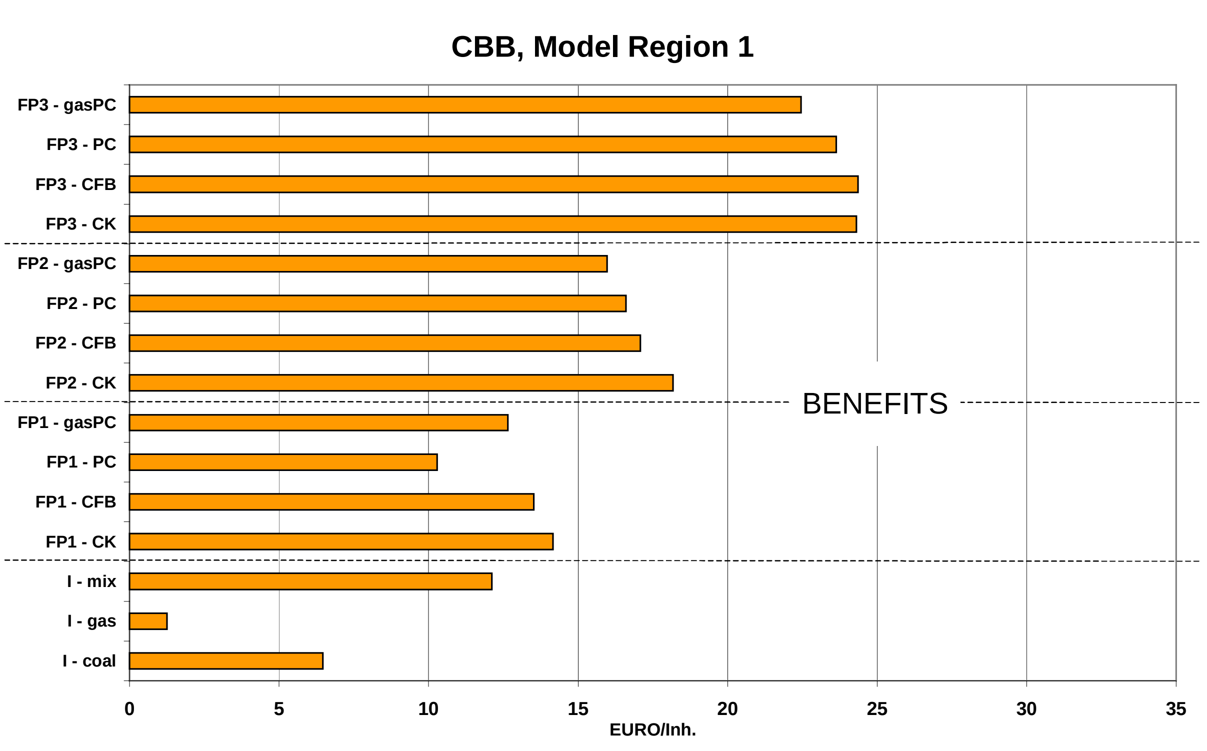

Figure 19: CBB of Model Region 1

The internal and external costs are summarised in the cost-benefit balance (CBB). It can be shown that all analysed scenarios achieve a positive CBB. This means that all scenarios investigated are beneficial for the national economy compared to the alternative of disposing of residual wastes in landfill. The average benefit achieved is in the order of 10-20 Euro/Inh. and year (referred to Model Region 1).

Within the incineration scenarios it can be seen that it is very important to consider which type of energy generation process is substituted in fact. In terms of the substitution of a gas fired power plant combined with a low efficiency of energy recovery in the incinerator it would be almost of the same value to bring residual wastes to landfill (provided the landfill meets the technical standards of the Landfill Directive). Here, the benefits that can be achieved for the national economy are rather small.

The cost-benefit balance finally shows a clear hierarchy between the options of fuel preparation. The best results can be achieved with the production of hard pellets, followed by the production of soft pellets and fluff. A main reason for that is the different productivity regarding amount and heating value of the recovered fuel produced.

7.1.5 Energy Saved compared to Landfill

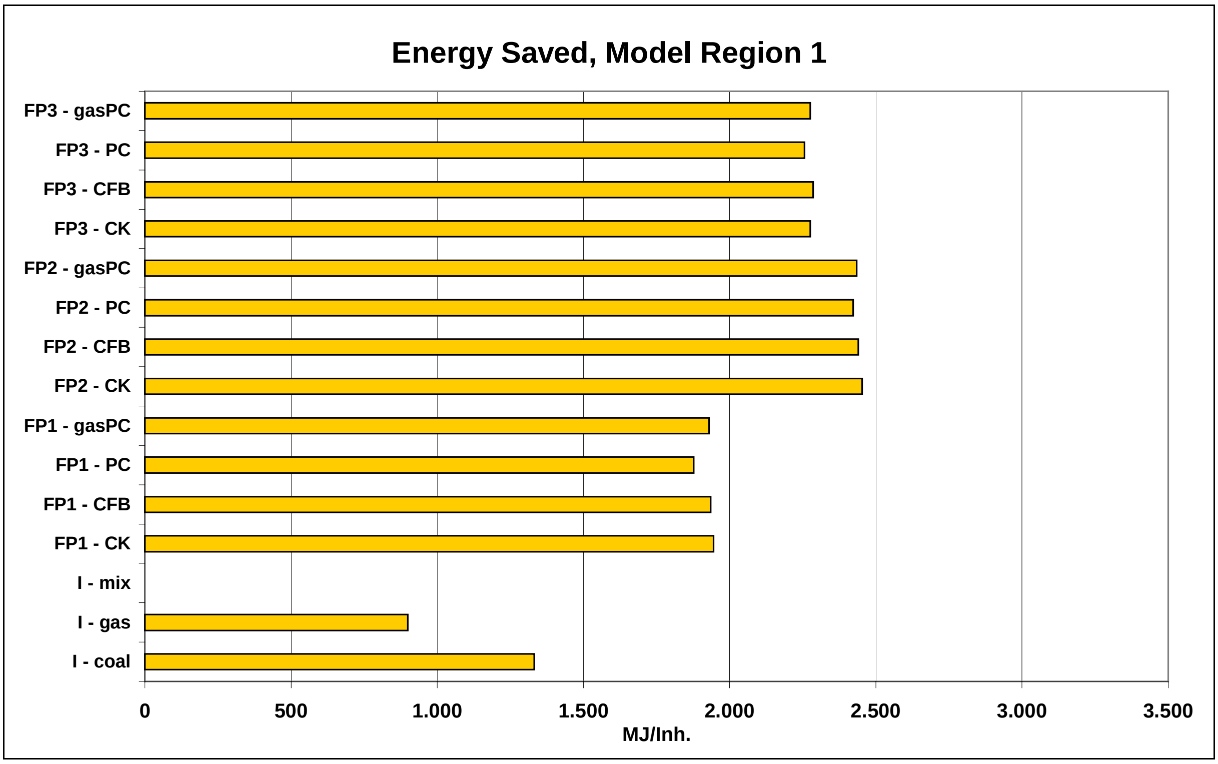

Figure 20: Energy saved by means of energy recovery in Model Region 1[34]

Figure 20 presents the energy content of the fossil energy carriers that can be saved in the respective scenarios in comparison with the baseline scenario. It can be seen that the higher productivity of the FP 3 process does not necessarily mean that the highest degree of conventional energy carriers can be saved. The FP3 process itself is rather energy-intensive. Correspondingly, the net amount of energy saved is largely influenced by the internal energy consumption. In the end, the amount of energy saved in the FP3 scenarios is slightly lower than the amount saved in the FP2 scenarios.

The energy content of conventional energy carriers saved is in the order of 1,500 - 2,500 MJ/Inh.. In comparison, the average energy consumption of solid fuels in the EU amounts to about 28,000 MJ/Inh.[35]. Thus, under the conditions given in Model Region 1 more than 5% of the average need of solid fuels can be substituted by energy recovered from residual waste.

[34] Because of a lack of data it was not possible to derive the energy carriers saved in case of substituting the energy mixes applied. So, there is no energy content presented in the I-mix scenario.

[35] Source: Eurostat - 1996, Association of Finnish Peat Industry - 1996, IEA - 1994

7.2 Model Region 2 ("Central")

Model Region 2 is characterised by a medium waste generation rate (350 kg/inh.) and an average waste composition (medium organic, paper, plastic). The separate collection system is fully built up which means that glass, paper, metals, plastics and biowaste are collected separately. The cost levels regarding investment and personnel are in the middle. Both heat and power generated in the MSW incinerator can be sold.

7.2.1 Recovered Fuels

Table 17: Recovered fuels in Model Region 2

	fluff - FP1	pellets - FP1	soft pellets - FP2	hard pellets - FP3
amount [kg/Inh.]	87,1	71,1	102,8	140
amount [MJ/Inh.]	1.522	1.583	1.961	2.963
heating value [MJ/kg]	17,5	22,3	19,1	21,1
water content	22%	4%	16%	4%
Composition*				
C [%dm]	55,0%	46,7%	52,5%	43,9%
N [%dm]	0,52%	0,45%	0,43%	0,54%
S [%dm]	0,24%	0,22%	0,23%	0,23%
Cl [%dm]	0,76%	0,78%	0,77%	0,78%
Cd [mg/kg dm]	6	7	6	6
Hg [mg/kg dm]	0,47	0,26	0,29	0,44
Pb [mg/kg dm]	143	142	141	152

* The composition of recovered fuels is calculated on the basis of substance groups. Measurements undertaken in the field are more accurate. Producers of recovered fuels reported that the quality of recovered fuel is generally higher than shown in the table.

The different productivity of recovered fuel between the fuel preparation processes can also be observed in Model Region 2. The differences, however, are lower than in Model Region 1. So, slightly more FP1 fuel can be recovered in relation to FP3 fuel. The reason for the increase in productivity is the higher waste generation rate as well as the higher share of combustibles in residual waste. The higher share of combustibles also affects the heating values of prepared fuel. The heating values generally higher than in Model Region 1.

7.2.2 Internal Costs/Benefits compared to Landfill

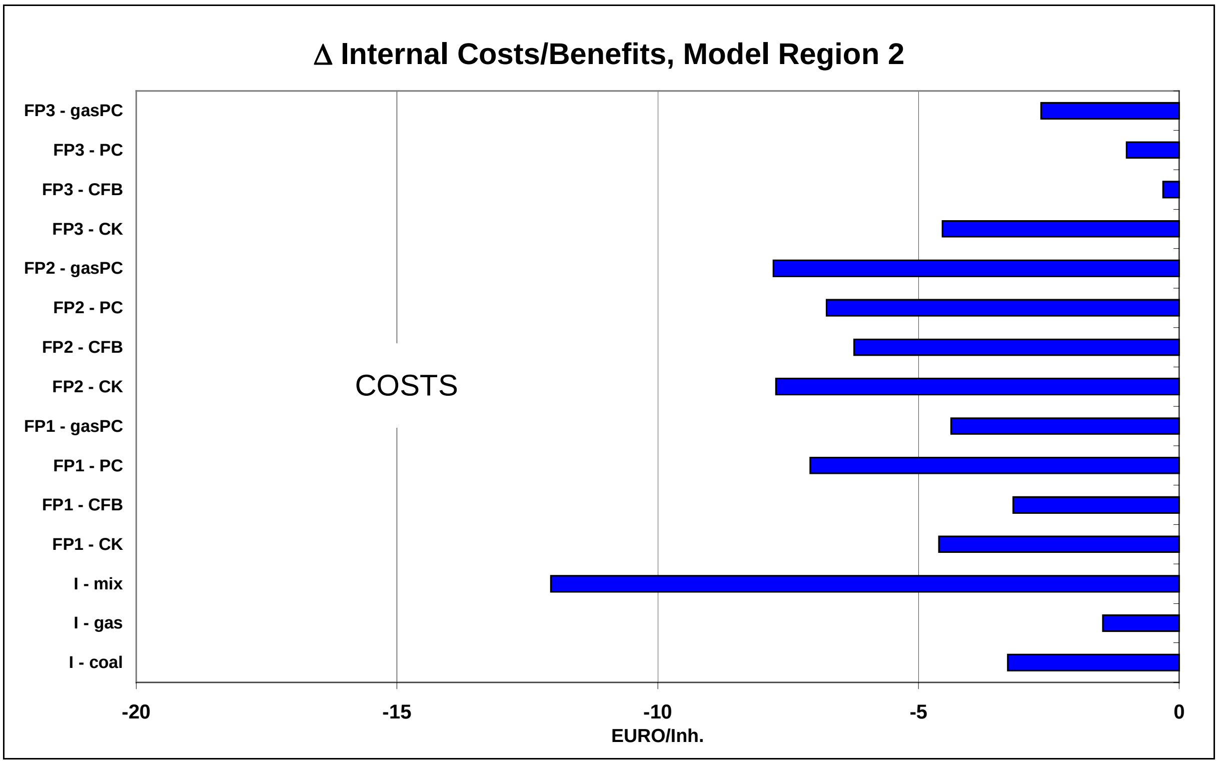

Figure 21: Internal costs/benefits of Model Region 2

The internal costs in Model Region 2 show basically the same ranking like in Model Region 1. The performance of the analysed scenarios in absolute figures, however, is generally better. The reason for that is the higher heating value of the waste collected as well as the higher waste generation rate. Thus, more primary energy production can be substituted and more economic benefits can be achieved.

In case of the I-mix scenario it can clearly be seen that the price for energy is assumed to be independent of the model region chosen. In Model Region 2 the cost levels for investment and personnel are higher than in Model Region 1. So, the costs for primary energy production in coal and gas fired power plants are rising, too. This, of course, influences the benefits (for substituting those power plants) which are rising in the same way. As a consequence, the internal costs of the I-coal and I-gas scenario are reduced significantly and can even fall below the costs arising in the FP1 and FP2 scenarios.

In case of substituting the energy mix (I-mix) or in case of substituting regular fuel (co-combustion processes) the specific benefits for substitution remain the same like in Model Region 1. So, the higher costs for waste treatment in Model region 2 can not be compensated in the same order like under the conditions of Model Region 1. For most scenarios this finally results in higher internal costs than in case of substituting a coal or gas fired power plant.

7.2.3 External Costs/Benefits compared to Landfill

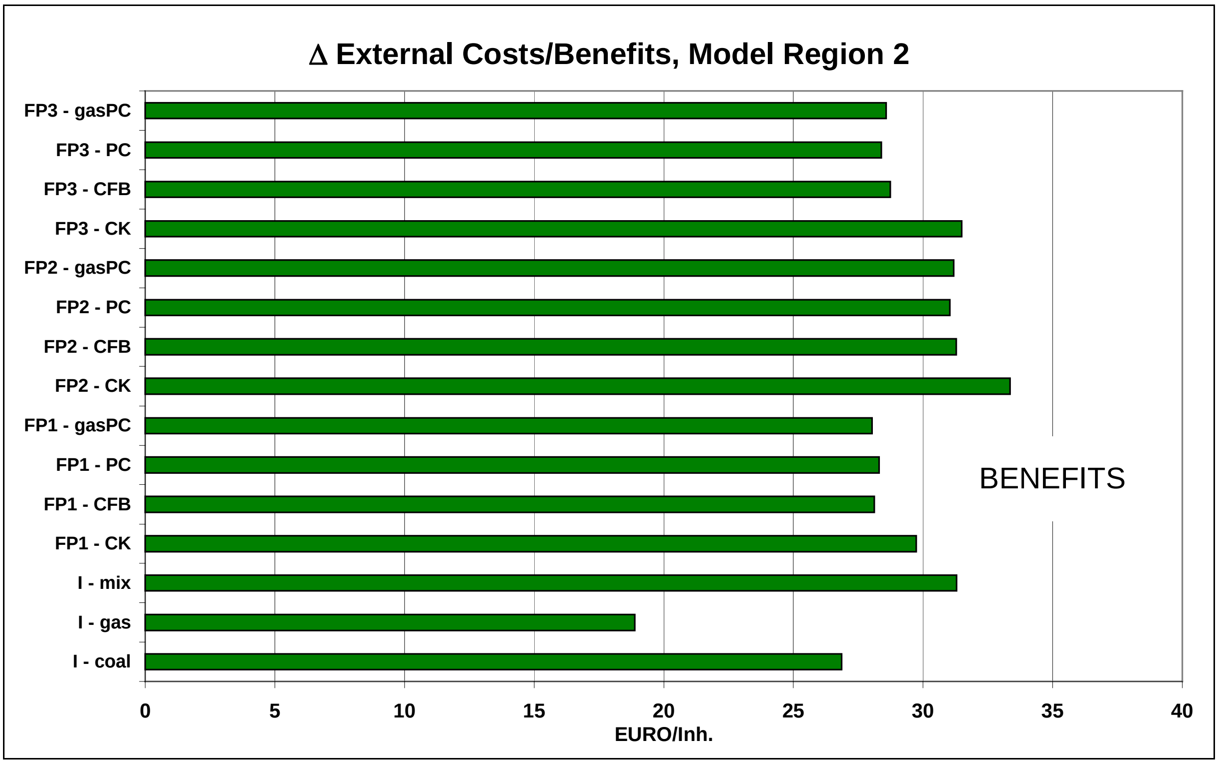

Figure 22: External costs/benefits of Model Region 2

Under the conditions of Model Region 2 clear external benefits can be achieved also. The external benefits are even higher than in Model Region 1. The reasons are the higher share of combustibles in residual waste as well as the higher efficiency of the MSW-incinerator (saleability of heat). The combination of both enables to substitute a considerable higher level of primary energy production. This especially increases the benefits achieved through the substitution of fossil CO_2 emissions (see Figure 23).

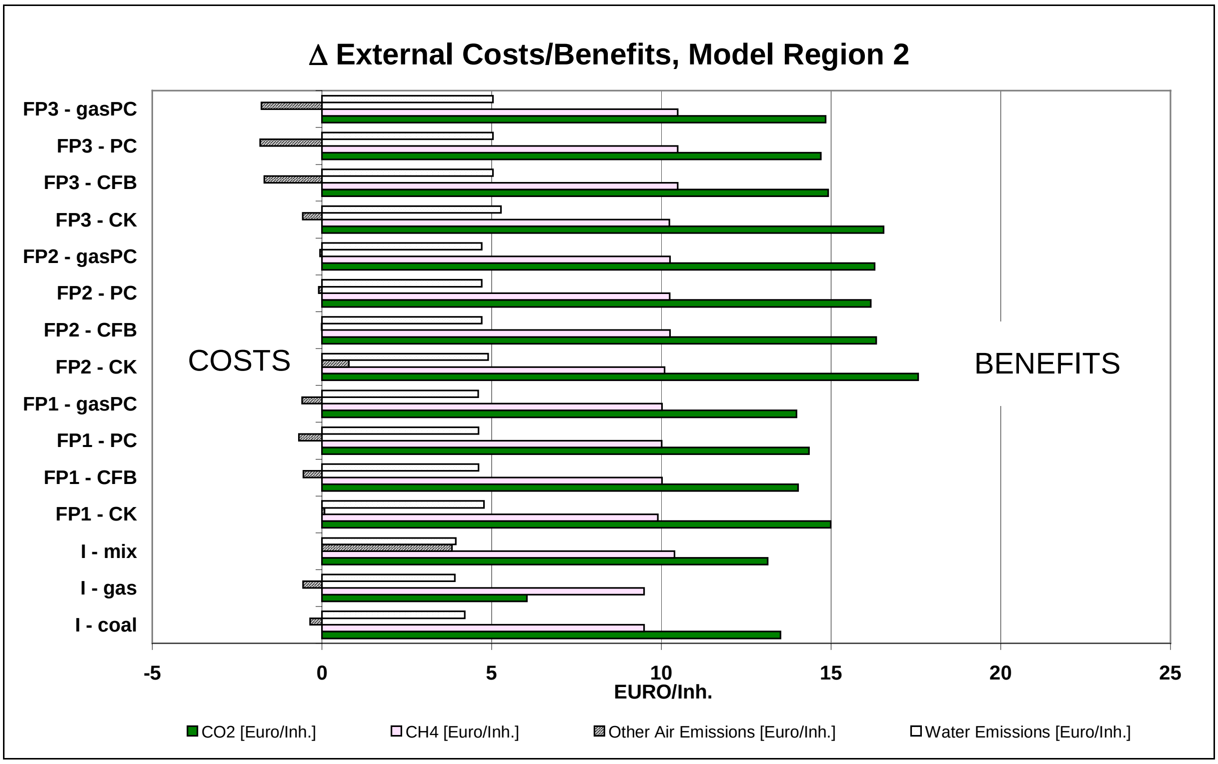

Figure 23: Distribution of external costs/benefits in Model Region 2

The lower organic carbon content in residual waste (lower share of organics) is mirrored in the lower CH_4-emission-costs contributing to the external benefits. In Model Region 2, the highest external benefit results from the substitution of fossil CO_2-emissions.

Also by considering heat substitution the hierarchy of the external benefits remains the same: The external benefits of the FP2 scenarios are slightly above the benefits of the FP3 and FP1 scenarios respectively followed by the benefits achieved in the incineration scenarios.

7.2.4 Cost-Benefit Balance compared to Landfill

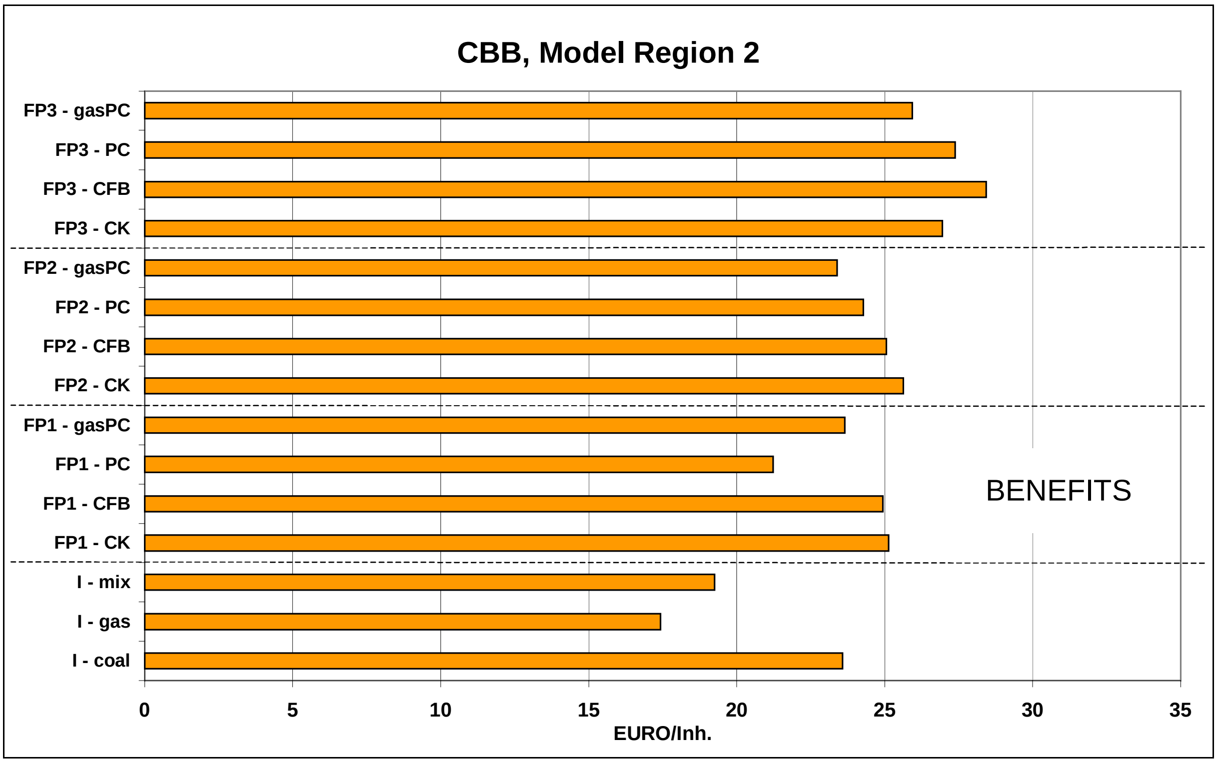

Figure 24: CBB of Model Region 2

In Model Region 2 all analysed scenarios achieve a clear positive cost-benefit balance. The hierarchy of the analysed scenarios remains almost the same like in Model Region 1, however, the differences between the scenarios have become much smaller. Especially the incineration and FP1 scenarios have significantly increased their CBB.

Averaged over all analysed scenarios the benefits achieved are in the order of 20 - 25 Euro/Inh.. This means that - from the welfare macro economic point of view - it is clearly desirable to support energy recovery from residual waste under the conditions of Model Region 2.

7.2.5 Energy Saved compared to Landfill

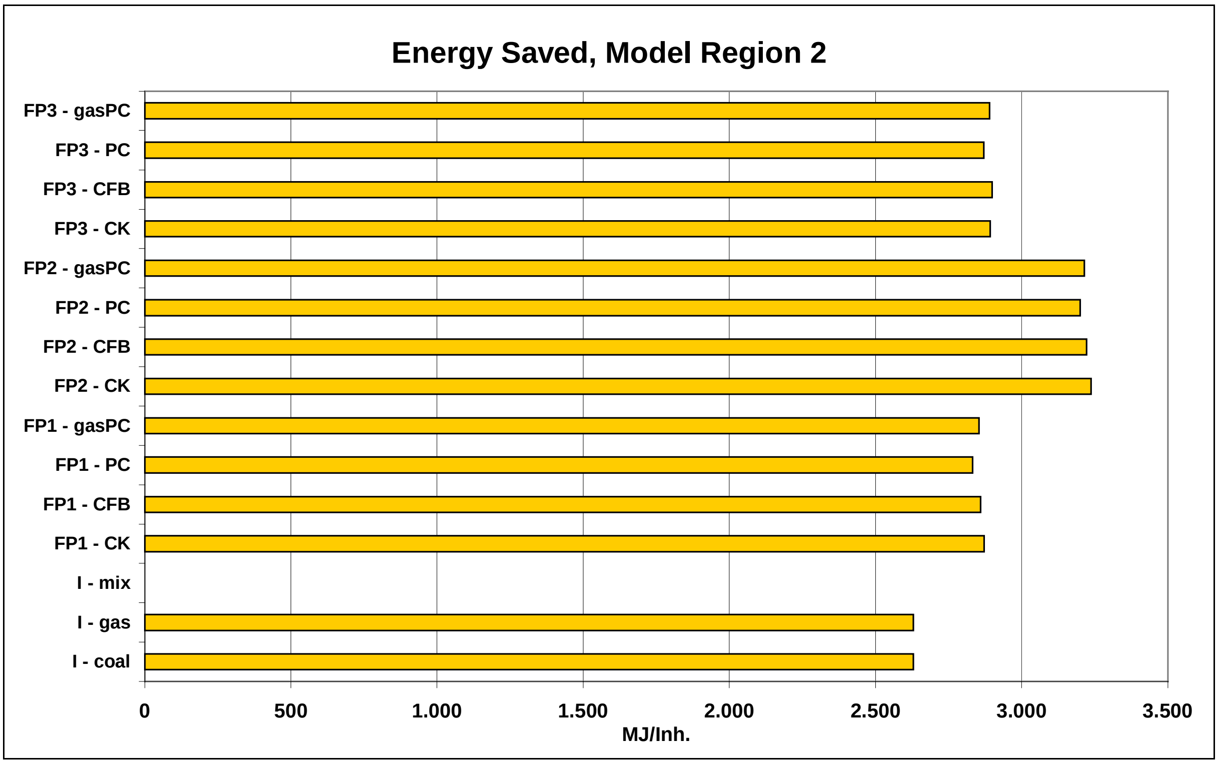

Figure 25: Energy saved by means of energy recovery in Model Region 2

The higher content of combustibles in residual waste as well as the better performance of energy recovery in the incinerator also influences the amount of fossil energy carriers saved. In comparison with Model Region 1 generally more fossil energy carriers can be substituted in Model Region 2.

The energy content of conventional energy carriers substituted is in the order of 2,600 - 3,200 MJ/Inh.. So, more than 10% of the average European solid fuel consumption can be saved under the conditions of Model Region 2.

7.3 Model Region 3 ("North")

Model Region 3 is characterised by a high waste generation rate (400 kg/Inh.). The waste composition is made up of a high share of paper and plastics and a low share of organics. The separate collection system includes separate collection of glass, paper, metals, and biowaste. The heat and power generated in the MSW incinerators can be sold to 100% efficiency.

7.3.1 Recovered Fuels

Table 18: Recovered fuels in Model Region 3

	fluff - FP1	pellets - FP1	soft pellets - FP2	hard pellets - FP3
amount [kg/Inh.]	101,9	83,6	131,0	203
amount [MJ/Inh.]	1.726	1.811	2.534	4.341
heating value [MJ/kg]	16,9	21,7	19,3	21,4
water content	23%	4%	16%	4%
Composition*				
C [%dm]	54,0%	45,5%	52,4%	43,7%
N [%dm]	0,50%	0,43%	0,43%	0,50%
S [%dm]	0,23%	0,21%	0,22%	0,22%
Cl [%dm]	0,72%	0,74%	0,76%	0,74%
Cd [mg/kg dm]	6	6	6	6
Hg [mg/kg dm]	0,43	0,24	0,27	0,38
Pb [mg/kg dm]	135	135	140	145

* The composition of recovered fuels is calculated on the basis of substance groups. Measurements undertaken in the field are more accurate. Producers of recovered fuels reported that the quality of recovered fuel is generally higher than shown in the table.

In Model Region 3 the highest share and amount of residual waste can be transferred into recovered fuel. For instance, in the FP3 process more than 40% of the waste generated in the region is finally used for fuel production. Moreover, in Model Region 3 the highest heating values of FP2 and FP3-fuel are achieved.

7.3.2 Internal Costs/Benefits compared to Landfill

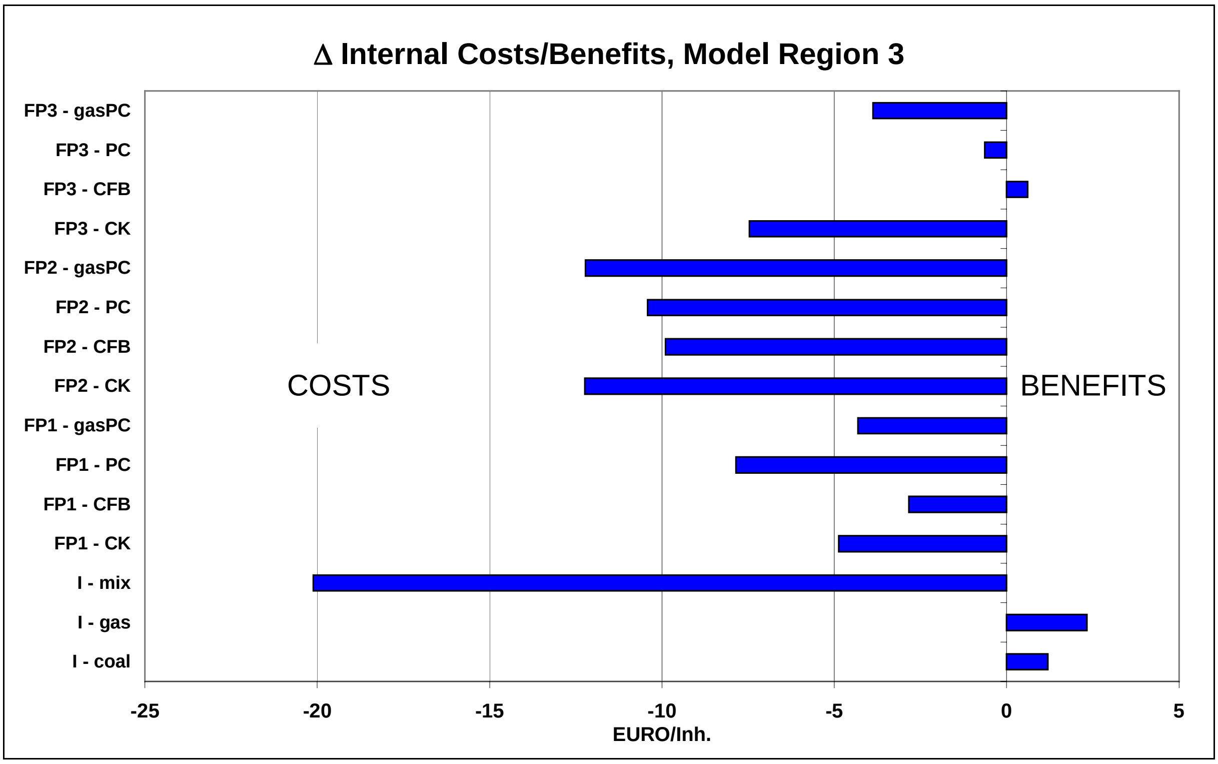

Figure 26: Internal costs/benefits of Model Region 3

In Model Region 3 the costs for labour and investments are higher than in Model Region 1 and 2. This means that the process costs arising in the analysed system are higher, too. The energy costs, however, that can be saved through the use of recovered fuel remain in the same order like in the other Model Regions. So, in Model Region 3 less benefits can be achieved relatively to the costs linked with the preparation and co-combustion of recovered fuel. As a consequence, the internal costs of most FP scenarios and of the I-mix scenario are even higher than in Model Region 2 although in Model Region 3 more energy from waste can be recovered and, hence, more fossil energy carriers can be saved.

The internal costs of the I-coal and I-gas scenario, however, are much smaller than in Model Region 1 and 2. Here, the higher costs for labour and investments are also considered in the field of substitution. In these scenarios not only a fossil energy carrier but the whole operation of a coal or a gas fired power plant (including labour and investment) is substituted. So, the saved costs in the system of substituted primary energy production rise in the same way like the costs in the analysed system. Because of the high calorific value of residual waste (no separate collection of plastics) and because of the higher efficiency of waste incineration (100%) the internal costs of these scenarios can be reduced significantly.

In terms of the I-coal, I-gas, and also for the FP3-CFB scenario the benefits of saved primary energy production are even high enough to overcompensate the additional costs of energy recovery compared to the alternative of full landfilling. This means that - without considering externalities and saved emissions respectively - these three scenarios already achieve a (small) benefit for the national welfare.

7.3.3 External Costs/Benefits compared to Landfill

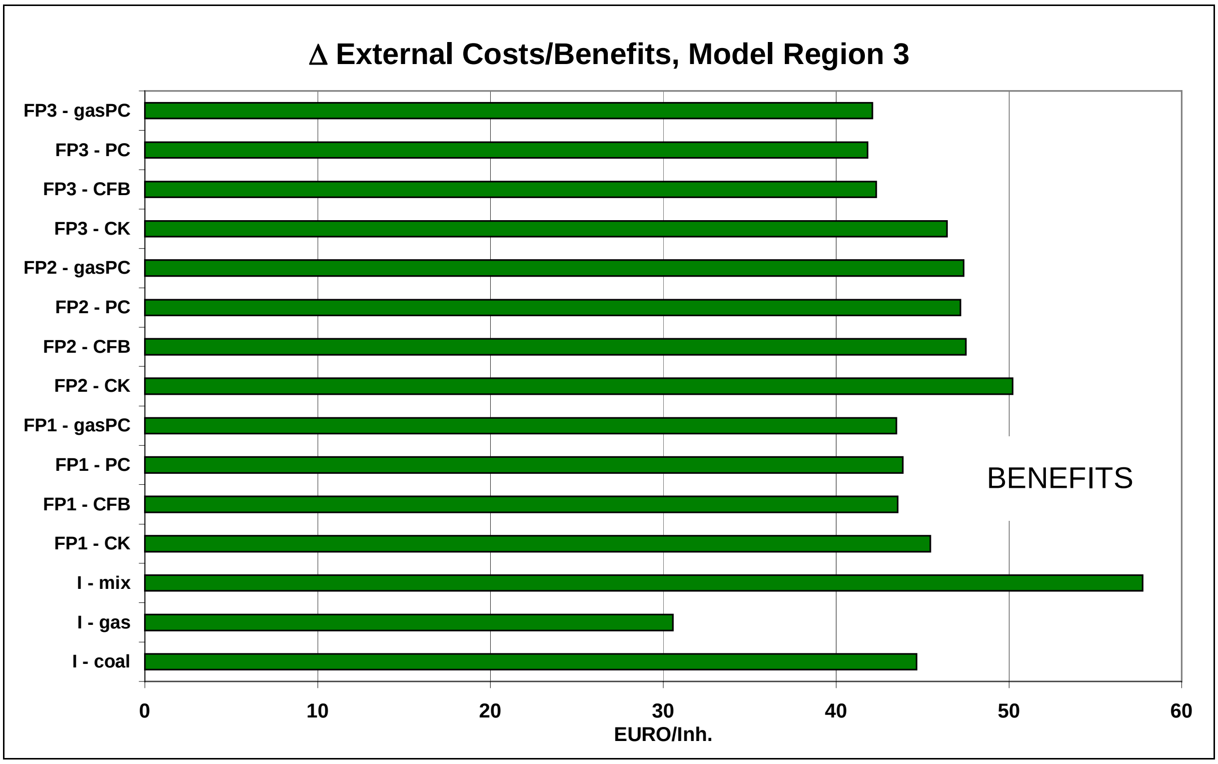

Figure 27: External costs/benefits of Model Region 3

The external benefits in Model Region 3 are generally higher than in Model Region 2. The higher calorific value of the waste and the higher efficiency of the incinerator lead to higher CO_2 benefits and to higher external benefits consequently.

The incineration scenario I-mix even shows the highest external benefits among the analysed scenarios. The emissions of the processes forming the energy mix are generally higher than the emissions of a coal or gas fired power plant or of a co-combustion processes powered with regular fuel. Combined with a 100% efficiency of MSWI, thus, the highest external benefits can be achieved by substituting the European energy mix.

The 100% efficiency of MSWI also supports the FP1 scenarios whose external benefits become even higher than the benefits of the FP3 scenarios.

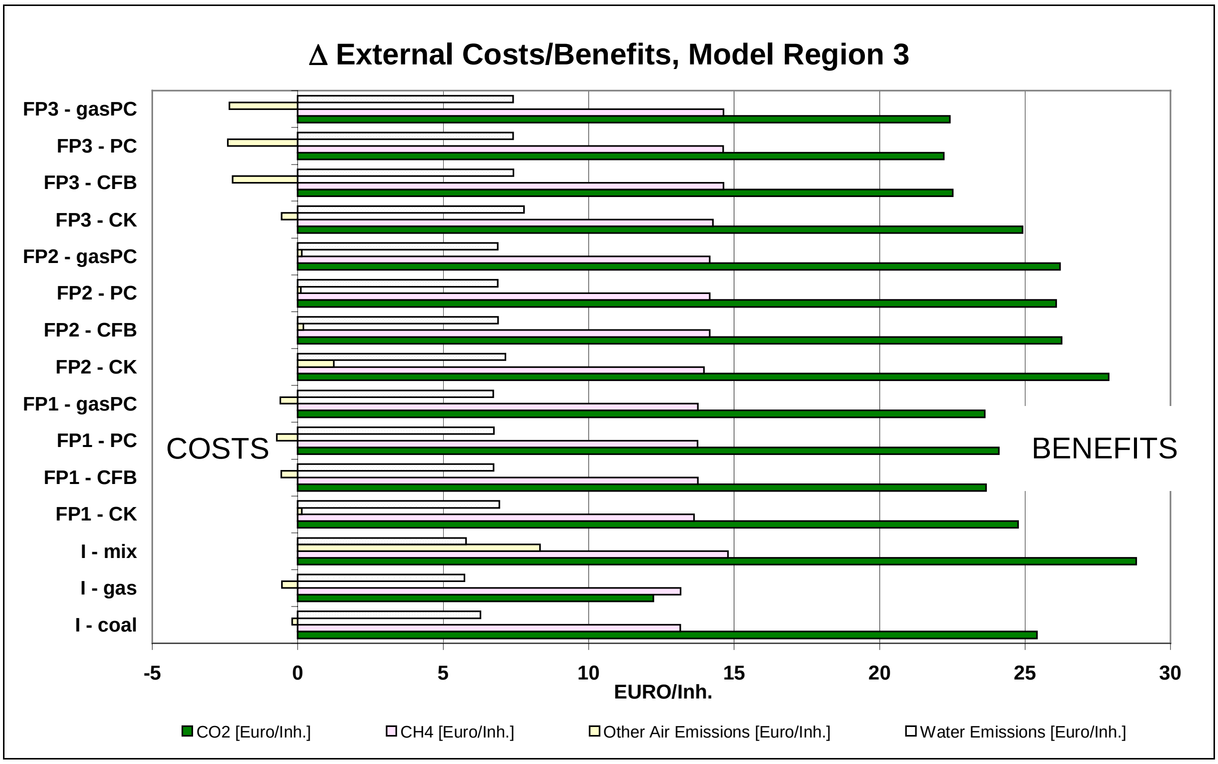

Figure 28: Distribution of external costs/benefits in Model Region 3

7.3.4 Cost-Benefit Balance compared to Landfill

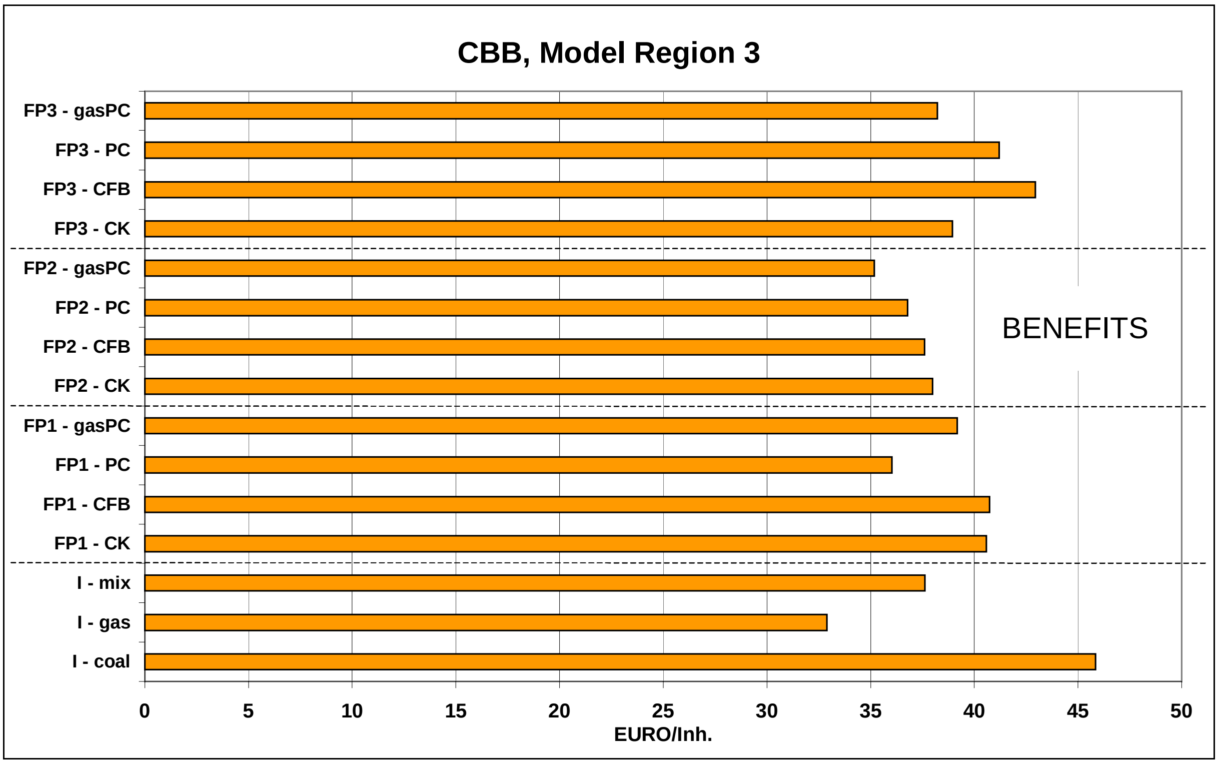

Figure 29: CBB of Model Region 3

The cost-benefit balance of Model Region 3 is significantly better than the CBBs of Model Region 1 and 2.

Under the circumstances of Model Region 3 the analysed scenarios achieve very similar results. The reasons for that are, on the one hand, the high calorific value of the residual waste and, on the other hand, waste incineration with a maximum of energy recovery (100%). Under these circumstances, it makes almost no difference if the waste is directed to an efficient fuel preparation process (FP3) or if the waste is directly fed into a waste incinerator. Averaged over all scenarios investigated the benefit for the national economy is in the order of 35-40 Euro/Inh..

7.3.5 Energy Saved compared to Landfill

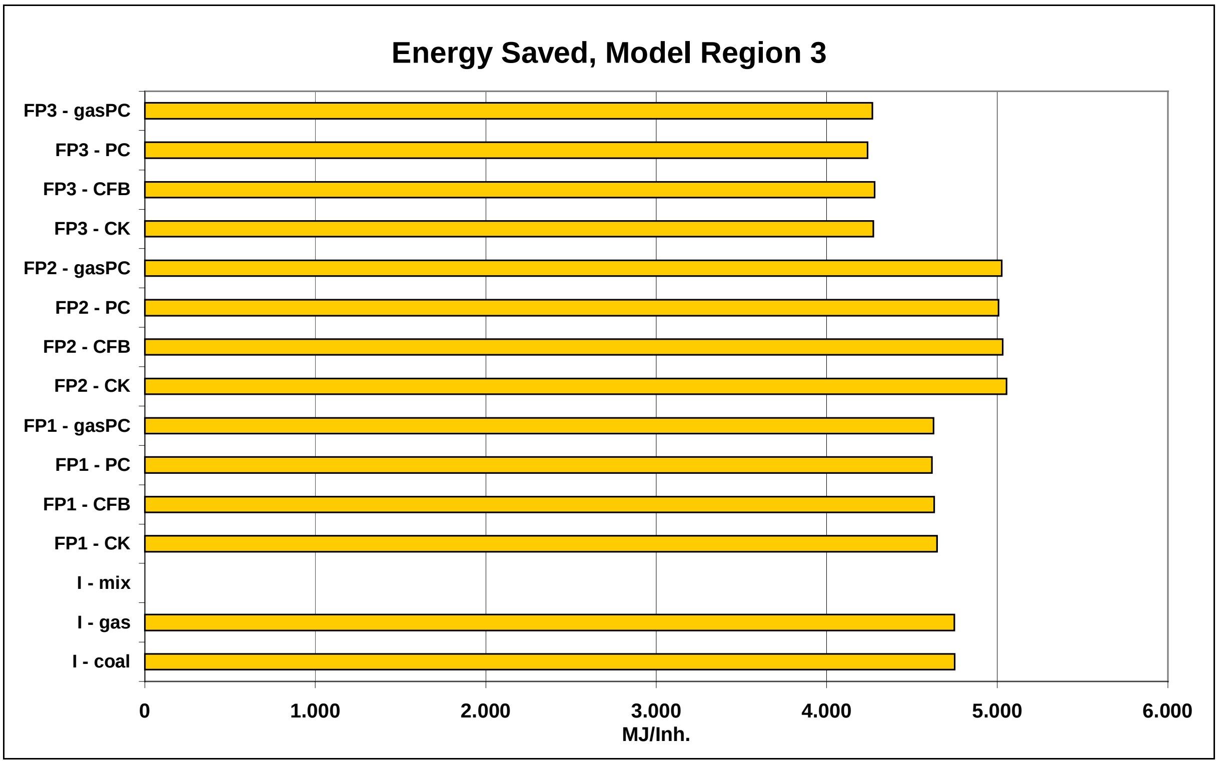

Figure 30: Energy saved by means of energy recovery in Model Region 3

The amount of saved energy carriers in the FP 3 scenarios falls below the values observed in the other scenarios. This is because of the rather high consumption of energy in the FP3 process in combination with the supporting conditions for direct incineration in Model Region 3.

The energy content of conventional energy carriers saved in Model Region 3 is in the order of 4,200 - 5,000 MJ/Inh.. So, more than 15% of the average solid fuel consumption can be substituted.

8 SENSITIVITY ANALYSES

The objective of the sensitivity analyses is to identify the most driving parameters on the result of the cost-benefit analysis.

As a first step a so called "Base Region" is defined. The Base Region acts as a reference for the sensitivity analyses undertaken. It is characterised by middle ranged parameters.

Table 19: Parameters characterising the Base Region

Parameter	**Base Region** (city of 500,000 inh.)
MSW generation	350 kg/Inh.
MSW composition	medium organic and packaging (paper, plastics) like in Model Region 2
amount of commercial and industrial waste	COMM: 65 kg/inh. IND: 35 kg/inh.
separate collection system	glass, paper, metals, bio-waste like in Model Region 3
personnel cost factor	1
investment cost factor	1
energy cost factor	1
capacity of waste incinerator	150,000 t/a
saleable energy of MSW incinerator	electric eff.: 10% thermal eff.: 70%
averting cost factor	1

As a second step the parameters, which might be important for the result of the cost-benefit analysis, are varied one after another. So, the influence of the different parameters on the cost-benefit balance can clearly be demonstrated.

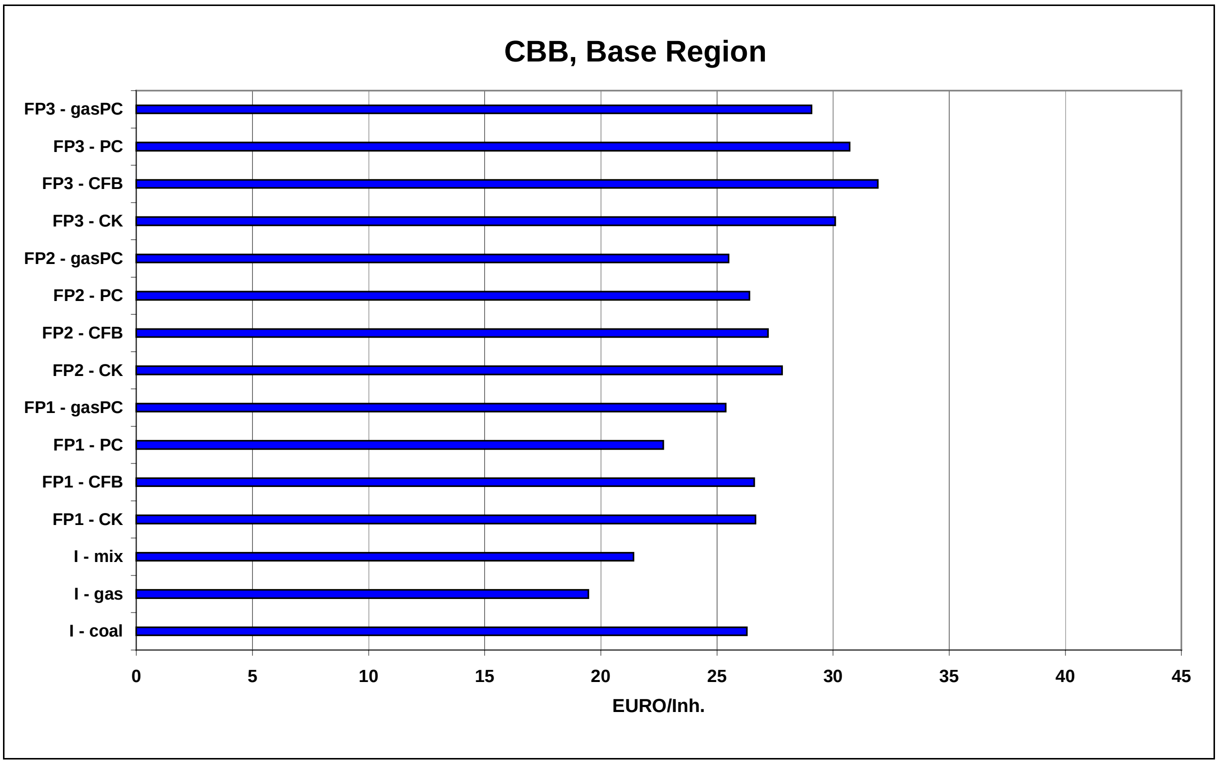

Figure 31: CBB of Base Region

Figure 31 shows the cost-benefit balance of the analysed scenarios for the parameters describing the Base Region. In the following the cost-benefit balance of the scenarios in the Base Region will be compared with the cost-benefit balance resulting after a particular parameter is varied within a given range.

The following parameters will be investigated by means of sensitivity analyses:

- waste generation
- waste composition
- amount of commercial/industrial waste
- separate collection system
- investment/personnel cost
- energy costs
- capacity of the waste incinerator
- saleable energy of waste incineration
- residues of fuel preparation go to landfill (including the examination whether or not the Landfill Directive is met)
- examination period of landfilling
- averting costs

Waste Generation

Range investigated: 300 kg/Inh.

350 kg/Inh. (Base Region)

400 kg/Inh.

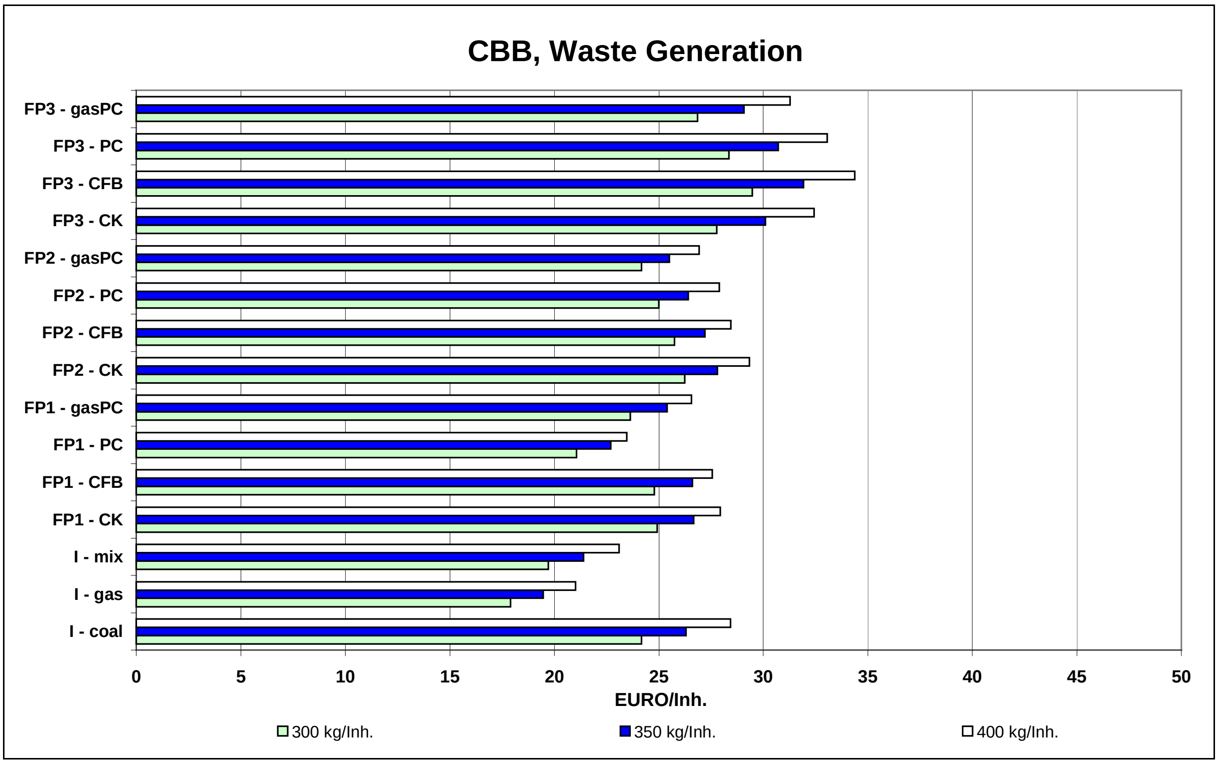

Figure 32: Influence of the waste generation rate on the cost-benefit balance

In general, a higher waste generation rate means a higher energy input into the analysed system. So, an increase of the waste generation rate of some 15% (350 kg/Inh. -> 400 kg/Inh.) leads to an increase of the energy input (as residual waste) of some 8%. The cost-benefit balance ranges in this order correspondingly.

Differences between the analysed scenarios regarding the range of 8% are caused by different input specific costs of the processes in the analysed system. This is especially the case for specific transport costs which are increasing the less waste is transported. This effect can especially be observed in the incineration as well as in the FP3 scenarios.

Waste Composition

Range investigated:
- high organic, low packaging (paper, plastics) - composition like in Model Region 1 above
- medium organic and packaging (paper, plastics) - composition like in Model Region 2 above (Base Region)
- low organic, high packaging (paper, plastics) - composition like in Model Region 3 above

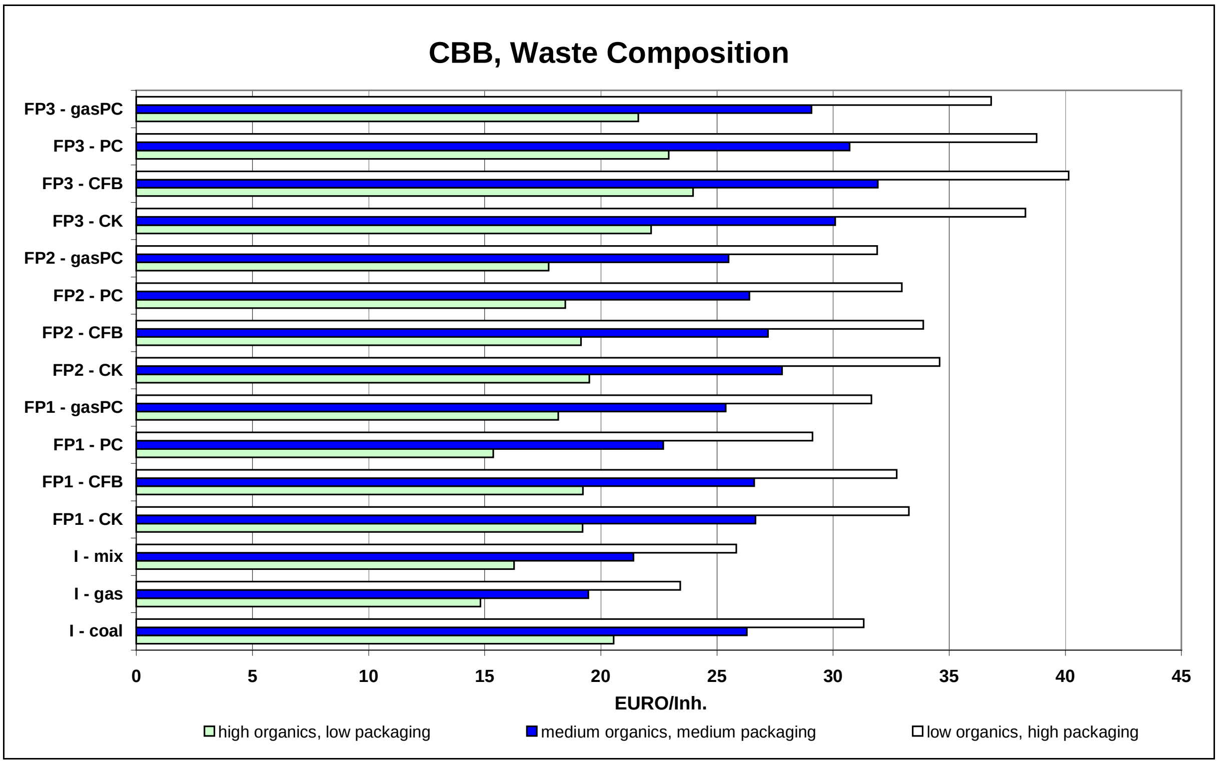

Figure 33: Influence of the waste composition on the cost-benefit balance

The cost-benefit balance is rather sensitive on the “quality” of the waste generated. In terms of energy recovery, a high percentage of combustibles in MSW significantly increases the cost-benefit balance. However, even with a low share of combustibles and a high share of organics the cost-benefit balance remains positive. A clear benefit for national welfare is still achievable.

Amount of Commercial/Industrial Waste

Range investigated:
- Commercial waste: 45 kg/Inh.
  Industrial waste: 25 kg/Inh.
- Commercial waste: 65 kg/Inh.
  Industrial waste: 35 kg/Inh. (Base Region)
- Commercial waste: 85 kg/Inh.
  Industrial waste: 45 kg/Inh.

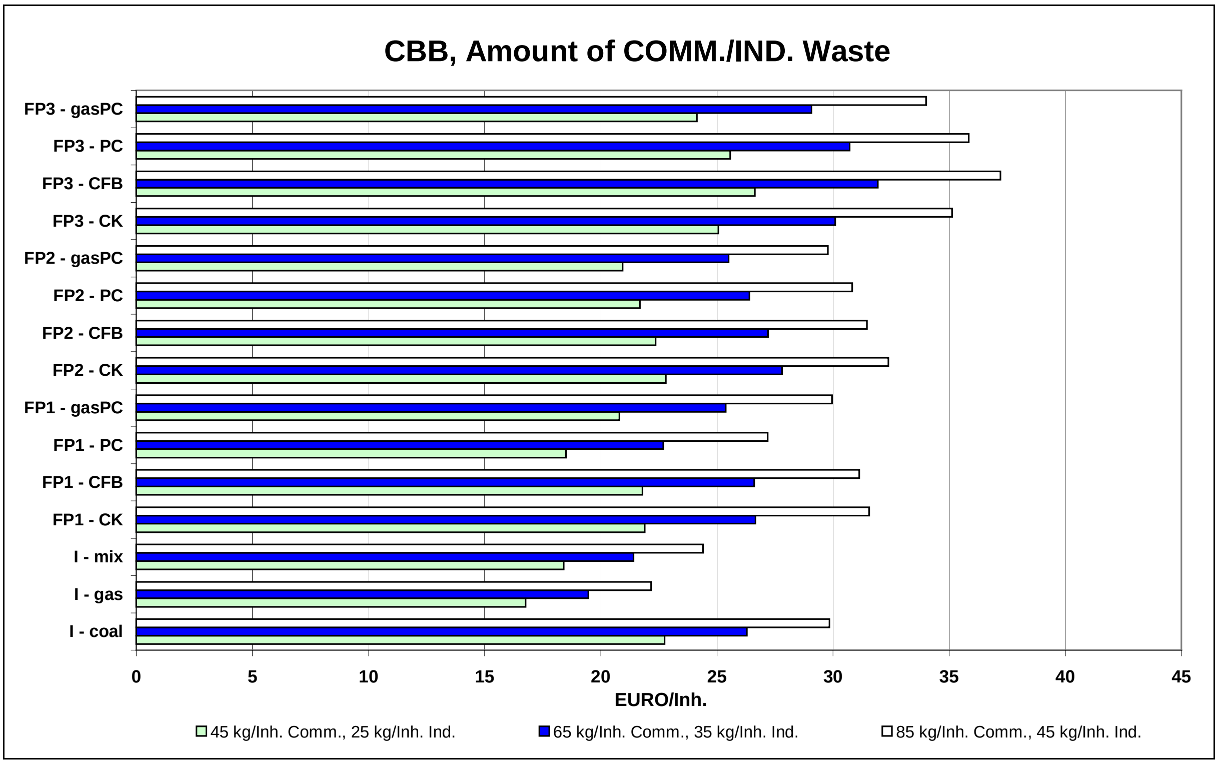

Figure 34: Influence of the amount of commercial and industrial waste on the cost-benefit balance

The composition of commercial/industrial waste assumed in the model is mainly dominated by combustibles (see Table 12). So, the influence of the amount of commercial/industrial waste on the cost-benefit balance is similar to the influence of the waste composition presented above. The higher the share of commercial/industrial waste and, hence, the higher the share of combustibles the higher the cost-benefit balance can get. The variation of combustibles shows a slightly higher influence on the FP scenarios than on the incineration scenarios.

Separate Collection System

Range investigated:
- low level of separate collection (glass, paper, biowaste) - the same system like in Model Region 1 above
- medium level of separate collection (glass, paper, metals, biowaste) - the same system like in Model Region 3 above
- high level of separate collection (glass, paper, metals, biowaste, plastics) - the same system like in Model Region 2 above

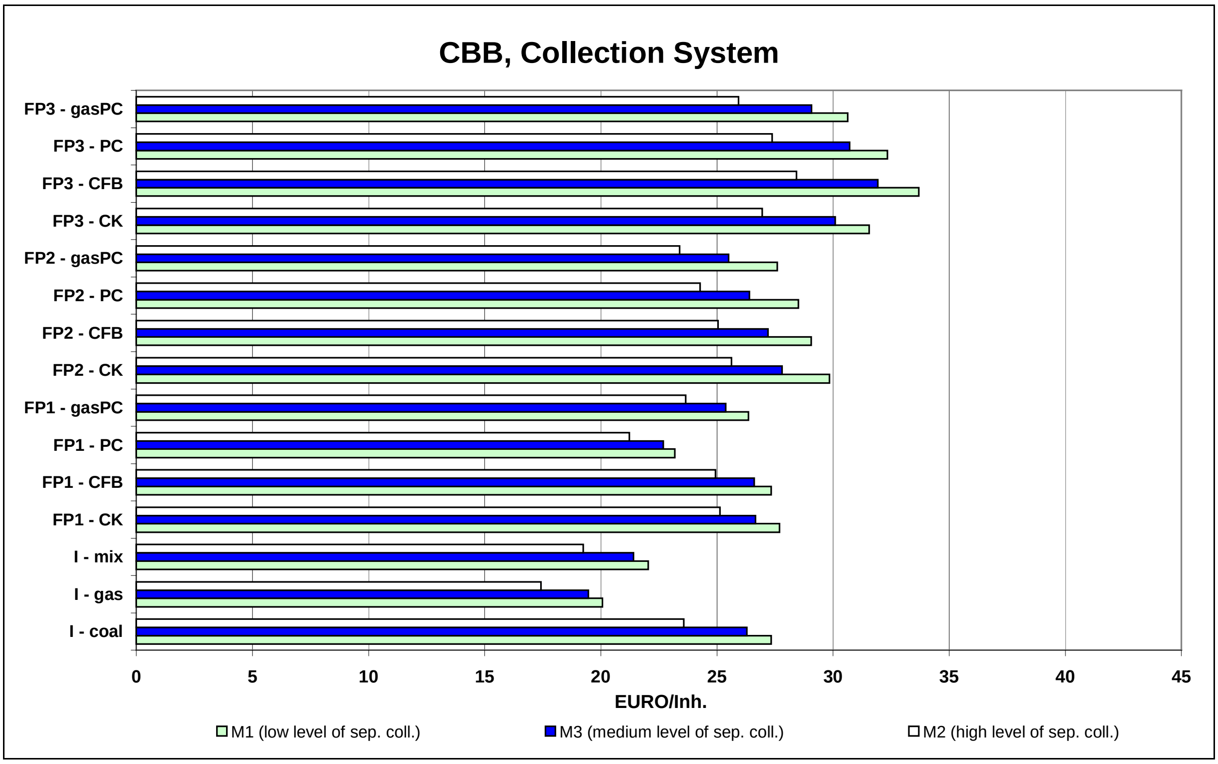

Figure 35: Influence of the separate collection system applied on the cost-benefit balance

A low level of separate collection means that most of the combustibles (paper, plastics) remain in residual waste and can be used for the purpose of energy and fuel recovery. Considering the definition chosen for the baseline scenario this means that it would be better to have a low level of separate collection in order to increase the cost-benefit balance.

However, from that it can not be concluded that it is better to have a low level of separate collection in principle. The benefits that are connected with separate collection are also part of the baseline scenario. With the calculation of the cost-benefit balance these benefits are cancelled out because the analysed scenarios (where the same benefits are included) are subtracted from the baseline scenario. This means that the cost-benefit balance - like it is calculated in the cost-benefit analysis - can only be interpreted in view to the way of waste treatment after secondary materials have been separated for recycling.

So, in the sensitivity analysis it can be shown that - in case of a high level of separate collection - energy recovery of the remaining waste is still beneficial although most of the combustibles (paper, plastics) are directed to material recycling. Whether or not this high level of recycling is beneficial for the national welfare has to be shown in a different study.

Investment/Personnel Cost

Range investigated: - Factor 0.7

- Factor 1.0 (Base Region)

- Factor 1.3

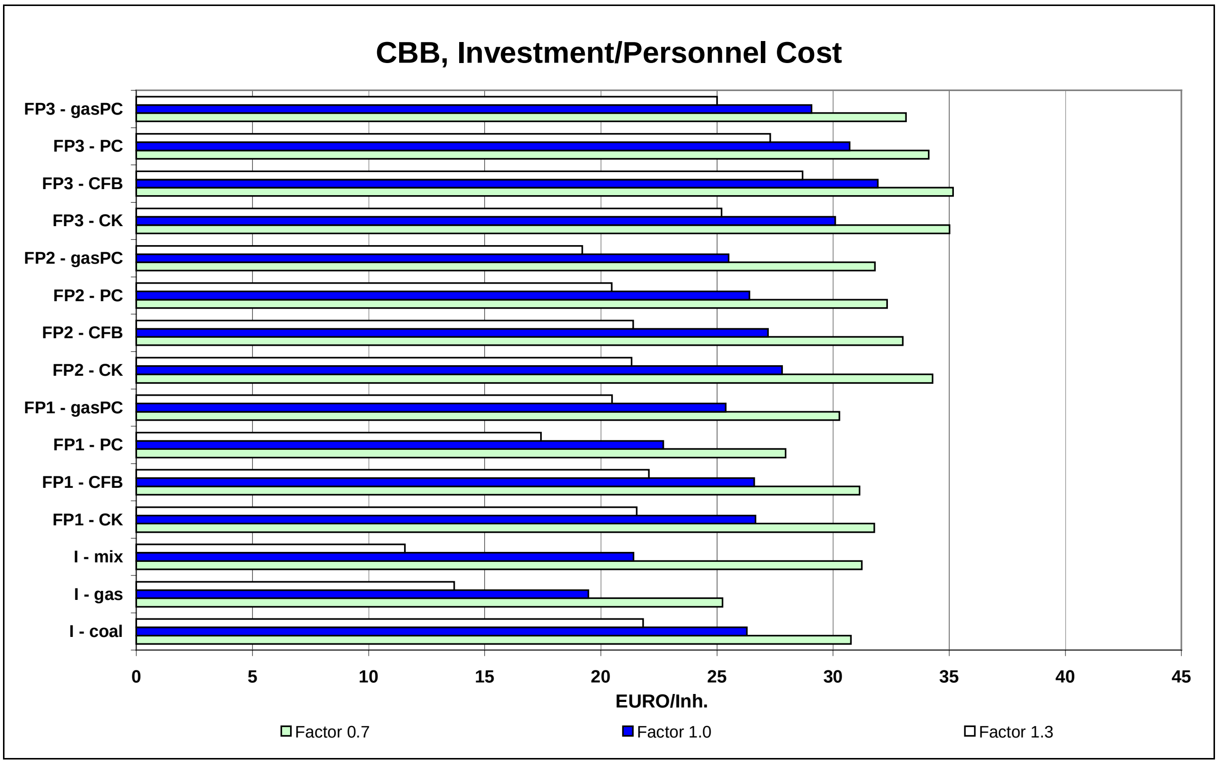

Figure 36: Influence of the investment and personnel cost on the cost-benefit balance

It is obvious that higher investment cost and personnel cost respectively will directly influence the cost-benefit balance. The internal cost as an important part of the cost-benefit balance will increase significantly. The benefits that can be achieved in form of saved energy costs, however, remain in the same order. As a consequence, the benefits can only cover a smaller part of the costs which results in a lower cost-benefit balance in the end.

The contrary effect can be observed for smaller investment and personnel costs. Here, higher cost-benefit balances are achieved.

Energy Costs

Range investigated: - Factor 0.7

- Factor 1.0 (Base Region)
- Factor 1.3

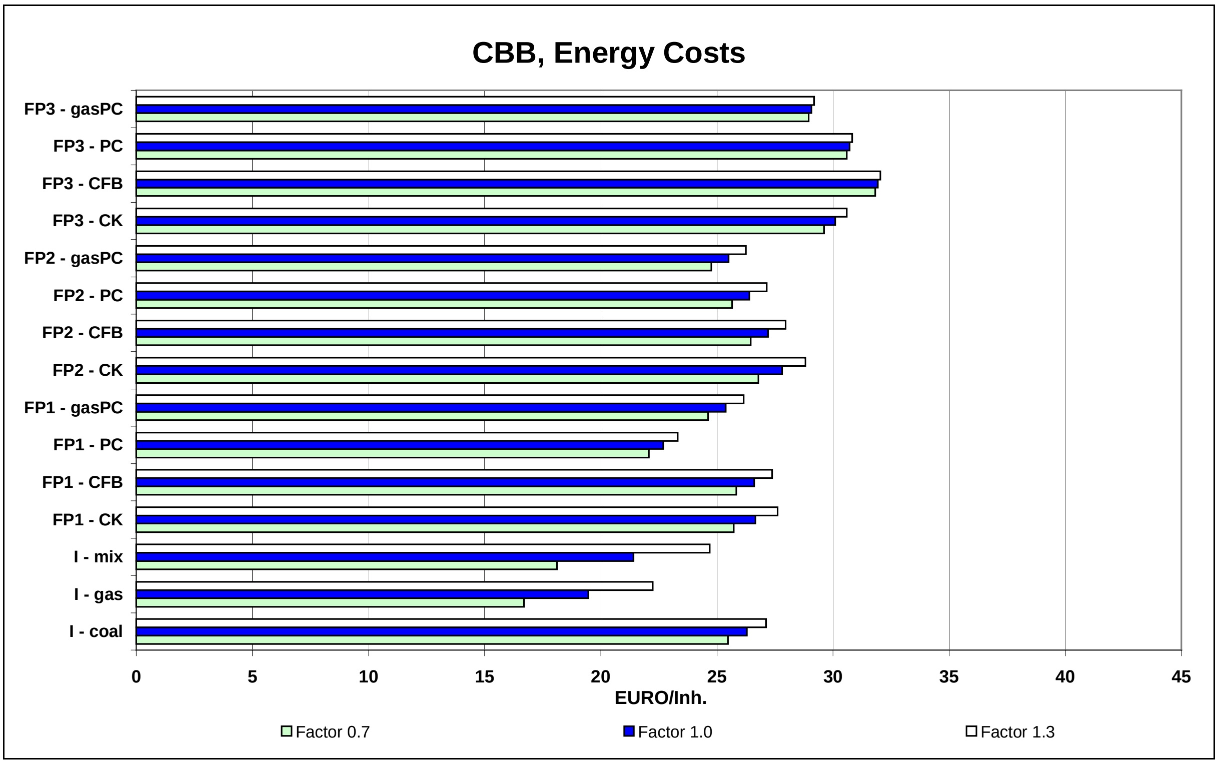

Figure 37: Influence of the energy costs on the cost-benefit balance

The energy costs have only a minor effect on the cost-benefit balance. In the FP3 scenarios the effect can hardly be noticed. In these scenarios the fuel preparation process is also rather energy consuming (esp. heating oil). Moreover, the heating value of the residuals directed to the incinerator is rather low which requires additional co-firing with natural gas in the incinerator. With the consumption of heating oil and natural gas in the analysed system additional energy costs are arising which almost level out the higher benefits that can be achieved through the higher cost level of regular fuels substituted.

The highest influence of the energy costs can be observed in the I-gas and I-mix scenarios. Here, natural gas and the electricity/heat mix are substituted. Due to the higher energy costs of gas and electricity/heat in comparison with the costs of coal an increase of the energy costs shows a higher influence on the cost-benefit balance compared to the other scenarios where (mainly) coal is substituted.

Capacity of the Waste Incinerator

Range investigated: - 60,000 t/a

- 150,000 t/a (Base Region)
- 300,000 t/a

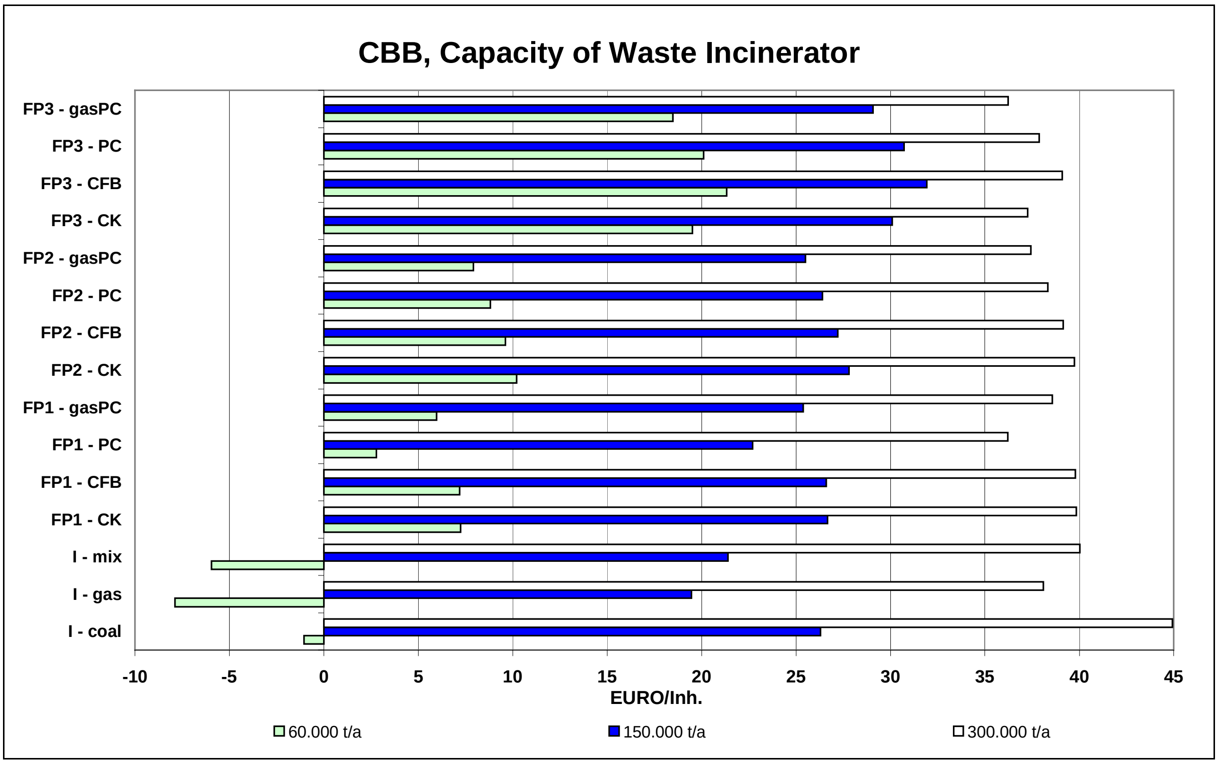

Figure 38: Influence of the capacity of the waste incinerator on the cost-benefit balance

The capacity of the waste incinerator shows a major influence on the cost-benefit balance. The reason for that is, on the one hand, that waste incineration plays an important role in every analysed scenario and, on the other hand, that the business costs of waste incineration depend very much on the capacity of the incinerator.

With a low capacity of the waste incinerator the internal costs are raising so much that in some scenarios the external benefits are not big enough to compensate the internal costs sufficiently. This, finally, results in negative cost-benefit balances.

With a high capacity, however, the internal costs decrease considerably and high benefits for the national economy can be achieved. In this case the "pure" incineration scenario with the substitution of a coal fired power plant even represents the best analysed scenario.

Saleable Energy of Waste Incinerator

Range investigated: - 25% electricity

- 10% electricity; 70% heat (Base Region)

- 20% electricity; 80% heat

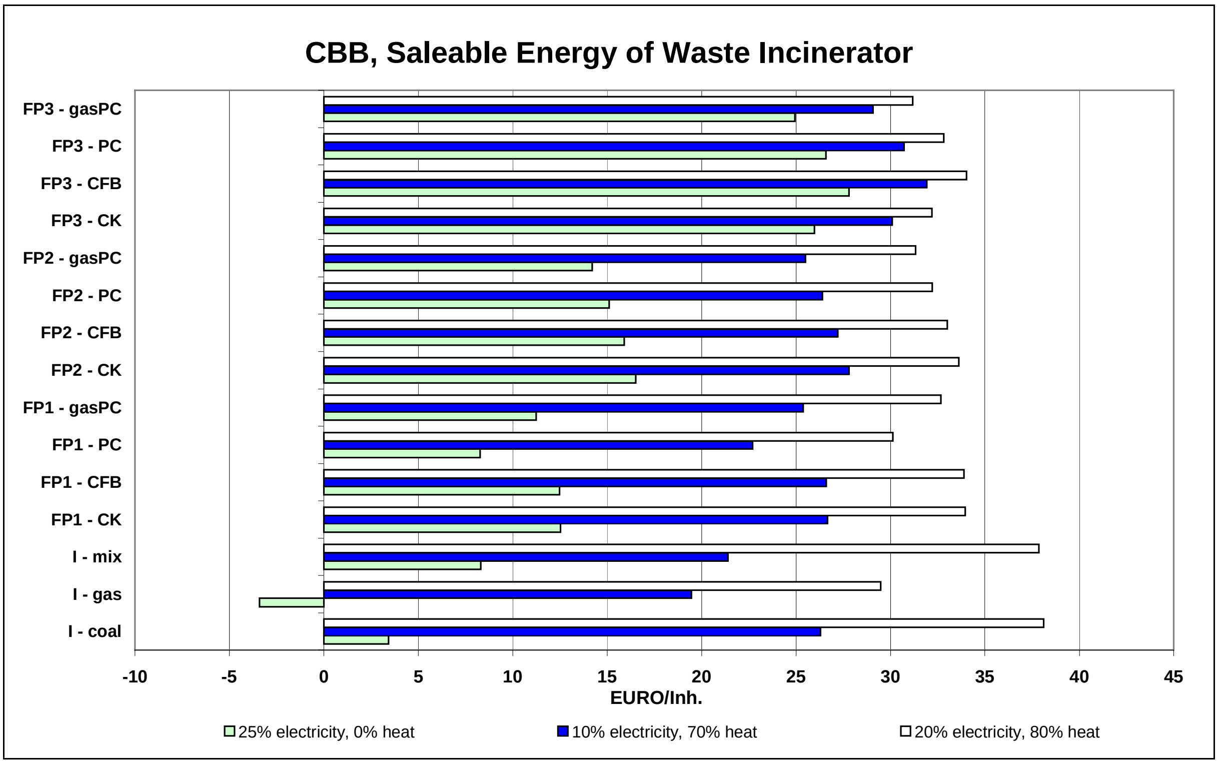

Figure 39: Influence of the efficiency of the waste incinerator regarding saleable energy on the cost-benefit balance

The amount of energy that can be sold from waste incineration shows also a big influence on the cost-benefit-balance. The influence is increasing the more waste is directed to the waste incinerator. In case of the I-gas scenario the cost-benefit balance even becomes negative when only electricity can be sold.

In general, the high dependency of the analysed scenarios on the performance of the waste incinerator (capacity, efficiency) results from the assumption that all residues of fuel preparation are directed to a waste incinerator.

In the following sensitivity analysis, however, the option of landfilling all residues will be examined.

Residues of Fuel Preparation go to Landfill

Range investigated: - Residues of fuel preparation go directly to landfill

- Residues of fuel preparation go to incineration (Base Region)

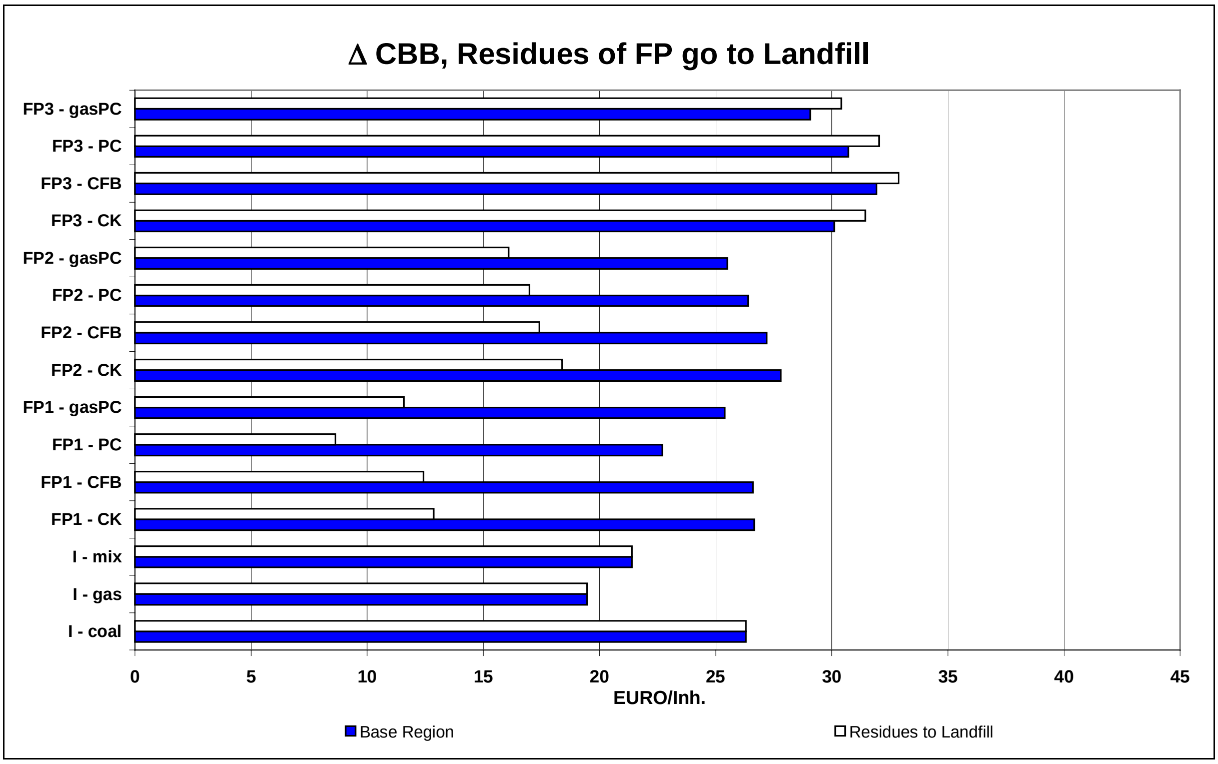

Figure 40: Influence of landfilling the residues of fuel preparation on the cost-benefit balance

Instead of directing the residues of fuel preparation to a waste incinerator the residues can also be directed to landfill.

In this case the FP1 and FP2 scenarios show a considerable reduction of the benefits achieved. The reason for that is the rather high energy content of the residues which is "lost" through landfilling. In case of directing the residues to an incinerator, the residues represent a valuable input stream in view to the production of saleable energy. In case of landfilling, however, the residues are mainly broken down to CO_2 and CH_4 which considerably increases the external costs and decreases the benefits of the respective scenarios consequently.

A different effect can be observed in the FP3 scenarios. Here, even higher benefits can be achieved when the residues are directed to landfill. This results from the rather low energy content of the residues leaving the FP3 process. In case of incineration, the low energy content requires additional co-firing which increases the internal costs of incineration. In case of landfilling, the low energy content and the low content of carbon respectively leads to rather low CO_2 and CH_4 emissions. So, the external costs of landfilling are only slightly higher than the external costs of incineration. The internal costs of landfilling, however, are much lower than the internal costs of incineration. In summary, in the FP3 scenarios better results for the national economy can be achieved if the residues go directly to landfill.

For the option of landfilling it is additionally examined whether or not the diversion requirements stated in the European Landfill Directive are met.

The Landfill Directive follows the strategy to reduce the amount of biodegradable municipal waste going to landfills. The Directive aims at a reduction of biodegradable municipal waste to 35% of the total amount of biodegradable municipal waste produced.

In the following the limit of 35% is examined for each analysed scenario.

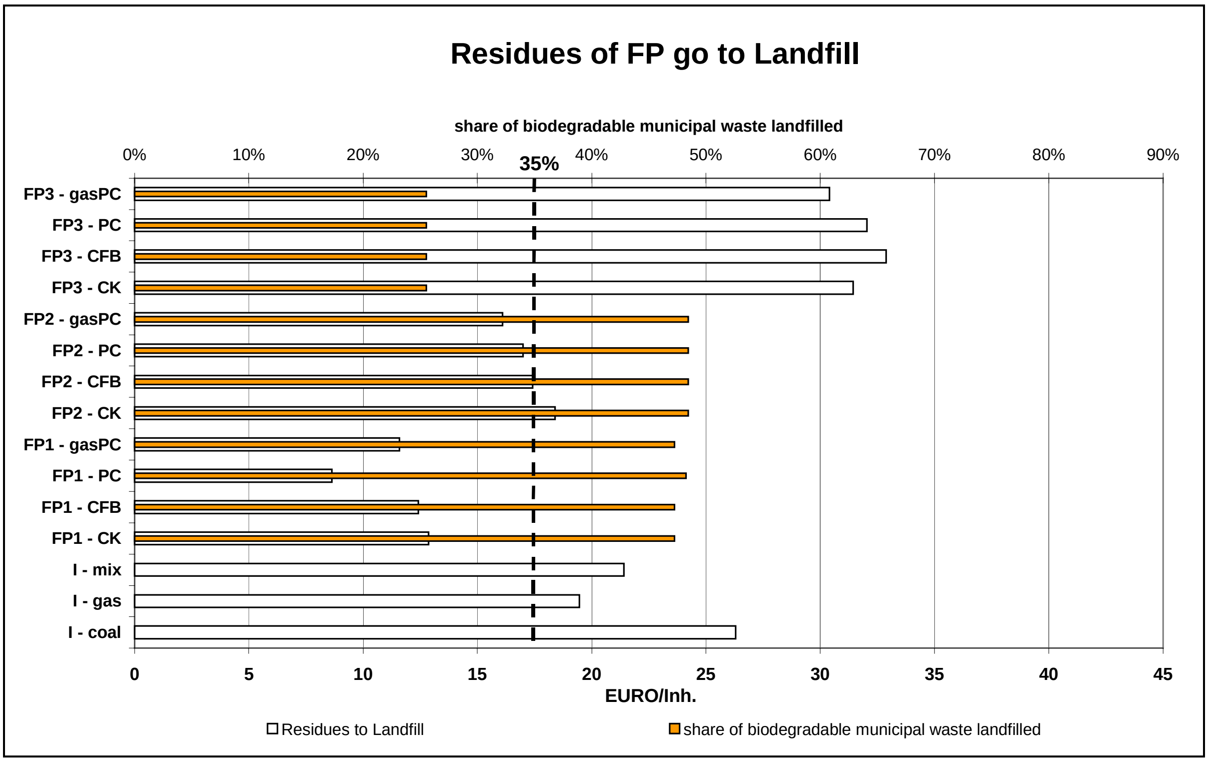

Figure 41: CBB (in Euro/Inh.) and share of biodegradable waste landfilled (in % of biodegradable waste produced) in case of directing the residues of fuel preparation to landfill

Figure 41 shows the cost-benefit balance as well as the share of biodegradable waste landfilled for each analysed scenario. The figure also shows the borderline of 35% stated in the Landfill Directive.

In the FP1 and FP2 scenarios the share of biodegradable municipal waste is far above the borderline of 35%. In these scenarios nearly 50% of the biodegradable municipal waste produced finally go to landfill. So, compared to incineration, the option of directing the residues to landfill achieves not only a lower cost-benefit balance (see Figure 40 above) but it is also not in line with the Landfill Directive. This means that the residues have to go to a further treatment such as incineration or biological treatment in any case.

In the FP3 scenarios, however, the share of biodegradable municipal waste landfilled is in the order of 25% and, thus, in line with the Landfill Directive.

In summary, it is better to direct residues of fuel preparation to landfill on the pre-condition that the fuel preparation process shows a high efficiency regarding the separation and production of recovered fuel. In this case, the share of municipal biodegradable waste going to landfill also falls below the border stated in the Landfill Directive.

Examination Period of Landfilling

Range investigated: - 100 years

- 10,000 years (Base Region)

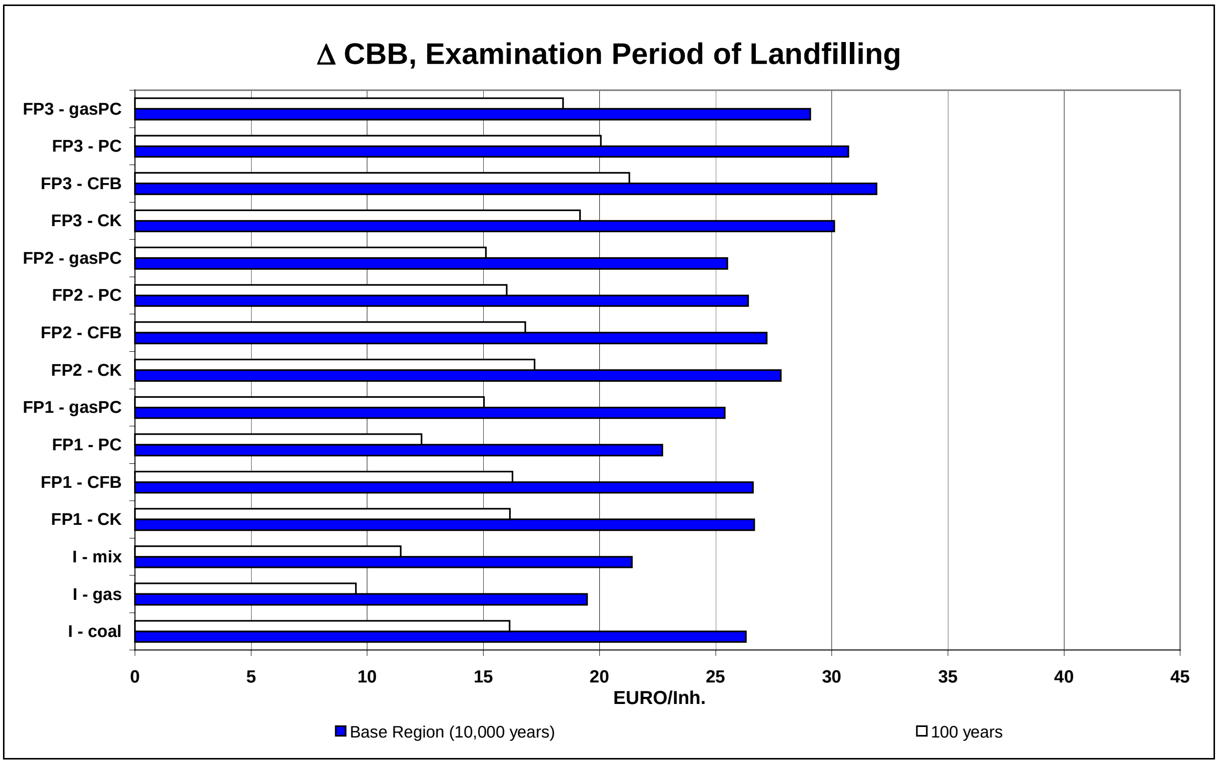

Figure 42: Influence of the examination period of landfilling on the cost-benefit balance

In this sensitivity analysis the examination period of landfilling is reduced from 10,000 years to 100 years. This means that a considerable amount of the elements landfilled has not left the landfill in form of gaseous or liquid emissions. So, for instance, approximately half of the carbon, that has been landfilled, is still in the landfill body[36].

The sensitivity analysis shows that under an examination period of 100 years the cost-benefit balance of the initial base region is reduced by about 40%. The contribution of the baseline scenario (landfilling) on the external benefits is reduced from more than 50% to about 25%. This indicates that roughly half of the environmental effects of landfilling are already occurring in the first period after the waste has been landfilled. The most driving effect in this connection is the formation and emission of methane.

[36] The transfer-coefficients of landfilling for both examination periods 10,000 and 100 years are listed in the Appendix (chapter 4).

Averting Costs

Range investigated: - Factor 0.7

- Factor 1.0 (Base Region)

- Factor 1.3

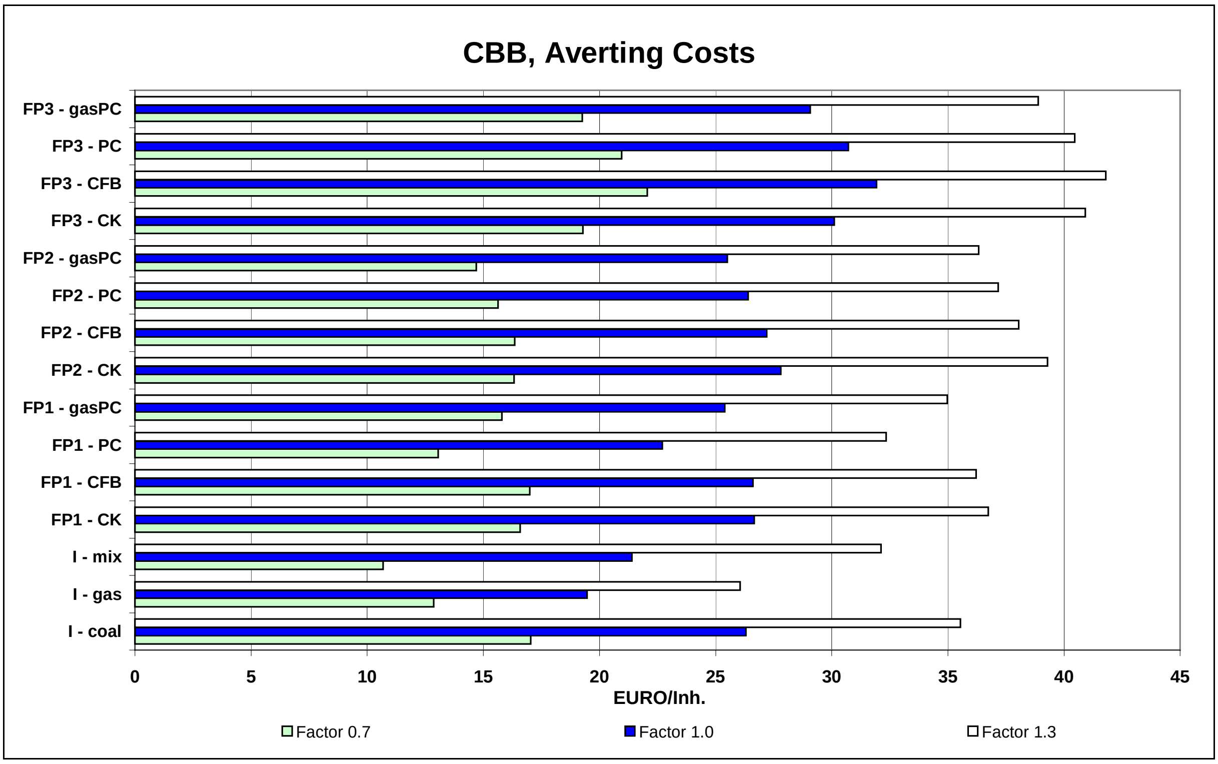

Figure 43: Influence of the averting costs on the cost-benefit balance

As the external benefits play an important role in the calculation of the cost-benefit balance a variation of the averting costs has a significant influence on the final result[37]. The cost-benefit balance, however, would remain positive until the averting costs are reduced to a quarter (reduction factor of 0.25).

[37] The averting costs are - besides the emission rates themselves- the second factor of calculating the external costs.

Overview of Sensitivities

The following figure provides an comparative overview of the sensitivities investigated. In the figure, however, only those input parameters are shown which are varied along a certain scale within an appropriate range. So, the influence of directing the residues of fuel preparation to landfill or the influence of a shorter examination period of landfilling are not shown in the figure below.

However, other sensitivities, which have not been discussed before, are included in the figure below. These sensitivities are

- the influence of fuel preparation costs,
- the share of C-biogenic, and
- the yield of recovered fuel.

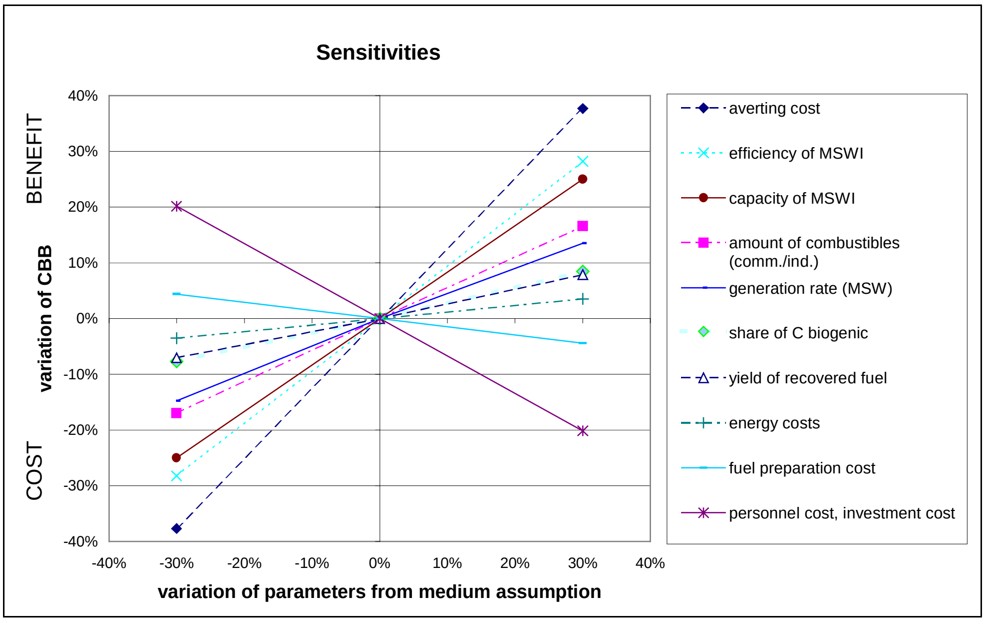

Figure 44: Comparative overview of sensitivities

The significance of input parameters to the results can be grouped in the following order:

1. The (external) averting costs have the greatest influence on the results. They affect landfilling the most, because of the long calculation period, 10,000 years, without discounting. A calculation period of 100 years for landfilling roughly reduces the results by one third, but does not change the overall conclusions or affect the internal ranking of the analysed recovery scenarios.
2. The energy efficiency and size of the MSW incinerator. The influence of (direct) labour and investment costs are also high. It is noted that Fuel Recovery in general is a decentralised option involving smaller units, more job opportunities and less investment compared to dedicated MSW mass burn facilities.

3. The amount of waste and especially the amount of non-recyclable combustible waste. This makes Fuel Recovery a favoured option in industrialised regions.
4. The share of biogenic carbon in combustible waste and the yield of recovered fuel have a less significant influence on the results.
5. The (direct) costs of primary energy sources and of recovered fuel production affect the results only to a minor degree.

9 CONCLUSION

The cost-benefit analysis demonstrates that it is beneficial for the national economy to direct residual waste to processes carrying out energy recovery. The level of the benefits achieved, however, depends very much on the particular circumstances given.

High benefits can be achieved when the share of combustibles in residual waste (paper, plastics) is high and when the waste is directed to fuel preparation processes.

In terms of the fuel preparation processes it is desirable to have a high productivity regarding the separation of combustibles and the production of recovered fuel respectively. The more fuel can be recovered from residual waste the more regular fuels can be saved and the more benefits for the national economy can be achieved consequently. In principle, highest benefits are achieved when a maximum of waste is diverted from landfill.

Within the limitations of the computer model it is shown that the type of co-combustion facility, in which the recovered fuel is finally used, has only a minor effect on the cost-benefit balance.

Residual waste directed to waste incineration is also beneficial for the national economy. Here, however, the extent of saleable energy (electricity, district heat, industrial heat) as well as the capacity of the waste incinerator play an important role. So, high benefits can be achieved if a maximum of energy can be sold and if the business costs of waste incineration are low. Low business costs of waste incineration are given when the capacity of the waste incinerator is high.

Besides the saleability of energy and the capacity of the incinerator, the cost-benefit balance is also largely influenced by the type of conventional energy production which can be saved through waste incineration in fact. Here, the highest benefits can be achieved if coal fired power plants are substituted. Rather low or even negative cost-benefit balances result if the operation of gas fired power plants is saved.

All analysed scenarios show a significant reduction of greenhouse gas emissions, carbon dioxide and methane. The reduction is proportionate to the diversion from landfill and yield of recovered fuel.

When a high yield fuel recovery option is employed, it is possible to direct production rejects to landfill and still meet the diversion requirements of the Landfill Directive.

Averaged over a number of scenarios and regional conditions investigated the annual welfare economic benefit, which can be achieved for the national welfare, is in the order of 15 - 40 Euro/person. The study shows that fuel and energy recovery can save 2 - 5 GJ/person (= 50 - 125 kg of oil equivalent). This corresponds to some 10 % of the solid fuel consumption and to 2 - 4 % of total fossil fuel consumption in Europe. It is a significant contribution to the Kyoto targets.

The cost-benefit analysis undertaken concentrates on the management of residual waste from households and commercial/industrial facilities after secondary materials have been separated for material recycling. So, separate collection and material recycling - esp. of high calorific fractions such as paper/cardboard and plastics - are not questioned.

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11 APPENDIX

11.1 Results of the Cost-Benefit Analysis

11.1.1 Model Region 1

Model Region 1	BS (baseline)			I - coal		
	analysed system	saved primary production	Difference	analysed system	saved primary production	Difference
Cost Benefit Analysis						
Internal Costs [Euro/Inh.]	52	126	**-74**	73	133	**-59**
External Costs [Euro/Inh.]	28	13	**15**	16	22	**-6**
Total [Euro/Inh.]	80	139	**-59**	89	155	**-65**
Energy	**consumed**	**produced**	**substituted** (incl. subst. E-mix)	**consumed**	**produced**	**substituted** (incl. subst. E-mix)
electricity [kWh/Inh.]	9,0	44,7	48,5	41,5	220,7	195,2
heat household [kWh/Inh.]	0,0	0,0	0,0	0,0	0,0	0,0
heat industrial [kWh/Inh.]	0,0	0,0	0,0	0,0	0,0	0,0
Energy Carrier	**consumed**	**substituted**	**Difference**	**consumed**	**substituted**	**Difference**
diesel [l/a]	1.747.301	0	1.747.301	1.561.908	0	1.561.908
fuel oil [l/a]	0	0	0	186.288	193.273	-6.986
hard coal [t/a]	0	0	0	70	31.727	-31.657
lignite [t/a]	0	0	0	0	0	0
natural gas [m³/a]	310.449	686.203	-375.754	3.304.356	686.203	2.618.153
energy content [MJ/Inh.]	213	143	70	671	1.933	-1.262
Recovered Fuel						
amount [kg/Inh.]						
heating value [MJ/t]						
water content						
Composition						
C [%dm]						
N [%dm]						
S [%dm]						
Cl [%dm]						
Cd [mg/kg dm]						
Hg [mg/kg dm]						
Pb [mg/kg dm]						
Zn [mg/kg dm]						

Model Region 1	**I - gas**			**I - mix**		
	analysed system	**saved primary production**	**Difference**	**analysed system**	**saved primary production**	**Difference**
Cost Benefit Analysis						
Internal Costs [Euro/Inh.]	73	134	**-60**	73	135	**-61**
External Costs [Euro/Inh.]	16	16	**0**	16	26	**-10**
Total [Euro/Inh.]	89	150	**-60**	89	161	**-71**
Energy	**consumed**	**produced**	**substituted** (incl. subst. E-mix)	**consumed**	**produced**	**substituted** (incl. subst. E-mix)
electricity [kWh/Inh.]	41,5	220,7	195,2	41,5	220,7	195,2
heat household [kWh/Inh.]	0,0	0,0	0,0	0,0	0,0	0,0
heat industrial [kWh/Inh.]	0,0	0,0	0,0	0,0	0,0	0,0
Energy Carrier	**consumed**	**substituted**	**Difference**	**consumed**	**substituted**	**Difference**
diesel [l/a]	1.567.929	0	1.567.929	1.567.929	0	1.567.929
fuel oil [l/a]	186.288	193.273	-6.986	186.288	193.273	-6.986
hard coal [t/a]	70	2.212	-2.142	70	2.212	-2.142
lignite [t/a]	0	0	0	0	0	0
natural gas [m³/a]	3.304.356	17.056.513	-13.752.157	3.304.356	686.203	2.618.153
energy content [MJ/Inh.]	671	1.501	-829	671	303	369
Recovered Fuel						
amount [kg/Inh.]						
heating value [MJ/t]						
water content						
Composition						
C [%dm]						
N [%dm]						
S [%dm]						
Cl [%dm]						
Cd [mg/kg dm]						
Hg [mg/kg dm]						
Pb [mg/kg dm]						
Zn [mg/kg dm]						

Model Region 1	FP1 - CK			FP1 - CFB		
	analysed system	saved primary production	Difference	analysed system	saved primary production	Difference
Cost Benefit Analysis						
Internal Costs [Euro/Inh.]	72	134	**-62**	70	133	**-63**
External Costs [Euro/Inh.]	23	34	**-11**	17	26	**-10**
Total [Euro/Inh.]	95	168	**-73**	87	159	**-73**
Energy	**consumed**	**produced**	**substituted** (incl. subst. E-mix)	**consumed**	**produced**	**substituted** (incl. subst. E-mix)
electricity [kWh/Inh.]	51,8	132,9	101,1	51,8	255,8	224,0
heat household [kWh/Inh.]	0,0	0,0	0,0	0,0	0,0	0,0
heat industrial [kWh/Inh.]	0,0	315,9	315,9	0,0	175,5	175,5
Energy Carrier	**consumed**	**substituted**	**Difference**	**consumed**	**substituted**	**Difference**
diesel [l/a]	2.359.688	0	2.359.688	2.363.170	0	2.363.170
fuel oil [l/a]	280.888	1.919.582	-1.638.693	280.888	357.621	-76.733
hard coal [t/a]	103	37.281	-37.179	103	43.389	-43.287
lignite [t/a]	0	9.597	-9.597	0	0	0
natural gas [m³/a]	2.521.967	1.075.316	1.446.651	2.521.967	695.543	1.826.424
energy content [MJ/Inh.]	754	2.629	-1.875	754	2.619	-1.865
Recovered Fuel	**FP1 - fluff**			**FP1 - fluff**		
amount [kg/Inh.]	80,6			80,6		
heating value [MJ/t]	15.683			15.683		
water content	24,6%			24,6%		
Composition						
C [%dm]	52,8%			52,8%		
N [%dm]	0,5%			0,5%		
S [%dm]	0,2%			0,2%		
Cl [%dm]	0,7%			0,7%		
Cd [mg/kg dm]	5,1			5,1		
Hg [mg/kg dm]	0,49			0,49		
Pb [mg/kg dm]	130			130		
Zn [mg/kg dm]	430			430		

Model Region 1	FP1 - PC			FP1 - gasPC		
	analysed system	saved primary production	Difference	analysed system	saved primary production	Difference
Cost Benefit Analysis						
Internal Costs [Euro/Inh.]	73	133	**-60**	71	133	**-62**
External Costs [Euro/Inh.]	17	27	**-10**	17	26	**-10**
Total [Euro/Inh.]	91	160	**-69**	88	159	**-72**
Energy	**consumed**	**produced**	**substituted** (incl. subst. E-mix)	**consumed**	**produced**	**substituted** (incl. subst. E-mix)
electricity [kWh/Inh.]	58,4	291,5	252,9	52,5	283,9	251,3
heat household [kWh/Inh.]	0,0	0,0	0,0	0,0	0,0	0,0
heat industrial [kWh/Inh.]	0,0	0,0	0,0	0,0	0,0	0,0
Energy Carrier	**consumed**	**substituted**	**Difference**	**consumed**	**substituted**	**Difference**
diesel [l/a]	2.355.867	0	2.355.867	2.363.240	0	2.363.240
fuel oil [l/a]	278.604	355.252	-76.647	280.888	357.621	-76.733
hard coal [t/a]	102	44.435	-44.333	103	43.389	-43.287
lignite [t/a]	0	0	0	0	0	0
natural gas [m³/a]	3.444.737	695.543	2.749.194	2.521.967	695.543	1.826.424
energy content [MJ/Inh.]	869	2.677	-1.807	760	2.619	-1.860
Recovered Fuel	**FP1 - pellets**			**FP1 - fluff**		
amount [kg/Inh.]	62,6			80,6		
heating value [MJ/t]	20.756			15.683		
water content	4,0%			24,6%		
Composition						
C [%dm]	44,7%			52,8%		
N [%dm]	0,4%			0,5%		
S [%dm]	0,2%			0,2%		
Cl [%dm]	0,7%			0,7%		
Cd [mg/kg dm]	5,9			5,1		
Hg [mg/kg dm]	0,27			0,49		
Pb [mg/kg dm]	130			130		
Zn [mg/kg dm]	292			430		

Model Region 1	FP2 - CK			FP2 - CFB		
	analysed system	saved primary production	Difference	analysed system	saved primary production	Difference
Cost Benefit Analysis						
Internal Costs [Euro/Inh.]	75	137	**-62**	74	136	**-62**
External Costs [Euro/Inh.]	25	41	**-16**	17	31	**-14**
Total [Euro/Inh.]	101	178	**-77**	91	167	**-76**
Energy	**consumed**	**produced**	**substituted** (incl. subst. E-mix)	**consumed**	**produced**	**substituted** (incl. subst. E-mix)
electricity [kWh/Inh.]	56,5	113,0	106,1	56,5	271,2	264,3
heat household [kWh/Inh.]	0,0	0,0	0,0	0,0	0,0	0,0
heat industrial [kWh/Inh.]	0,0	406,8	406,8	0,0	226,0	226,0
Energy Carrier	**consumed**	**substituted**	**Difference**	**consumed**	**substituted**	**Difference**
diesel [l/a]	2.048.905	0	2.048.905	2.052.000	0	2.052.000
fuel oil [l/a]	392.875	3.244.411	-2.851.536	392.875	1.232.898	-840.023
hard coal [t/a]	116	39.742	-39.627	116	47.609	-47.493
lignite [t/a]	0	12.360	-12.360	0	0	0
natural gas [m³/a]	2.469.124	1.291.709	1.177.415	2.469.124	802.633	1.666.492
energy content [MJ/Inh.]	772	3.155	-2.383	772	3.142	-2.370
Recovered Fuel	**FP2 - soft pellets**			**FP2 - soft pellets**		
amount [kg/Inh.]	89,9			89,9		
heating value [MJ/t]	18.107			18.107		
water content	16,0%			16,0%		
Composition						
C [%dm]	50,9%			50,9%		
N [%dm]	0,4%			0,4%		
S [%dm]	0,2%			0,2%		
Cl [%dm]	0,7%			0,7%		
Cd [mg/kg dm]	5,6			5,6		
Hg [mg/kg dm]	0,31			0,31		
Pb [mg/kg dm]	131			131		
Zn [mg/kg dm]	309			309		

Model Region 1	FP2 - PC			FP2 - gasPC		
	analysed system	saved primary production	Difference	analysed system	saved primary production	Difference
Cost Benefit Analysis						
Internal Costs [Euro/Inh.]	74	136	**-62**	75	136	**-61**
External Costs [Euro/Inh.]	17	31	**-14**	17	31	**-14**
Total [Euro/Inh.]	91	167	**-76**	92	167	**-75**
Energy	**consumed**	**produced**	**substituted** (incl. subst. E-mix)	**consumed**	**produced**	**substituted** (incl. subst. E-mix)
electricity [kWh/Inh.]	59,1	307,4	297,9	57,4	307,4	299,6
heat household [kWh/Inh.]	0,0	0,0	0,0	0,0	0,0	0,0
heat industrial [kWh/Inh.]	0,0	0,0	0,0	0,0	0,0	0,0
Energy Carrier	**consumed**	**substituted**	**Difference**	**consumed**	**substituted**	**Difference**
diesel [l/a]	2.052.062	0	2.052.062	2.052.062	0	2.052.062
fuel oil [l/a]	392.875	1.232.898	-840.023	392.875	1.232.898	-840.023
hard coal [t/a]	116	47.609	-47.493	116	47.609	-47.493
lignite [t/a]	0	0	0	0	0	0
natural gas [m³/a]	2.469.124	802.633	1.666.492	2.469.124	802.633	1.666.492
energy content [MJ/Inh.]	790	3.142	-2.352	778	3.142	-2.364
Recovered Fuel	**FP2 - soft pellets**			**FP2 - soft pellets**		
amount [kg/Inh.]	89,9			89,9		
heating value [MJ/t]	18.107			18.107		
water content	16,0%			16,0%		
Composition						
C [%dm]	50,9%			50,9%		
N [%dm]	0,4%			0,4%		
S [%dm]	0,2%			0,2%		
Cl [%dm]	0,7%			0,7%		
Cd [mg/kg dm]	5,6			5,6		
Hg [mg/kg dm]	0,31			0,31		
Pb [mg/kg dm]	131			131		
Zn [mg/kg dm]	309			309		

Model Region 1	FP3 - CK			FP3 - CFB		
	analysed system	saved primary production	Difference	analysed system	saved primary production	Difference
Cost Benefit Analysis						
Internal Costs [Euro/Inh.]	66	134	**-69**	61	132	**-71**
External Costs [Euro/Inh.]	35	50	**-15**	20	32	**-12**
Total [Euro/Inh.]	101	184	**-83**	81	165	**-83**
Energy	**consumed**	**produced**	**substituted** (incl. subst. E-mix)	**consumed**	**produced**	**substituted** (incl. subst. E-mix)
electricity [kWh/Inh.]	73,1	45,3	-11,7	68,9	315,2	262,6
heat household [kWh/Inh.]	0,0	0,0	0,0	0,0	0,0	0,0
heat industrial [kWh/Inh.]	0,0	694,2	694,2	0,0	385,7	385,7
Energy Carrier	**consumed**	**substituted**	**Difference**	**consumed**	**substituted**	**Difference**
diesel [l/a]	1.652.883	0	1.652.883	1.657.013	0	1.657.013
fuel oil [l/a]	4.489.316	3.639.790	849.526	4.489.316	207.330	4.281.986
hard coal [t/a]	75	44.392	-44.317	75	57.814	-57.740
lignite [t/a]	0	21.091	-21.091	0	0	0
natural gas [m³/a]	2.609.779	1.520.767	1.089.011	2.609.779	686.203	1.923.575
energy content [MJ/Inh.]	1.192	3.398	-2.206	1.162	3.376	-2.215
Recovered Fuel	**FP3 - hard pellets**			**FP3 - hard pellets**		
amount [kg/Inh.]	142			142		
heating value [MJ/t]	19.577			19.577		
water content	4,0%			4,0%		
Composition						
C [%dm]	40,6%			40,6%		
N [%dm]	0,6%			0,6%		
S [%dm]	0,2%			0,2%		
Cl [%dm]	0,7%			0,7%		
Cd [mg/kg dm]	5,1			5,1		
Hg [mg/kg dm]	0,45			0,45		
Pb [mg/kg dm]	136			136		
Zn [mg/kg dm]	387			387		

Model Region 1	FP3 - PC			FP3 - gasPC		
	analysed system	saved primary production	Difference	analysed system	saved primary production	Difference
Cost Benefit Analysis						
Internal Costs [Euro/Inh.]	62	132	**-71**	63	132	**-69**
External Costs [Euro/Inh.]	20	32	**-12**	20	32	**-12**
Total [Euro/Inh.]	82	165	**-83**	83	165	**-81**
Energy	**consumed**	**produced**	**substituted** (incl. subst. E-mix)	**consumed**	**produced**	**substituted** (incl. subst. E-mix)
electricity [kWh/Inh.]	72,8	376,9	320,3	70,1	376,9	323,0
heat household [kWh/Inh.]	0,0	0,0	0,0	0,0	0,0	0,0
heat industrial [kWh/Inh.]	0,0	0,0	0,0	0,0	0,0	0,0
Energy Carrier	**consumed**	**substituted**	**Difference**	**consumed**	**substituted**	**Difference**
diesel [l/a]	1.657.095	0	1.657.095	1.657.095	0	1.657.095
fuel oil [l/a]	4.489.316	207.330	4.281.986	4.489.316	207.330	4.281.986
hard coal [t/a]	75	57.814	-57.740	75	57.814	-57.740
lignite [t/a]	0	0	0	0	0	0
natural gas [m³/a]	2.609.779	686.203	1.923.575	2.609.779	686.203	1.923.575
energy content [MJ/Inh.]	1.190	3.376	-2.186	1.171	3.376	-2.206

Recovered Fuel	**FP3 - hard pellets**	**FP3 - hard pellets**
amount [kg/Inh.]	142	142
heating value [MJ/t]	19.577	19.577
water content	4,0%	4,0%
Composition		
C [%dm]	40,6%	40,6%
N [%dm]	0,6%	0,6%
S [%dm]	0,2%	0,2%
Cl [%dm]	0,7%	0,7%
Cd [mg/kg dm]	5,1	5,1
Hg [mg/kg dm]	0,45	0,45
Pb [mg/kg dm]	136	136
Zn [mg/kg dm]	387	387

11.1.2 Model Region 2

Model Region 2	BS (baseline)			I - coal		
	analysed system	saved primary production	Difference	analysed system	saved primary production	Difference
Cost Benefit Analysis						
Internal Costs [Euro/Inh.]	101	134	**-33**	127	156	**-30**
External Costs [Euro/Inh.]	31	17	**14**	21	35	**-13**
Total [Euro/Inh.]	132	151	**-19**	148	191	**-43**
Energy	**consumed**	**produced**	**substituted** (incl. subst. E-mix)	**consumed**	**produced**	**substituted** (incl. subst. E-mix)
electricity [kWh/Inh.]	35,9	35,7	56,2	64,0	94,5	89,5
heat household [kWh/Inh.]	0,0	0,0	0,0	8,1	462,9	454,8
heat industrial [kWh/Inh.]	0,0	0,0	0,0	3,5	198,4	194,9
Energy Carrier	**consumed**	**substituted**	**Difference**	**consumed**	**substituted**	**Difference**
diesel [l/a]	2.819.784	0	2.819.784	2.628.153	0	2.628.153
fuel oil [l/a]	168.956	799.930	-630.973	330.837	967.881	-637.044
hard coal [t/a]	41	1.318	-1.277	102	55.500	-55.398
lignite [t/a]	0	0	0	0	0	0
natural gas [m³/a]	1.064.531	3.157.362	-2.092.831	3.666.194	3.157.362	508.832
energy content [MJ/Inh.]	554	772	-218	949	3.797	-2.849
Recovered Fuel						
amount [kg/Inh.]						
heating value [MJ/t]						
water content						
Composition						
C [%dm]						
N [%dm]						
S [%dm]						
Cl [%dm]						
Cd [mg/kg dm]						
Hg [mg/kg dm]						
Pb [mg/kg dm]						
Zn [mg/kg dm]						

Model Region 2	I - gas			I - mix		
	analysed system	saved primary production	Difference	analysed system	saved primary production	Difference
Cost Benefit Analysis						
Internal Costs [Euro/Inh.]	127	158	**-31**	127	148	**-21**
External Costs [Euro/Inh.]	22	27	**-5**	22	39	**-18**
Total [Euro/Inh.]	149	185	**-37**	149	187	**-38**
Energy	**consumed**	**produced**	**substituted** (incl. subst. E-mix)	**consumed**	**produced**	**substituted** (incl. subst. E-mix)
electricity [kWh/Inh.]	64,0	94,5	89,5	64,0	94,5	89,5
heat household [kWh/Inh.]	8,1	462,9	454,8	8,1	462,9	454,8
heat industrial [kWh/Inh.]	3,5	198,4	194,9	3,5	198,4	194,9
Energy Carrier	**consumed**	**substituted**	**Difference**	**consumed**	**substituted**	**Difference**
diesel [l/a]	2.638.814	0	2.638.814	2.638.814	0	2.638.814
fuel oil [l/a]	330.837	967.881	-637.044	330.837	967.881	-637.044
hard coal [t/a]	102	3.241	-3.139	102	3.241	-3.139
lignite [t/a]	0	0	0	0	0	0
natural gas [m³/a]	3.666.194	42.591.372	-38.925.178	3.666.194	3.157.362	508.832
energy content [MJ/Inh.]	950	3.797	-2.848	950	911	39
Recovered Fuel						
amount [kg/Inh.]						
heating value [MJ/t]						
water content						
Composition						
C [%dm]						
N [%dm]						
S [%dm]						
Cl [%dm]						
Cd [mg/kg dm]						
Hg [mg/kg dm]						
Pb [mg/kg dm]						
Zn [mg/kg dm]						

Model Region 2	FP1 - CK			FP1 - CFB		
	analysed system	saved primary production	Difference	analysed system	saved primary production	Difference
Cost Benefit Analysis						
Internal Costs [Euro/Inh.]	122	150	**-28**	119	149	**-30**
External Costs [Euro/Inh.]	29	45	**-16**	22	36	**-14**
Total [Euro/Inh.]	151	195	**-44**	141	185	**-44**
Energy	**consumed**	**produced**	**substituted** (incl. subst. E-mix)	**consumed**	**produced**	**substituted** (incl. subst. E-mix)
electricity [kWh/Inh.]	72,0	52,2	42,1	72,0	200,2	190,1
heat household [kWh/Inh.]	5,5	255,7	250,2	5,5	255,7	250,2
heat industrial [kWh/Inh.]	2,4	490,2	487,8	2,4	321,0	318,7
Energy Carrier	**consumed**	**substituted**	**Difference**	**consumed**	**substituted**	**Difference**
diesel [l/a]	3.284.157	0	3.284.157	3.287.359	0	3.287.359
fuel oil [l/a]	391.215	2.963.852	-2.572.636	391.215	1.081.945	-690.730
hard coal [t/a]	122	52.655	-52.533	122	60.014	-59.892
lignite [t/a]	0	11.563	-11.563	0	0	0
natural gas [m³/a]	2.837.168	3.622.180	-785.012	2.837.168	3.164.616	-327.448
energy content [MJ/Inh.]	999	4.089	-3.090	999	4.077	-3.078
Recovered Fuel	**FP1 - fluff**			**FP1 - fluff**		
amount [kg/Inh.]	87,1			87,1		
heating value [MJ/t]	17.471			17.471		
water content	22,4%			22,4%		
Composition						
C [%dm]	55,0%			55,0%		
N [%dm]	0,5%			0,5%		
S [%dm]	0,2%			0,2%		
Cl [%dm]	0,8%			0,8%		
Cd [mg/kg dm]	6,2			6,2		
Hg [mg/kg dm]	0,47			0,47		
Pb [mg/kg dm]	143			143		
Zn [mg/kg dm]	426			426		

Model Region 2	FP1 - PC			FP1 - gasPC		
	analysed system	saved primary production	Difference	analysed system	saved primary production	Difference
Cost Benefit Analysis						
Internal Costs [Euro/Inh.]	124	149	**-26**	121	149	**-29**
External Costs [Euro/Inh.]	22	37	**-15**	22	36	**-14**
Total [Euro/Inh.]	146	186	**-40**	142	185	**-43**
Energy	**consumed**	**produced**	**substituted** (incl. subst. E-mix)	**consumed**	**produced**	**substituted** (incl. subst. E-mix)
electricity [kWh/Inh.]	79,4	242,6	225,1	72,8	234,0	223,1
heat household [kWh/Inh.]	5,7	261,9	256,2	5,5	255,7	250,2
heat industrial [kWh/Inh.]	2,4	112,2	109,8	2,4	109,6	107,2
Energy Carrier	**consumed**	**substituted**	**Difference**	**consumed**	**substituted**	**Difference**
diesel [l/a]	3.276.704	0	3.276.704	3.287.423	0	3.287.423
fuel oil [l/a]	389.539	1.080.206	-690.667	391.215	1.081.945	-690.730
hard coal [t/a]	122	61.785	-61.664	122	60.014	-59.892
lignite [t/a]	0	0	0	0	0	0
natural gas [m³/a]	3.816.098	3.164.616	651.482	2.837.168	3.164.616	-327.448
energy content [MJ/Inh.]	1.123	4.175	-3.051	1.005	4.077	-3.072

Recovered Fuel	**FP1 - pellets**	**FP1 - fluff**
amount [kg/Inh.]	71,1	87,1
heating value [MJ/t]	22.256	17.471
water content	4,0%	22,4%
Composition		
C [%dm]	46,7%	55,0%
N [%dm]	0,4%	0,5%
S [%dm]	0,2%	0,2%
Cl [%dm]	0,8%	0,8%
Cd [mg/kg dm]	6,8	6,2
Hg [mg/kg dm]	0,26	0,47
Pb [mg/kg dm]	142	143
Zn [mg/kg dm]	302	426

Model Region 2	FP2 - CK			FP2 - CFB		
	analysed system	saved primary production	Difference	analysed system	saved primary production	Difference
Cost Benefit Analysis						
Internal Costs [Euro/Inh.]	126	151	**-25**	123	150	**-27**
External Costs [Euro/Inh.]	31	51	**-20**	22	40	**-18**
Total [Euro/Inh.]	157	202	**-45**	145	189	**-44**
Energy	**consumed**	**produced**	**substituted** (incl. subst. E-mix)	**consumed**	**produced**	**substituted** (incl. subst. E-mix)
electricity [kWh/Inh.]	76,5	42,3	50,8	76,5	233,0	241,5
heat household [kWh/Inh.]	5,0	207,5	202,5	5,0	207,5	202,5
heat industrial [kWh/Inh.]	2,1	579,2	577,1	2,1	361,3	359,2
Energy Carrier	**consumed**	**substituted**	**Difference**	**consumed**	**substituted**	**Difference**
diesel [l/a]	3.055.765	0	3.055.765	3.058.944	0	3.058.944
fuel oil [l/a]	473.554	4.183.384	-3.709.831	473.554	1.759.320	-1.285.766
hard coal [t/a]	131	53.267	-53.136	131	62.746	-62.616
lignite [t/a]	0	14.895	-14.895	0	0	0
natural gas [m³/a]	2.720.438	3.837.510	-1.117.072	2.720.438	3.248.126	-527.688
energy content [MJ/Inh.]	1.013	4.469	-3.455	1.013	4.453	-3.440
Recovered Fuel	**FP2 - soft pellets**			**FP2 - soft pellets**		
amount [kg/Inh.]	102,8			102,8		
heating value [MJ/t]	19.076			19.076		
water content	16,0%			16,0%		
Composition						
C [%dm]	52,5%			52,5%		
N [%dm]	0,4%			0,4%		
S [%dm]	0,2%			0,2%		
Cl [%dm]	0,8%			0,8%		
Cd [mg/kg dm]	6,3			6,3		
Hg [mg/kg dm]	0,29			0,29		
Pb [mg/kg dm]	141			141		
Zn [mg/kg dm]	316			316		

Model Region 2	FP2 - PC			FP2 - gasPC		
	analysed system	saved primary production	Difference	analysed system	saved primary production	Difference
Cost Benefit Analysis						
Internal Costs [Euro/Inh.]	124	150	**-26**	125	150	**-25**
External Costs [Euro/Inh.]	22	40	**-17**	22	40	**-17**
Total [Euro/Inh.]	146	189	**-43**	147	189	**-43**
Energy	**consumed**	**produced**	**substituted** (incl. subst. E-mix)	**consumed**	**produced**	**substituted** (incl. subst. E-mix)
electricity [kWh/Inh.]	79,3	276,6	282,2	77,4	276,6	284,1
heat household [kWh/Inh.]	5,0	207,5	202,5	5,0	207,5	202,5
heat industrial [kWh/Inh.]	2,1	88,9	86,8	2,1	88,9	86,8
Energy Carrier	**consumed**	**substituted**	**Difference**	**consumed**	**substituted**	**Difference**
diesel [l/a]	3.059.008	0	3.059.008	3.059.008	0	3.059.008
fuel oil [l/a]	473.554	1.759.320	-1.285.766	473.554	1.759.320	-1.285.766
hard coal [t/a]	131	62.746	-62.616	131	62.746	-62.616
lignite [t/a]	0	0	0	0	0	0
natural gas [m³/a]	2.720.438	3.248.126	-527.688	2.720.438	3.248.126	-527.688
energy content [MJ/Inh.]	1.034	4.453	-3.419	1.020	4.453	-3.433
Recovered Fuel	**FP2 - soft pellets**			**FP2 - soft pellets**		
amount [kg/Inh.]	102,8			102,8		
heating value [MJ/t]	19.076			19.076		
water content	16,0%			16,0%		
Composition						
C [%dm]	52,5%			52,5%		
N [%dm]	0,4%			0,4%		
S [%dm]	0,2%			0,2%		
Cl [%dm]	0,8%			0,8%		
Cd [mg/kg dm]	6,3			6,3		
Hg [mg/kg dm]	0,29			0,29		
Pb [mg/kg dm]	141			141		
Zn [mg/kg dm]	316			316		

Model Region 2	FP3 - CK			FP3 - CFB		
	analysed system	saved primary production	Difference	analysed system	saved primary production	Difference
Cost Benefit Analysis						
Internal Costs [Euro/Inh.]	117	145	**-28**	111	143	**-33**
External Costs [Euro/Inh.]	39	57	**-18**	24	39	**-15**
Total [Euro/Inh.]	156	202	**-46**	135	183	**-48**
Energy	**consumed**	**produced**	**substituted** (incl. subst. E-mix)	**consumed**	**produced**	**substituted** (incl. subst. E-mix)
electricity [kWh/Inh.]	90,6	18,7	-12,9	86,4	306,8	279,4
heat household [kWh/Inh.]	3,2	91,8	88,5	3,2	91,8	88,5
heat industrial [kWh/Inh.]	1,4	780,2	778,8	1,4	450,9	449,5
Energy Carrier	**consumed**	**substituted**	**Difference**	**consumed**	**substituted**	**Difference**
diesel [l/a]	2.726.684	0	2.726.684	2.729.973	0	2.729.973
fuel oil [l/a]	3.917.485	4.626.722	-709.237	3.917.485	963.513	2.953.973
hard coal [t/a]	100	52.385	-52.285	100	66.710	-66.610
lignite [t/a]	0	22.508	-22.508	0	0	0
natural gas [m³/a]	2.291.873	4.048.030	-1.756.157	2.291.873	3.157.362	-865.489
energy content [MJ/Inh.]	1.328	4.439	-3.111	1.298	4.416	-3.117
Recovered Fuel	**FP3 - hard pellets**			**FP3 - hard pellets**		
amount [kg/Inh.]	140			140		
heating value [MJ/t]	21.139			21.139		
water content	4,0%			4,0%		
Composition						
C [%dm]	43,9%			43,9%		
N [%dm]	0,5%			0,5%		
S [%dm]	0,2%			0,2%		
Cl [%dm]	0,8%			0,8%		
Cd [mg/kg dm]	6,1			6,1		
Hg [mg/kg dm]	0,44			0,44		
Pb [mg/kg dm]	152			152		
Zn [mg/kg dm]	396			396		

Model Region 2	FP3 - PC			FP3 - gasPC		
	analysed system	saved primary production	Difference	analysed system	saved primary production	Difference
Cost Benefit Analysis						
Internal Costs [Euro/Inh.]	111	143	**-32**	113	143	**-30**
External Costs [Euro/Inh.]	24	39	**-15**	24	39	**-15**
Total [Euro/Inh.]	136	183	**-47**	137	183	**-45**
Energy	**consumed**	**produced**	**substituted** (incl. subst. E-mix)	**consumed**	**produced**	**substituted** (incl. subst. E-mix)
electricity [kWh/Inh.]	90,3	372,7	341,3	87,7	372,7	344,0
heat household [kWh/Inh.]	3,2	91,8	88,5	3,2	91,8	88,5
heat industrial [kWh/Inh.]	1,4	39,3	37,9	1,4	39,3	37,9
Energy Carrier	**consumed**	**substituted**	**Difference**	**consumed**	**substituted**	**Difference**
diesel [l/a]	2.730.039	0	2.730.039	2.730.039	0	2.730.039
fuel oil [l/a]	3.917.485	963.513	2.953.973	3.917.485	963.513	2.953.973
hard coal [t/a]	100	66.710	-66.610	100	66.710	-66.610
lignite [t/a]	0	0	0	0	0	0
natural gas [m³/a]	2.291.873	3.157.362	-865.489	2.291.873	3.157.362	-865.489
energy content [MJ/Inh.]	1.327	4.416	-3.089	1.307	4.416	-3.108
Recovered Fuel	**FP3 - hard pellets**			**FP3 - hard pellets**		
amount [kg/Inh.]	140			140		
heating value [MJ/t]	21.139			21.139		
water content	4,0%			4,0%		
Composition						
C [%dm]	43,9%			43,9%		
N [%dm]	0,5%			0,5%		
S [%dm]	0,2%			0,2%		
Cl [%dm]	0,8%			0,8%		
Cd [mg/kg dm]	6,1			6,1		
Hg [mg/kg dm]	0,44			0,44		
Pb [mg/kg dm]	152			152		
Zn [mg/kg dm]	396			396		

11.1.3 Model Region 3

Model Region 3	BS (baseline)			I - coal		
	analysed system	saved primary production	Difference	analysed system	saved primary production	Difference
Cost Benefit Analysis						
Internal Costs [Euro/Inh.]	105	130	**-25**	151	177	**-27**
External Costs [Euro/Inh.]	39	16	**23**	26	47	**-22**
Total [Euro/Inh.]	144	147	**-2**	176	224	**-48**
Energy	**consumed**	**produced**	**substituted** (incl. subst. E-mix)	**consumed**	**produced**	**substituted** (incl. subst. E-mix)
electricity [kWh/Inh.]	24,1	49,4	70,3	61,9	263,9	250,6
heat household [kWh/Inh.]	0,0	0,0	0,0	15,6	1.055,4	1.039,8
heat industrial [kWh/Inh.]	0,0	0,0	0,0	0,0	0,0	0,0
Energy Carrier	**consumed**	**substituted**	**Difference**	**consumed**	**substituted**	**Difference**
diesel [l/a]	2.447.717	0	2.447.717	2.173.561	0	2.173.561
fuel oil [l/a]	88.632	215.631	-126.999	306.518	441.688	-135.170
hard coal [t/a]	29	917	-888	110	95.715	-95.605
lignite [t/a]	0	0	0	0	0	0
natural gas [m³/a]	854.629	1.986.915	-1.132.286	4.356.369	1.986.915	2.369.454
energy content [MJ/Inh.]	420	537	-117	950	5.817	-4.867
Recovered Fuel						
amount [kg/Inh.]						
heating value [MJ/t]						
water content						
Composition						
C [%dm]						
N [%dm]						
S [%dm]						
Cl [%dm]						
Cd [mg/kg dm]						
Hg [mg/kg dm]						
Pb [mg/kg dm]						
Zn [mg/kg dm]						

Model Region 3	I - gas			I - mix		
	analysed system	saved primary production	Difference	analysed system	saved primary production	Difference
Cost Benefit Analysis						
Internal Costs [Euro/Inh.]	151	179	**-28**	151	156	**-5**
External Costs [Euro/Inh.]	26	34	**-8**	26	61	**-35**
Total [Euro/Inh.]	177	212	**-35**	177	217	**-40**
Energy	**consumed**	**produced**	**substituted** (incl. subst. E-mix)	**consumed**	**produced**	**substituted** (incl. subst. E-mix)
electricity [kWh/Inh.]	61,9	263,9	250,6	61,9	263,9	250,6
heat household [kWh/Inh.]	15,6	1.055,4	1.039,8	15,6	1.055,4	1.039,8
heat industrial [kWh/Inh.]	0,0	0,0	0,0	0,0	0,0	0,0
Energy Carrier	**consumed**	**substituted**	**Difference**	**consumed**	**substituted**	**Difference**
diesel [l/a]	2.192.372	0	2.192.372	2.192.372	0	2.192.372
fuel oil [l/a]	306.518	441.688	-135.170	306.518	441.688	-135.170
hard coal [t/a]	110	3.504	-3.394	110	3.504	-3.394
lignite [t/a]	0	0	0	0	0	0
natural gas [m³/a]	4.356.369	71.568.270	-67.211.901	4.356.369	1.986.915	2.369.454
energy content [MJ/Inh.]	952	5.817	-4.865	952	724	228
Recovered Fuel						
amount [kg/Inh.]						
heating value [MJ/t]						
water content						
Composition						
C [%dm]						
N [%dm]						
S [%dm]						
Cl [%dm]						
Cd [mg/kg dm]						
Hg [mg/kg dm]						
Pb [mg/kg dm]						
Zn [mg/kg dm]						

Model Region 3	FP1 - CK			FP1 - CFB		
	analysed system	saved primary production	Difference	analysed system	saved primary production	Difference
Cost Benefit Analysis						
Internal Costs [Euro/Inh.]	144	165	**-20**	141	164	**-23**
External Costs [Euro/Inh.]	35	57	**-22**	27	47	**-21**
Total [Euro/Inh.]	179	222	**-43**	168	211	**-43**
Energy	**consumed**	**produced**	**substituted** (incl. subst. E-mix)	**consumed**	**produced**	**substituted** (incl. subst. E-mix)
electricity [kWh/Inh.]	73,7	168,0	147,4	73,7	335,8	315,2
heat household [kWh/Inh.]	11,2	671,9	660,7	11,2	671,9	660,7
heat industrial [kWh/Inh.]	0,0	431,5	431,5	0,0	239,7	239,7
Energy Carrier	**consumed**	**substituted**	**Difference**	**consumed**	**substituted**	**Difference**
diesel [l/a]	3.109.027	0	3.109.027	3.145.265	0	3.145.265
fuel oil [l/a]	413.043	2.763.053	-2.350.010	413.043	629.707	-216.664
hard coal [t/a]	147	86.021	-85.874	147	94.363	-94.216
lignite [t/a]	0	13.108	-13.108	0	0	0
natural gas [m³/a]	3.372.554	2.516.547	856.007	3.372.554	1.997.848	1.374.706
energy content [MJ/Inh.]	1.041	5.805	-4.763	1.044	5.791	-4.747

Recovered Fuel	**FP1 - fluff**	**FP1 - fluff**
amount [kg/Inh.]	101,9	101,9
heating value [MJ/t]	16.942	16.942
water content	22,8%	22,8%
Composition		
C [%dm]	54,0%	54,0%
N [%dm]	0,5%	0,5%
S [%dm]	0,2%	0,2%
Cl [%dm]	0,7%	0,7%
Cd [mg/kg dm]	5,7	5,7
Hg [mg/kg dm]	0,43	0,43
Pb [mg/kg dm]	135	135
Zn [mg/kg dm]	407	407

Model Region 3	FP1 - PC			FP1 - gasPC		
	analysed system	saved primary production	Difference	analysed system	saved primary production	Difference
Cost Benefit Analysis						
Internal Costs [Euro/Inh.]	147	164	**-18**	142	164	**-21**
External Costs [Euro/Inh.]	27	48	**-21**	27	47	**-20**
Total [Euro/Inh.]	174	212	**-38**	169	211	**-41**
Energy	**consumed**	**produced**	**substituted** (incl. subst. E-mix)	**consumed**	**produced**	**substituted** (incl. subst. E-mix)
electricity [kWh/Inh.]	82,3	386,8	357,7	74,6	374,1	352,7
heat household [kWh/Inh.]	11,4	682,3	670,9	11,2	671,9	660,7
heat industrial [kWh/Inh.]	0,0	0,0	0,0	0,0	0,0	0,0
Energy Carrier	**consumed**	**substituted**	**Difference**	**consumed**	**substituted**	**Difference**
diesel [l/a]	3.126.705	0	3.126.705	3.113.044	0	3.113.044
fuel oil [l/a]	409.332	625.857	-216.525	413.043	629.707	-216.664
hard coal [t/a]	146	96.745	-96.600	147	94.363	-94.216
lignite [t/a]	0	0	0	0	0	0
natural gas [m³/a]	4.515.356	1.997.848	2.517.508	3.372.554	1.997.848	1.374.706
energy content [MJ/Inh.]	1.187	5.922	-4.734	1.048	5.791	-4.743

Recovered Fuel	**FP1 - pellets**	**FP1 - fluff**
amount [kg/Inh.]	83,6	101,9
heating value [MJ/t]	21.671	16.942
water content	4,0%	22,8%
Composition		
C [%dm]	45,5%	54,0%
N [%dm]	0,4%	0,5%
S [%dm]	0,2%	0,2%
Cl [%dm]	0,7%	0,7%
Cd [mg/kg dm]	6,4	5,7
Hg [mg/kg dm]	0,24	0,43
Pb [mg/kg dm]	135	135
Zn [mg/kg dm]	299	407

Model Region 3	FP2 - CK			FP2 - CFB		
	analysed system	saved primary production	Difference	analysed system	saved primary production	Difference
Cost Benefit Analysis						
Internal Costs [Euro/Inh.]	150	163	**-13**	146	162	**-15**
External Costs [Euro/Inh.]	39	66	**-27**	27	51	**-24**
Total [Euro/Inh.]	189	229	**-40**	173	213	**-40**
Energy	**consumed**	**produced**	**substituted** (incl. subst. E-mix)	**consumed**	**produced**	**substituted** (incl. subst. E-mix)
electricity [kWh/Inh.]	80,3	129,6	137,1	80,3	376,0	383,4
heat household [kWh/Inh.]	9,8	518,5	508,7	9,8	518,5	508,7
heat industrial [kWh/Inh.]	0,0	633,4	633,4	0,0	351,9	351,9
Energy Carrier	**consumed**	**substituted**	**Difference**	**consumed**	**substituted**	**Difference**
diesel [l/a]	2.789.311	0	2.789.311	2.825.538	0	2.825.538
fuel oil [l/a]	533.922	4.775.786	-4.241.864	533.922	1.643.780	-1.109.858
hard coal [t/a]	159	83.602	-83.444	159	95.850	-95.692
lignite [t/a]	0	19.245	-19.245	0	0	0
natural gas [m³/a]	3.146.394	2.884.729	261.665	3.146.394	2.123.217	1.023.177
energy content [MJ/Inh.]	1.059	6.231	-5.171	1.062	6.211	-5.149
Recovered Fuel	**FP2 - soft pellets**			**FP2 - soft pellets**		
amount [kg/Inh.]	131,0			131,0		
heating value [MJ/t]	19.340			19.340		
water content	16,0%			16,0%		
Composition						
C [%dm]	52,4%			52,4%		
N [%dm]	0,4%			0,4%		
S [%dm]	0,2%			0,2%		
Cl [%dm]	0,8%			0,8%		
Cd [mg/kg dm]	6,4			6,4		
Hg [mg/kg dm]	0,27			0,27		
Pb [mg/kg dm]	140			140		
Zn [mg/kg dm]	318			318		

Model Region 3	FP2 - PC			FP2 - gasPC		
	analysed system	saved primary production	Difference	analysed system	saved primary production	Difference
Cost Benefit Analysis						
Internal Costs [Euro/Inh.]	147	162	**-15**	148	162	**-13**
External Costs [Euro/Inh.]	27	51	**-24**	27	51	**-24**
Total [Euro/Inh.]	174	213	**-39**	175	213	**-37**
Energy	**consumed**	**produced**	**substituted** (incl. subst. E-mix)	**consumed**	**produced**	**substituted** (incl. subst. E-mix)
electricity [kWh/Inh.]	84,0	432,3	436,0	81,5	432,3	438,5
heat household [kWh/Inh.]	9,8	518,5	508,7	9,8	518,5	508,7
heat industrial [kWh/Inh.]	0,0	0,0	0,0	0,0	0,0	0,0
Energy Carrier	**consumed**	**substituted**	**Difference**	**consumed**	**substituted**	**Difference**
diesel [l/a]	2.793.316	0	2.793.316	2.793.316	0	2.793.316
fuel oil [l/a]	533.922	1.643.780	-1.109.858	533.922	1.643.780	-1.109.858
hard coal [t/a]	159	95.850	-95.692	159	95.850	-95.692
lignite [t/a]	0	0	0	0	0	0
natural gas [m³/a]	3.146.394	2.123.217	1.023.177	3.146.394	2.123.217	1.023.177
energy content [MJ/Inh.]	1.086	6.211	-5.125	1.068	6.211	-5.143
Recovered Fuel	**FP2 - soft pellets**			**FP2 - soft pellets**		
amount [kg/Inh.]	131,0			131,0		
heating value [MJ/t]	19.340			19.340		
water content	16,0%			16,0%		
Composition						
C [%dm]	52,4%			52,4%		
N [%dm]	0,4%			0,4%		
S [%dm]	0,2%			0,2%		
Cl [%dm]	0,8%			0,8%		
Cd [mg/kg dm]	6,4			6,4		
Hg [mg/kg dm]	0,27			0,27		
Pb [mg/kg dm]	140			140		
Zn [mg/kg dm]	318			318		

Model Region 3	FP3 - CK			FP3 - CFB		
	analysed system	saved primary production	Difference	analysed system	saved primary production	Difference
Cost Benefit Analysis						
Internal Costs [Euro/Inh.]	130	148	**-18**	119	145	**-26**
External Costs [Euro/Inh.]	51	75	**-23**	30	49	**-19**
Total [Euro/Inh.]	181	222	**-41**	149	194	**-45**
Energy	**consumed**	**produced**	**substituted** (incl. subst. E-mix)	**consumed**	**produced**	**substituted** (incl. subst. E-mix)
electricity [kWh/Inh.]	99,1	42,1	-8,3	93,0	464,1	419,8
heat household [kWh/Inh.]	5,5	168,4	162,9	5,5	168,4	162,9
heat industrial [kWh/Inh.]	0,0	1.085,2	1.085,2	0,0	602,9	602,9
Energy Carrier	**consumed**	**substituted**	**Difference**	**consumed**	**substituted**	**Difference**
diesel [l/a]	2.292.180	0	2.292.180	2.296.763	0	2.296.763
fuel oil [l/a]	5.308.359	5.806.909	-498.550	5.308.359	441.408	4.866.951
hard coal [t/a]	110	75.169	-75.059	110	96.151	-96.041
lignite [t/a]	0	32.968	-32.968	0	0	0
natural gas [m³/a]	2.554.062	3.291.476	-737.414	2.554.062	1.986.915	567.147
energy content [MJ/Inh.]	1.487	5.875	-4.389	1.443	5.841	-4.398
Recovered Fuel	**FP3 - hard pellets**			**FP3 - hard pellets**		
amount [kg/Inh.]	203			203		
heating value [MJ/t]	21.383			21.383		
water content	4,0%			4,0%		
Composition						
C [%dm]	43,7%			43,7%		
N [%dm]	0,5%			0,5%		
S [%dm]	0,2%			0,2%		
Cl [%dm]	0,7%			0,7%		
Cd [mg/kg dm]	6,1			6,1		
Hg [mg/kg dm]	0,38			0,38		
Pb [mg/kg dm]	145			145		
Zn [mg/kg dm]	374			374		

Model Region 3	FP3 - PC			FP3 - gasPC		
	analysed system	saved primary production	Difference	analysed system	saved primary production	Difference
Cost Benefit Analysis						
Internal Costs [Euro/Inh.]	120	145	**-25**	124	145	**-21**
External Costs [Euro/Inh.]	30	49	**-19**	30	49	**-19**
Total [Euro/Inh.]	150	194	**-44**	153	194	**-41**
Energy	**consumed**	**produced**	**substituted** (incl. subst. E-mix)	**consumed**	**produced**	**substituted** (incl. subst. E-mix)
electricity [kWh/Inh.]	98,7	560,6	510,5	94,8	560,6	514,4
heat household [kWh/Inh.]	5,5	168,4	162,9	5,5	168,4	162,9
heat industrial [kWh/Inh.]	0,0	0,0	0,0	0,0	0,0	0,0
Energy Carrier	**consumed**	**substituted**	**Difference**	**consumed**	**substituted**	**Difference**
diesel [l/a]	2.296.855	0	2.296.855	2.296.855	0	2.296.855
fuel oil [l/a]	5.308.359	441.408	4.866.951	5.308.359	441.408	4.866.951
hard coal [t/a]	110	96.151	-96.041	110	96.151	-96.041
lignite [t/a]	0	0	0	0	0	0
natural gas [m³/a]	2.554.062	1.986.915	567.147	2.554.062	1.986.915	567.147
energy content [MJ/Inh.]	1.484	5.841	-4.357	1.457	5.841	-4.385
Recovered Fuel	**FP3 - hard pellets**			**FP3 - hard pellets**		
amount [kg/Inh.]	203			203		
heating value [MJ/t]	21.383			21.383		
water content	4,0%			4,0%		
Composition						
C [%dm]	43,7%			43,7%		
N [%dm]	0,5%			0,5%		
S [%dm]	0,2%			0,2%		
Cl [%dm]	0,7%			0,7%		
Cd [mg/kg dm]	6,1			6,1		
Hg [mg/kg dm]	0,38			0,38		
Pb [mg/kg dm]	145			145		
Zn [mg/kg dm]	374			374		

11.2 Air and Water Emissions

11.2.1 Model Region 1

Model Region 1	BS (baseline)													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	8.178	70.365	0	0	0	0	0	75.437	0	83.615	70.365
CO2foss [t/a]	3.495	513	40	5.536	58.303	0	0	0	0	0	61.824	19.398	71.409	77.701
CH4 [kg/a]	4.255	624	79	9.765	17.902	0	0	0	0	0	4.519.177	42.376	4.533.899	60.278
CO [kg/a]	19.180	2.814	59	812	14.276	0	0	0	0	0	5.525	3.193	28.389	17.469
SO2 [kg/a]	5.267	773	142	16.439	50.821	0	0	0	0	0	1.875	80.506	24.496	131.327
NOx [kg/a]	62.894	9.228	237	9.270	61.463	0	0	0	0	0	18.245	38.919	99.873	100.382
NMVOC [kg/a]	21.808	3.200	67	1.219	4.432	0	0	0	0	0	6.285	4.168	32.579	8.600
Dust [kg/a]	1.441	211	43	4.685	7.568	0	0	0	0	0	525	24.809	6.906	32.378
PCDD/F [kg/a]	0	0	0	1,31E-12	2,79E-08	0	0	0	0	0	0	0	1,31E-12	2,79E-08
HCl [kg/a]	8,51E+00	1,25E+00	5,46E+00	6,21E+02	1,33E+03	0	0	0	0	0	1,79E+01	3,44E+03	6,54E+02	4,77E+03
CFC [kg/a]	2,39E-05	3,50E-06	3,66E-06	4,19E-04	1,33E-03	0	0	0	0	0	1,71E-05	2,27E-03	4,67E-04	3,60E-03
Cd [kg/a]	4,05E-02	5,93E-03	4,75E-04	4,19E-02	8,95E-02	0	0	0	0	0	1,27E-02	2,29E-01	1,01E-01	3,19E-01
Hg [kg/a]	4,16E-03	6,10E-04	1,02E-03	1,19E-01	2,43E-01	0	0	0	0	0	1,45E-02	6,36E-01	1,39E-01	8,79E-01
Pb [kg/a]	2,23E-01	3,26E-02	4,21E-03	5,39E+00	6,81E+00	0	0	0	0	0	7,42E-02	2,27E+00	5,72E+00	9,08E+00
Zn [kg/a]	1,33E+00	1,96E-01	1,16E-02	9,05E-01	2,04E+00	0	0	0	0	0	4,05E-01	4,96E+00	2,85E+00	7,00E+00
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	157	23	1	14.469	1.225.883	0	0	0	0	0	2.907.098	48	2.921.747	1.225.930
NH4 [kg/a]	139	20	0	8	13	0	0	0	0	0	585.014	43	585.182	57
Cd [kg/a]	7,04E-02	1,03E-02	8,62E-04	7,67E-02	1,53E-01	0	0	0	0	0	8,11E+01	4,22E-01	8,13E+01	5,75E-01
Hg [kg/a]	6,26E-04	9,18E-05	2,42E-05	3,84E-03	5,31E-02	0	0	0	0	0	1,04E+02	1,42E-02	1,04E+02	6,73E-02
Pb [kg/a]	1,72E-01	2,52E-02	6,34E-02	7,24E+00	1,43E+01	0	0	0	0	0	1,23E+03	3,98E+01	1,24E+03	5,41E+01
Zn [kg/a]	7,41E-01	1,09E-01	1,24E-01	1,41E+01	2,27E+01	0	0	0	0	0	4,68E+04	7,72E+01	4,68E+04	9,99E+01
Cl- [kg/a]	3,38E+04	4,97E+03	1,88E+02	1,10E+04	1,78E+04	0	0	0	0	0	4,40E+05	5,94E+04	4,90E+05	7,72E+04

Model Region 1	I - coal													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	8.178	70.365	0	0	0	87.666	0	0	0	95.844	70.365
CO2foss [t/a]	3.495	718	40	10.518	70.276	0	0	0	82.556	78.336	254	0	97.582	148.611
CH4 [kg/a]	4.255	874	79	18.291	62.775	0	0	0	41.040	1.483	323	0	64.862	64.258
CO [kg/a]	19.180	3.940	59	19.281	90.781	0	0	0	23.391	14.830	1.319	0	67.169	105.610
SO2 [kg/a]	5.267	1.082	142	28.901	67.466	0	0	0	49.566	51.327	419	0	85.377	118.793
NOx [kg/a]	62.894	12.919	237	17.217	74.949	0	0	0	116.479	26.694	4.347	0	214.092	101.643
NMVOC [kg/a]	21.808	4.479	67	2.037	5.397	0	0	0	11.346	1.483	1.501	0	41.239	6.880
Dust [kg/a]	1.441	296	43	9.340	13.260	0	0	0	23.975	2.010	117	0	35.212	15.269
PCDD/F [kg/a]	0	0	0	1,31E-12	2,79E-08	0	0	0	8,32E-02	0	0	0	8,32E-02	2,79E-08
HCl [kg/a]	8,51E+00	1,75E+00	5,46E+00	1,14E+03	5,55E+03	0	0	0	2,02E+03	2,94E+03	3,05E+00	0	3,17E+03	8,48E+03
CFC [kg/a]	2,39E-05	4,90E-06	3,66E-06	7,53E-04	1,57E-03	0	0	0	1,40E-03	8,88E-04	3,27E-06	0	2,19E-03	2,45E-03
Cd [kg/a]	4,05E-02	8,31E-03	4,75E-04	8,02E-02	2,75E-01	0	0	0	4,27E-01	3,90E-01	2,94E-03	0	5,60E-01	6,65E-01
Hg [kg/a]	4,16E-03	8,55E-04	1,02E-03	2,52E-01	3,30E-01	0	0	0	5,15E+00	3,23E+00	7,41E-04	0	5,41E+00	3,56E+00
Pb [kg/a]	2,23E-01	4,57E-02	4,21E-03	4,56E+01	2,58E+01	0	0	0	1,37E+00	1,53E+01	1,69E-02	0	4,72E+01	4,11E+01
Zn [kg/a]	1,33E+00	2,74E-01	1,16E-02	1,63E+00	2,59E+00	0	0	0	1,38E+01	2,93E+01	9,51E-02	0	1,71E+01	3,19E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	157	32	1	16.417	1.227.831	0	0	0	399.414	364	625.419	0	1.041.440	1.228.196
NH4 [kg/a]	139	29	0	16	26	0	0	0	1.868	119	125.858	0	127.910	145
Cd [kg/a]	7,04E-02	1,45E-02	8,62E-04	1,38E-01	5,64E-01	0	0	0	3,22E-01	4,25E+00	1,94E+01	0	1,99E+01	4,81E+00
Hg [kg/a]	6,26E-04	1,29E-04	2,42E-05	9,23E-02	1,41E-01	0	0	0	1,38E-02	1,16E-01	2,49E+01	0	2,50E+01	2,57E-01
Pb [kg/a]	1,72E-01	3,52E-02	6,34E-02	1,32E+01	5,55E+01	0	0	0	2,35E+01	4,11E+02	2,95E+02	0	3,32E+02	4,66E+02
Zn [kg/a]	7,41E-01	1,52E-01	1,24E-01	2,52E+01	1,05E+02	0	0	0	4,65E+01	8,23E+02	1,12E+04	0	1,13E+04	9,27E+02
Cl- [kg/a]	3,38E+04	6,95E+03	1,88E+02	3,03E+04	7,02E+04	0	0	0	3,47E+05	5,28E+05	1,05E+05	0	5,24E+05	5,98E+05

Model Region 1	I - gas													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	8.178	70.365	0	0	0	87.666	0	0	0	95.844	70.365
CO2foss [t/a]	3.495	718	40	10.518	70.276	0	0	0	82.556	33.044	273	0	97.601	103.320
CH4 [kg/a]	4.255	874	79	18.291	62.775	0	0	0	41.040	2.516	347	0	64.886	65.291
CO [kg/a]	19.180	3.940	59	19.281	90.781	0	0	0	23.391	50.310	1.419	0	67.269	141.091
SO2 [kg/a]	5.267	1.082	142	28.901	67.466	0	0	0	49.566	260	451	0	85.409	67.726
NOx [kg/a]	62.894	12.919	237	17.217	74.949	0	0	0	116.479	50.310	4.676	0	214.421	125.260
NMVOC [kg/a]	21.808	4.479	67	2.037	5.397	0	0	0	11.346	2.516	1.614	0	41.352	7.912
Dust [kg/a]	1.441	296	43	9.340	13.260	0	0	0	23.975	252	126	0	35.220	13.511
PCDD/F [kg/a]	0	0	0	1,31E-12	2,79E-08	0	0	0	8,32E-02	0	0	0	8,32E-02	2,79E-08
HCl [kg/a]	8,51E+00	1,75E+00	5,46E+00	1,14E+03	5,55E+03	0	0	0	2,02E+03	3,91E+01	3,28E+00	0	3,17E+03	5,59E+03
CFC [kg/a]	2,39E-05	4,90E-06	3,66E-06	7,53E-04	1,57E-03	0	0	0	1,40E-03	9,80E-05	3,51E-06	0	2,19E-03	1,66E-03
Cd [kg/a]	4,05E-02	8,31E-03	4,75E-04	8,02E-02	2,75E-01	0	0	0	4,27E-01	1,45E-02	3,16E-03	0	5,60E-01	2,89E-01
Hg [kg/a]	4,16E-03	8,55E-04	1,02E-03	2,52E-01	3,30E-01	0	0	0	5,15E+00	9,23E-01	7,97E-04	0	5,41E+00	1,25E+00
Pb [kg/a]	2,23E-01	4,57E-02	4,21E-03	4,56E+01	2,58E+01	0	0	0	1,37E+00	2,28E-01	1,82E-02	0	4,72E+01	2,60E+01
Zn [kg/a]	1,33E+00	2,74E-01	1,16E-02	1,63E+00	2,59E+00	0	0	0	1,38E+01	3,68E-01	1,02E-01	0	1,71E+01	2,96E+00
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	157	32	1	16.417	1.227.831	0	0	0	399.414	16	672.731	0	1.088.751	1.227.847
NH4 [kg/a]	139	29	0	16	26	0	0	0	1.868	41	135.379	0	137.431	67
Cd [kg/a]	7,04E-02	1,45E-02	8,62E-04	1,38E-01	5,64E-01	0	0	0	3,22E-01	2,84E-01	2,09E+01	0	2,14E+01	8,48E-01
Hg [kg/a]	6,26E-04	1,29E-04	2,42E-05	9,23E-02	1,41E-01	0	0	0	1,38E-02	4,95E-02	2,68E+01	0	2,69E+01	1,90E-01
Pb [kg/a]	1,72E-01	3,52E-02	6,34E-02	1,32E+01	5,55E+01	0	0	0	2,35E+01	2,83E+01	3,17E+02	0	3,54E+02	8,38E+01
Zn [kg/a]	7,41E-01	1,52E-01	1,24E-01	2,52E+01	1,05E+02	0	0	0	4,65E+01	5,65E+01	1,20E+04	0	1,21E+04	1,61E+02
Cl- [kg/a]	3,38E+04	6,95E+03	1,88E+02	3,03E+04	7,02E+04	0	0	0	3,47E+05	3,99E+04	1,13E+05	0	5,32E+05	1,10E+05

Model Region 1	I - mix													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	8.178	70.365	0	0	0	87.666	0	0	0	95.844	70.365
CO2foss [t/a]	3.495	718	40	10.518	70.276	0	0	0	82.556	84.966	273	0	97.601	155.242
CH4 [kg/a]	4.255	874	79	18.291	62.775	0	0	0	41.040	185.618	347	0	64.886	248.393
CO [kg/a]	19.180	3.940	59	19.281	90.781	0	0	0	23.391	13.988	1.419	0	67.269	104.769
SO2 [kg/a]	5.267	1.082	142	28.901	67.466	0	0	0	49.566	352.638	451	0	85.409	420.104
NOx [kg/a]	62.894	12.919	237	17.217	74.949	0	0	0	116.479	170.474	4.676	0	214.421	245.423
NMVOC [kg/a]	21.808	4.479	67	2.037	5.397	0	0	0	11.346	18.258	1.614	0	41.352	23.655
Dust [kg/a]	1.441	296	43	9.340	13.260	0	0	0	23.975	108.672	126	0	35.220	121.931
PCDD/F [kg/a]	0	0	0	1,31E-12	2,79E-08	0	0	0	8,32E-02	0	0	0	8,32E-02	2,79E-08
HCl [kg/a]	8,51E+00	1,75E+00	5,46E+00	1,14E+03	5,55E+03	0	0	0	2,02E+03	1,51E+04	3,28E+00	0	3,17E+03	2,06E+04
CFC [kg/a]	2,39E-05	4,90E-06	3,66E-06	7,53E-04	1,57E-03	0	0	0	1,40E-03	9,96E-03	3,51E-06	0	2,19E-03	1,15E-02
Cd [kg/a]	4,05E-02	8,31E-03	4,75E-04	8,02E-02	2,75E-01	0	0	0	4,27E-01	1,00E+00	3,16E-03	0	5,60E-01	1,28E+00
Hg [kg/a]	4,16E-03	8,55E-04	1,02E-03	2,52E-01	3,30E-01	0	0	0	5,15E+00	2,78E+00	7,97E-04	0	5,41E+00	3,11E+00
Pb [kg/a]	2,23E-01	4,57E-02	4,21E-03	4,56E+01	2,58E+01	0	0	0	1,37E+00	9,96E+00	1,82E-02	0	4,72E+01	3,57E+01
Zn [kg/a]	1,33E+00	2,74E-01	1,16E-02	1,63E+00	2,59E+00	0	0	0	1,38E+01	2,17E+01	1,02E-01	0	1,71E+01	2,43E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	157	32	1	16.417	1.227.831	0	0	0	399.414	208	672.731	0	1.088.751	1.228.040
NH4 [kg/a]	139	29	0	16	26	0	0	0	1.868	189	135.379	0	137.431	215
Cd [kg/a]	7,04E-02	1,45E-02	8,62E-04	1,38E-01	5,64E-01	0	0	0	3,22E-01	1,85E+00	2,09E+01	0	2,14E+01	2,41E+00
Hg [kg/a]	6,26E-04	1,29E-04	2,42E-05	9,23E-02	1,41E-01	0	0	0	1,38E-02	6,22E-02	2,68E+01	0	2,69E+01	2,03E-01
Pb [kg/a]	1,72E-01	3,52E-02	6,34E-02	1,32E+01	5,55E+01	0	0	0	2,35E+01	1,74E+02	3,17E+02	0	3,54E+02	2,30E+02
Zn [kg/a]	7,41E-01	1,52E-01	1,24E-01	2,52E+01	1,05E+02	0	0	0	4,65E+01	3,38E+02	1,20E+04	0	1,21E+04	4,43E+02
Cl- [kg/a]	3,38E+04	6,95E+03	1,88E+02	3,03E+04	7,02E+04	0	0	0	3,47E+05	2,60E+05	1,13E+05	0	5,32E+05	3,30E+05

Model Region 1	FP1 - CK													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	8.178	70.365	0	26.563	0	61.366	0	0	0	96.107	70.365
CO2foss [t/a]	3.495	1.318	40	11.449	70.068	5.833	33.632	68.353	47.834	45.784	191	0	103.793	184.205
CH4 [kg/a]	4.255	1.604	79	20.760	58.218	10.939	4.301	146.744	30.235	867	243	0	72.417	205.829
CO [kg/a]	19.180	7.231	59	15.789	75.320	10.888	18.861	27.327	15.170	8.667	994	0	88.171	111.314
SO2 [kg/a]	5.267	1.986	142	34.639	74.577	19.280	22.706	127.241	36.516	29.998	316	0	120.852	231.817
NOx [kg/a]	62.894	23.713	237	19.508	76.657	41.522	1.674.624	1.701.134	85.813	15.601	3.275	0	1.911.587	1.793.392
NMVOC [kg/a]	21.808	8.223	67	2.346	6.137	12.490	2.277	21.419	7.740	867	1.131	0	56.082	28.423
Dust [kg/a]	1.441	543	43	10.840	15.659	5.844	7.075	5.350	17.663	1.175	88	0	43.537	22.184
PCDD/F [kg/a]	0	0	0	7,67E-12	2,79E-08	0	9,11E-05	9,11E-05	6,13E-02	0	0	0	6,14E-02	9,12E-05
HCl [kg/a]	8,51E+00	3,21E+00	5,46E+00	1,37E+03	5,03E+03	7,09E+02	7,68E+02	2,05E+03	1,48E+03	1,72E+03	2,30E+00	0	4,35E+03	8,80E+03
CFC [kg/a]	2,39E-05	9,00E-06	3,66E-06	9,09E-04	1,75E-03	4,78E-04	2,31E-04	9,08E-04	1,03E-03	5,19E-04	2,46E-06	0	2,69E-03	3,18E-03
Cd [kg/a]	4,05E-02	1,53E-02	4,75E-04	1,04E-01	2,61E-01	6,84E-02	5,45E-02	9,83E-02	2,57E-01	2,28E-01	2,22E-03	0	5,43E-01	5,87E-01
Hg [kg/a]	4,16E-03	1,57E-03	1,02E-03	2,88E-01	3,78E-01	1,32E-01	6,10E+00	4,46E+00	2,90E+00	1,89E+00	5,58E-04	0	9,42E+00	6,72E+00
Pb [kg/a]	2,23E-01	8,39E-02	4,21E-03	3,75E+01	2,21E+01	5,84E-01	1,81E+00	1,78E+01	1,01E+00	8,96E+00	1,27E-02	0	4,12E+01	4,89E+01
Zn [kg/a]	1,33E+00	5,03E-01	1,16E-02	1,99E+00	3,05E+00	1,73E+00	1,81E+00	4,77E+00	9,12E+00	1,71E+01	7,16E-02	0	1,66E+01	2,50E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	157	59	1	16.018	1.227.436	93	5	75	253.354	213	471.214	0	740.901	1.227.724
NH4 [kg/a]	139	52	0	19	31	83	4	131	1.471	70	94.826	0	96.595	231
Cd [kg/a]	7,04E-02	2,65E-02	8,62E-04	1,67E-01	5,26E-01	1,24E-01	4,28E-02	1,82E+00	2,23E-01	2,48E+00	1,46E+01	0	1,53E+01	4,83E+00
Hg [kg/a]	6,26E-04	2,36E-04	2,42E-05	7,54E-02	1,24E-01	3,24E-03	1,44E-03	2,37E-03	1,02E-02	6,81E-02	1,88E+01	0	1,89E+01	1,94E-01
Pb [kg/a]	1,72E-01	6,47E-02	6,34E-02	1,59E+01	5,12E+01	8,24E+00	4,04E+00	1,76E+02	1,73E+01	2,40E+02	2,22E+02	0	2,68E+02	4,67E+02
Zn [kg/a]	7,41E-01	2,79E-01	1,24E-01	3,05E+01	9,60E+01	1,62E+01	7,83E+00	4,40E+02	3,42E+01	4,81E+02	8,43E+03	0	8,52E+03	1,02E+03
Cl- [kg/a]	3,38E+04	1,28E+04	1,88E+02	3,24E+04	6,74E+04	3,02E+04	6,03E+03	2,76E+05	2,24E+05	3,08E+05	7,92E+04	0	4,19E+05	6,52E+05

Model Region 1	FP1 - CFB													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	8.178	70.365	0	26.653	0	61.366	0	0	0	96.196	70.365
CO2foss [t/a]	3.495	1.318	40	11.449	70.068	5.833	33.738	62.164	47.834	45.784	202	0	103.910	178.016
CH4 [kg/a]	4.255	1.604	79	20.760	58.218	10.939	4.301	185.090	30.235	867	257	0	72.431	244.175
CO [kg/a]	19.180	7.231	59	15.789	75.320	10.888	7.761	13.268	15.170	8.667	1.052	0	77.129	97.256
SO2 [kg/a]	5.267	1.986	142	34.639	74.577	19.280	9.116	36.132	36.516	29.998	334	0	107.280	140.708
NOx [kg/a]	62.894	23.713	237	19.508	76.657	41.522	26.108	44.635	85.813	15.601	3.465	0	263.261	136.894
NMVOC [kg/a]	21.808	8.223	67	2.346	6.137	12.490	1.167	7.041	7.740	867	1.196	0	55.038	14.044
Dust [kg/a]	1.441	543	43	10.840	15.659	5.844	3.606	1.088	17.663	1.175	93	0	40.073	17.922
PCDD/F [kg/a]	0	0	0	7,67E-12	2,79E-08	0	1,64E-02	1,64E-02	6,13E-02	0	0	0	7,77E-02	1,64E-02
HCl [kg/a]	8,51E+00	3,21E+00	5,46E+00	1,37E+03	5,03E+03	7,09E+02	8,55E+02	4,08E+02	1,48E+03	1,72E+03	2,43E+00	0	4,44E+03	7,15E+03
CFC [kg/a]	2,39E-05	9,00E-06	3,66E-06	9,09E-04	1,75E-03	4,78E-04	2,31E-04	7,14E-04	1,03E-03	5,19E-04	2,60E-06	0	2,69E-03	2,99E-03
Cd [kg/a]	4,05E-02	1,53E-02	4,75E-04	1,04E-01	2,61E-01	6,84E-02	1,01E-01	1,14E-02	2,57E-01	2,28E-01	2,35E-03	0	5,90E-01	5,00E-01
Hg [kg/a]	4,16E-03	1,57E-03	1,02E-03	2,88E-01	3,78E-01	1,32E-01	2,55E-01	2,35E-01	2,90E+00	1,89E+00	5,91E-04	0	3,58E+00	2,50E+00
Pb [kg/a]	2,23E-01	8,39E-02	4,21E-03	3,75E+01	2,21E+01	5,84E-01	6,26E-01	2,19E+00	1,01E+00	8,96E+00	1,35E-02	0	4,00E+01	3,33E+01
Zn [kg/a]	1,33E+00	5,03E-01	1,16E-02	1,99E+00	3,05E+00	1,73E+00	4,42E+00	4,61E+00	9,12E+00	1,71E+01	7,58E-02	0	1,92E+01	2,48E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	157	59	1	16.018	1.227.436	93	42.802	43.497	253.354	213	534.526	0	847.011	1.271.147
NH4 [kg/a]	139	52	0	19	31	83	15	93	1.471	70	107.566	0	109.346	193
Cd [kg/a]	7,04E-02	2,65E-02	8,62E-04	1,67E-01	5,26E-01	1,24E-01	7,46E-01	1,64E+00	2,23E-01	2,48E+00	1,66E+01	0	1,79E+01	4,64E+00
Hg [kg/a]	6,26E-04	2,36E-04	2,42E-05	7,54E-02	1,24E-01	3,24E-03	1,64E-02	1,25E-02	1,02E-02	6,81E-02	2,13E+01	0	2,14E+01	2,04E-01
Pb [kg/a]	1,72E-01	6,47E-02	6,34E-02	1,59E+01	5,12E+01	8,24E+00	7,99E+00	1,54E+02	1,73E+01	2,40E+02	2,52E+02	0	3,02E+02	4,45E+02
Zn [kg/a]	7,41E-01	2,79E-01	1,24E-01	3,05E+01	9,60E+01	1,62E+01	2,09E+01	5,98E+02	3,42E+01	4,81E+02	9,56E+03	0	9,66E+03	1,17E+03
Cl- [kg/a]	3,38E+04	1,28E+04	1,88E+02	3,24E+04	6,74E+04	3,02E+04	1,22E+05	3,27E+05	2,24E+05	3,08E+05	8,97E+04	0	5,46E+05	7,03E+05

Model Region 1	FP1 - PC													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	8.178	70.365	0	20.097	0	63.634	0	0	0	91.909	70.365
CO2foss [t/a]	3.495	1.421	40	11.400	69.981	10.076	31.026	63.901	48.819	46.935	202	0	106.480	180.817
CH4 [kg/a]	4.255	1.729	79	20.670	57.905	20.632	5.011	190.260	31.069	889	256	0	83.700	249.054
CO [kg/a]	19.180	7.794	59	15.664	74.813	11.428	6.594	13.639	15.619	8.885	1.047	0	77.384	97.338
SO2 [kg/a]	5.267	2.140	142	34.492	74.436	29.514	9.520	34.085	37.523	30.752	333	0	118.930	139.273
NOx [kg/a]	62.894	25.559	237	19.424	76.553	46.095	21.811	40.315	88.179	15.994	3.451	0	267.649	132.861
NMVOC [kg/a]	21.808	8.862	67	2.338	6.129	13.130	1.114	7.238	7.963	889	1.191	0	56.475	14.255
Dust [kg/a]	1.441	586	43	10.789	15.612	8.877	3.778	845	18.150	1.204	93	0	43.756	17.661
PCDD/F [kg/a]	0	0	0	7,67E-12	2,79E-08	9,39E-10	1,62E-02	1,62E-02	6,30E-02	0	0	0	7,92E-02	1,62E-02
HCl [kg/a]	8,51E+00	3,46E+00	5,46E+00	1,36E+03	5,00E+03	1,13E+03	1,19E+03	4,63E+02	1,53E+03	1,76E+03	2,42E+00	0	5,24E+03	7,22E+03
CFC [kg/a]	2,39E-05	9,70E-06	3,66E-06	9,05E-04	1,75E-03	7,93E-04	2,69E-04	7,34E-04	1,06E-03	5,32E-04	2,59E-06	0	3,07E-03	3,02E-03
Cd [kg/a]	4,05E-02	1,64E-02	4,75E-04	1,04E-01	2,59E-01	9,60E-02	3,59E+00	4,70E-01	2,64E-01	2,34E-01	2,34E-03	0	4,11E+00	9,64E-01
Hg [kg/a]	4,16E-03	1,69E-03	1,02E-03	2,86E-01	3,78E-01	2,19E-01	2,43E+00	3,50E+00	3,15E+00	1,93E+00	5,88E-04	0	6,09E+00	5,81E+00
Pb [kg/a]	2,23E-01	9,04E-02	4,21E-03	3,72E+01	2,20E+01	8,63E-01	3,92E+01	2,09E+01	1,04E+00	9,19E+00	1,34E-02	0	7,87E+01	5,20E+01
Zn [kg/a]	1,33E+00	5,42E-01	1,16E-02	1,98E+00	3,05E+00	2,30E+00	5,87E-01	4,14E+00	9,84E+00	1,76E+01	7,55E-02	0	1,67E+01	2,48E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	157	64	1	16.005	1.227.424	95	35.777	44.712	260.951	218	534.173	0	847.221	1.272.354
NH4 [kg/a]	139	57	0	19	31	84	5	77	1.516	71	107.495	0	109.316	179
Cd [kg/a]	7,04E-02	2,86E-02	8,62E-04	1,66E-01	5,24E-01	1,74E-01	4,99E-02	1,58E+00	2,29E-01	2,54E+00	1,66E+01	0	1,73E+01	4,64E+00
Hg [kg/a]	6,26E-04	2,54E-04	2,42E-05	7,48E-02	1,23E-01	8,08E-03	1,68E-03	1,04E-03	1,04E-02	6,98E-02	2,13E+01	0	2,14E+01	1,94E-01
Pb [kg/a]	1,72E-01	6,97E-02	6,34E-02	1,58E+01	5,09E+01	1,32E+01	4,71E+00	1,56E+02	1,78E+01	2,46E+02	2,52E+02	0	3,03E+02	4,53E+02
Zn [kg/a]	7,41E-01	3,01E-01	1,24E-01	3,03E+01	9,54E+01	2,58E+01	9,12E+00	6,13E+02	3,52E+01	4,93E+02	9,55E+03	0	9,65E+03	1,20E+03
Cl- [kg/a]	3,38E+04	1,38E+04	1,88E+02	3,22E+04	6,70E+04	3,69E+04	7,02E+03	3,17E+05	2,33E+05	3,16E+05	8,96E+04	0	4,47E+05	7,00E+05

Model Region 1	FP1 - gasPC													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	8.178	70.365	0	26.653	0	61.366	0	0	0	96.196	70.365
CO2foss [t/a]	3.495	1.318	40	11.449	70.068	5.833	34.054	62.164	47.834	45.784	203	0	104.227	178.016
CH4 [kg/a]	4.255	1.604	79	20.760	58.218	10.939	4.992	185.090	30.235	867	257	0	73.122	244.175
CO [kg/a]	19.180	7.231	59	15.789	75.320	10.888	7.813	13.268	15.170	8.667	1.053	0	77.182	97.256
SO2 [kg/a]	5.267	1.986	142	34.639	74.577	19.280	9.485	33.158	36.516	29.998	335	0	107.649	137.734
NOx [kg/a]	62.894	23.713	237	19.508	76.657	41.522	26.743	44.635	85.813	15.601	3.469	0	263.899	136.894
NMVOC [kg/a]	21.808	8.223	67	2.346	6.137	12.490	1.235	7.041	7.740	867	1.198	0	55.107	14.044
Dust [kg/a]	1.441	543	43	10.840	15.659	5.844	4.011	1.088	17.663	1.175	93	0	40.478	17.922
PCDD/F [kg/a]	0	0	0	7,67E-12	2,79E-08	0	1,64E-02	1,64E-02	6,13E-02	0	0	0	7,77E-02	1,64E-02
HCl [kg/a]	8,51E+00	3,21E+00	5,46E+00	1,37E+03	5,03E+03	7,09E+02	1,18E+03	4,50E+02	1,48E+03	1,72E+03	2,43E+00	0	4,76E+03	7,20E+03
CFC [kg/a]	2,39E-05	9,00E-06	3,66E-06	9,09E-04	1,75E-03	4,78E-04	2,68E-04	7,14E-04	1,03E-03	5,19E-04	2,61E-06	0	2,73E-03	2,99E-03
Cd [kg/a]	4,05E-02	1,53E-02	4,75E-04	1,04E-01	2,61E-01	6,84E-02	3,15E+00	4,58E-01	2,57E-01	2,28E-01	2,35E-03	0	3,64E+00	9,47E-01
Hg [kg/a]	4,16E-03	1,57E-03	1,02E-03	2,88E-01	3,78E-01	1,32E-01	4,42E+00	3,41E+00	2,90E+00	1,89E+00	5,91E-04	0	7,75E+00	5,67E+00
Pb [kg/a]	2,23E-01	8,39E-02	4,21E-03	3,75E+01	2,21E+01	5,84E-01	3,98E+01	2,03E+01	1,01E+00	8,96E+00	1,35E-02	0	7,92E+01	5,14E+01
Zn [kg/a]	1,33E+00	5,03E-01	1,16E-02	1,99E+00	3,05E+00	1,73E+00	5,84E-01	4,02E+00	9,12E+00	1,71E+01	7,59E-02	0	1,53E+01	2,42E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	157	59	1	16.018	1.227.436	93	42.803	43.497	253.354	213	535.792	0	848.278	1.271.147
NH4 [kg/a]	139	52	0	19	31	83	5	75	1.471	70	107.821	0	109.591	176
Cd [kg/a]	7,04E-02	2,65E-02	8,62E-04	1,67E-01	5,26E-01	1,24E-01	4,97E-02	1,53E+00	2,23E-01	2,48E+00	1,66E+01	0	1,73E+01	4,54E+00
Hg [kg/a]	6,26E-04	2,36E-04	2,42E-05	7,54E-02	1,24E-01	3,24E-03	1,67E-03	1,02E-03	1,02E-02	6,81E-02	2,14E+01	0	2,15E+01	1,93E-01
Pb [kg/a]	1,72E-01	6,47E-02	6,34E-02	1,59E+01	5,12E+01	8,24E+00	4,69E+00	1,52E+02	1,73E+01	2,40E+02	2,52E+02	0	2,99E+02	4,43E+02
Zn [kg/a]	7,41E-01	2,79E-01	1,24E-01	3,05E+01	9,60E+01	1,62E+01	9,09E+00	5,96E+02	3,42E+01	4,81E+02	9,58E+03	0	9,67E+03	1,17E+03
Cl- [kg/a]	3,38E+04	1,28E+04	1,88E+02	3,24E+04	6,74E+04	3,02E+04	6,99E+03	3,08E+05	2,24E+05	3,08E+05	8,99E+04	0	4,31E+05	6,84E+05

Model Region 1	FP2 - CK													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	8.178	70.365	0	28.283	0	59.661	0	0	0	96.121	70.365
CO2foss [t/a]	3.495	1.524	40	13.073	87.040	6.096	43.575	88.026	37.610	38.193	183	0	105.596	213.259
CH4 [kg/a]	4.255	1.854	79	23.464	94.575	12.610	4.798	188.979	28.594	723	232	0	75.885	284.277
CO [kg/a]	19.180	8.357	59	17.939	85.702	4.895	22.539	35.192	13.582	7.230	949	0	87.499	128.124
SO2 [kg/a]	5.267	2.295	142	42.540	154.662	23.368	25.721	163.863	34.533	25.024	302	0	134.169	343.549
NOx [kg/a]	62.894	27.404	237	22.549	108.996	23.918	2.080.470	2.115.289	81.153	13.015	3.126	0	2.301.750	2.237.300
NMVOC [kg/a]	21.808	9.502	67	3.327	14.806	5.714	2.690	27.584	7.091	723	1.079	0	51.279	43.113
Dust [kg/a]	1.441	628	43	12.211	44.120	7.163	8.471	6.684	16.704	980	84	0	46.745	51.784
PCDD/F [kg/a]	0	0	0	8,06E-11	2,79E-08	0	1,13E-04	1,13E-04	5,79E-02	0	0	0	5,81E-02	1,13E-04
HCl [kg/a]	8,51E+00	3,71E+00	5,46E+00	1,52E+03	7,75E+03	9,54E+02	9,28E+02	2,64E+03	1,40E+03	1,43E+03	2,19E+00	0	4,82E+03	1,18E+04
CFC [kg/a]	2,39E-05	1,04E-05	3,66E-06	1,01E-03	3,31E-03	6,34E-04	2,57E-04	1,17E-03	9,77E-04	4,33E-04	2,35E-06	0	2,92E-03	4,91E-03
Cd [kg/a]	4,05E-02	1,76E-02	4,75E-04	2,21E-01	4,38E-01	7,18E-02	6,83E-02	1,27E-01	2,10E-01	1,90E-01	2,12E-03	0	6,31E-01	7,55E-01
Hg [kg/a]	4,16E-03	1,81E-03	1,02E-03	3,20E-01	8,15E-01	1,77E-01	4,73E+00	5,74E+00	1,89E+00	1,57E+00	5,33E-04	0	7,12E+00	8,13E+00
Pb [kg/a]	2,23E-01	9,70E-02	4,21E-03	4,18E+01	2,57E+01	6,75E-01	2,24E+00	2,30E+01	9,57E-01	7,47E+00	1,22E-02	0	4,60E+01	5,61E+01
Zn [kg/a]	1,33E+00	5,81E-01	1,16E-02	2,40E+00	7,06E+00	1,65E+00	1,73E+00	6,14E+00	8,31E+00	1,43E+01	6,84E-02	0	1,61E+01	2,75E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	157	68	1	16.219	1.227.707	46	5	96	224.457	178	449.775	0	690.728	1.227.981
NH4 [kg/a]	139	61	0	26	96	41	5	169	1.520	58	90.512	0	92.303	323
Cd [kg/a]	7,04E-02	3,07E-02	8,62E-04	1,89E-01	8,92E-01	1,31E-01	4,78E-02	2,34E+00	2,03E-01	2,07E+00	1,39E+01	0	1,46E+01	5,30E+00
Hg [kg/a]	6,26E-04	2,73E-04	2,42E-05	8,50E-02	1,43E-01	4,06E-03	1,61E-03	3,05E-03	9,60E-03	5,68E-02	1,79E+01	0	1,80E+01	2,03E-01
Pb [kg/a]	1,72E-01	7,47E-02	6,34E-02	1,75E+01	8,25E+01	1,10E+01	4,51E+00	2,26E+02	1,64E+01	2,00E+02	2,12E+02	0	2,62E+02	5,09E+02
Zn [kg/a]	7,41E-01	3,23E-01	1,24E-01	3,37E+01	1,57E+02	2,15E+01	8,73E+00	5,67E+02	3,24E+01	4,01E+02	8,04E+03	0	8,14E+03	1,13E+03
Cl- [kg/a]	3,38E+04	1,47E+04	1,88E+02	3,83E+04	1,33E+05	2,35E+04	6,72E+03	3,56E+05	1,94E+05	2,57E+05	7,56E+04	0	3,87E+05	7,46E+05

Model Region 1	FP2 - CFB													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	8.178	70.365	0	28.378	0	59.661	0	0	0	96.216	70.365
CO2foss [t/a]	3.495	1.524	40	13.073	87.040	6.096	43.714	80.056	37.610	38.193	192	0	105.745	205.289
CH4 [kg/a]	4.255	1.854	79	23.464	94.575	12.610	4.798	238.362	28.594	723	244	0	75.897	333.660
CO [kg/a]	19.180	8.357	59	17.939	85.702	4.895	9.259	17.087	13.582	7.230	1.000	0	74.271	110.019
SO2 [kg/a]	5.267	2.295	142	42.540	154.662	23.368	10.194	46.532	34.533	25.024	318	0	118.657	226.218
NOx [kg/a]	62.894	27.404	237	22.549	108.996	23.918	29.121	53.662	81.153	13.015	3.295	0	250.571	175.673
NMVOC [kg/a]	21.808	9.502	67	3.327	14.806	5.714	1.362	9.067	7.091	723	1.138	0	50.009	24.596
Dust [kg/a]	1.441	628	43	12.211	44.120	7.163	4.022	1.213	16.704	980	88	0	42.301	46.313
PCDD/F [kg/a]	0	0	0	8,06E-11	2,79E-08	0	2,04E-02	2,04E-02	5,79E-02	0	0	0	7,83E-02	2,04E-02
HCl [kg/a]	8,51E+00	3,71E+00	5,46E+00	1,52E+03	7,75E+03	9,54E+02	1,04E+03	5,25E+02	1,40E+03	1,43E+03	2,31E+00	0	4,94E+03	9,71E+03
CFC [kg/a]	2,39E-05	1,04E-05	3,66E-06	1,01E-03	3,31E-03	6,34E-04	2,57E-04	9,19E-04	9,77E-04	4,33E-04	2,48E-06	0	2,92E-03	4,66E-03
Cd [kg/a]	4,05E-02	1,76E-02	4,75E-04	2,21E-01	4,38E-01	7,18E-02	1,32E-01	1,47E-02	2,10E-01	1,90E-01	2,23E-03	0	6,95E-01	6,43E-01
Hg [kg/a]	4,16E-03	1,81E-03	1,02E-03	3,20E-01	8,15E-01	1,77E-01	2,19E-01	3,02E-01	1,89E+00	1,57E+00	5,62E-04	0	2,61E+00	2,69E+00
Pb [kg/a]	2,23E-01	9,70E-02	4,21E-03	4,18E+01	2,57E+01	6,75E-01	7,54E-01	2,82E+00	9,57E-01	7,47E+00	1,28E-02	0	4,45E+01	3,60E+01
Zn [kg/a]	1,33E+00	5,81E-01	1,16E-02	2,40E+00	7,06E+00	1,65E+00	4,07E+00	5,93E+00	8,31E+00	1,43E+01	7,21E-02	0	1,84E+01	2,73E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	157	68	1	16.219	1.227.707	46	51.208	56.016	224.457	178	520.394	0	812.549	1.283.901
NH4 [kg/a]	139	61	0	26	96	41	15	120	1.520	58	104.722	0	106.524	273
Cd [kg/a]	7,04E-02	3,07E-02	8,62E-04	1,89E-01	8,92E-01	1,31E-01	1,00E+00	2,11E+00	2,03E-01	2,07E+00	1,61E+01	0	1,78E+01	5,07E+00
Hg [kg/a]	6,26E-04	2,73E-04	2,42E-05	8,50E-02	1,43E-01	4,06E-03	1,32E-02	1,60E-02	9,60E-03	5,68E-02	2,08E+01	0	2,09E+01	2,16E-01
Pb [kg/a]	1,72E-01	7,47E-02	6,34E-02	1,75E+01	8,25E+01	1,10E+01	9,47E+00	1,98E+02	1,64E+01	2,00E+02	2,45E+02	0	3,00E+02	4,81E+02
Zn [kg/a]	7,41E-01	3,23E-01	1,24E-01	3,37E+01	1,57E+02	2,15E+01	2,04E+01	7,70E+02	3,24E+01	4,01E+02	9,31E+03	0	9,42E+03	1,33E+03
Cl- [kg/a]	3,38E+04	1,47E+04	1,88E+02	3,83E+04	1,33E+05	2,35E+04	1,56E+05	4,21E+05	1,94E+05	2,57E+05	8,73E+04	0	5,48E+05	8,11E+05

Model Region 1	FP2 - PC													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	8.178	70.365	0	28.378	0	59.661	0	0	0	96.216	70.365
CO2foss [t/a]	3.495	1.524	40	13.073	87.040	6.096	44.812	80.056	37.610	38.193	193	0	106.843	205.289
CH4 [kg/a]	4.255	1.854	79	23.464	94.575	12.610	7.196	238.362	28.594	723	245	0	78.296	333.660
CO [kg/a]	19.180	8.357	59	17.939	85.702	4.895	9.440	17.087	13.582	7.230	1.001	0	74.452	110.019
SO2 [kg/a]	5.267	2.295	142	42.540	154.662	23.368	13.671	42.702	34.533	25.024	318	0	122.135	222.388
NOx [kg/a]	62.894	27.404	237	22.549	108.996	23.918	31.324	53.662	81.153	13.015	3.299	0	252.777	175.673
NMVOC [kg/a]	21.808	9.502	67	3.327	14.806	5.714	1.598	9.067	7.091	723	1.139	0	50.246	24.596
Dust [kg/a]	1.441	628	43	12.211	44.120	7.163	5.426	1.213	16.704	980	89	0	43.705	46.313
PCDD/F [kg/a]	0	0	0	8,06E-11	2,79E-08	0	2,04E-02	2,04E-02	5,79E-02	0	0	0	7,83E-02	2,04E-02
HCl [kg/a]	8,51E+00	3,71E+00	5,46E+00	1,52E+03	7,75E+03	9,54E+02	1,58E+03	5,80E+02	1,40E+03	1,43E+03	2,32E+00	0	5,47E+03	9,76E+03
CFC [kg/a]	2,39E-05	1,04E-05	3,66E-06	1,01E-03	3,31E-03	6,34E-04	3,86E-04	9,19E-04	9,77E-04	4,33E-04	2,48E-06	0	3,05E-03	4,66E-03
Cd [kg/a]	4,05E-02	1,76E-02	4,75E-04	2,21E-01	4,38E-01	7,18E-02	4,28E+00	5,89E-01	2,10E-01	1,90E-01	2,23E-03	0	4,84E+00	1,22E+00
Hg [kg/a]	4,16E-03	1,81E-03	1,02E-03	3,20E-01	8,15E-01	1,77E-01	3,46E+00	4,39E+00	1,89E+00	1,57E+00	5,62E-04	0	5,86E+00	6,77E+00
Pb [kg/a]	2,23E-01	9,70E-02	4,21E-03	4,18E+01	2,57E+01	6,75E-01	5,00E+01	2,62E+01	9,57E-01	7,47E+00	1,28E-02	0	9,37E+01	5,93E+01
Zn [kg/a]	1,33E+00	5,81E-01	1,16E-02	2,40E+00	7,06E+00	1,65E+00	8,42E-01	5,18E+00	8,31E+00	1,43E+01	7,22E-02	0	1,52E+01	2,65E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	157	68	1	16.219	1.227.707	46	51.211	56.016	224.457	178	521.806	0	813.964	1.283.901
NH4 [kg/a]	139	61	0	26	96	41	7	97	1.520	58	105.006	0	106.800	251
Cd [kg/a]	7,04E-02	3,07E-02	8,62E-04	1,89E-01	8,92E-01	1,31E-01	7,16E-02	1,97E+00	2,03E-01	2,07E+00	1,62E+01	0	1,69E+01	4,94E+00
Hg [kg/a]	6,26E-04	2,73E-04	2,42E-05	8,50E-02	1,43E-01	4,06E-03	2,41E-03	1,31E-03	9,60E-03	5,68E-02	2,08E+01	0	2,09E+01	2,01E-01
Pb [kg/a]	1,72E-01	7,47E-02	6,34E-02	1,75E+01	8,25E+01	1,10E+01	6,76E+00	1,96E+02	1,64E+01	2,00E+02	2,46E+02	0	2,98E+02	4,79E+02
Zn [kg/a]	7,41E-01	3,23E-01	1,24E-01	3,37E+01	1,57E+02	2,15E+01	1,31E+01	7,67E+02	3,24E+01	4,01E+02	9,33E+03	0	9,43E+03	1,33E+03
Cl- [kg/a]	3,38E+04	1,47E+04	1,88E+02	3,83E+04	1,33E+05	2,35E+04	1,01E+04	3,97E+05	1,94E+05	2,57E+05	8,75E+04	0	4,02E+05	7,87E+05

Model Region 1	FP2 - gasPC													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	8.178	70.365	0	28.378	0	59.661	0	0	0	96.216	70.365
CO2foss [t/a]	3.495	1.524	40	13.073	87.040	6.096	44.067	80.056	37.610	38.193	193	0	106.098	205.289
CH4 [kg/a]	4.255	1.854	79	23.464	94.575	12.610	5.569	238.362	28.594	723	245	0	76.669	333.660
CO [kg/a]	19.180	8.357	59	17.939	85.702	4.895	9.317	17.087	13.582	7.230	1.001	0	74.330	110.019
SO2 [kg/a]	5.267	2.295	142	42.540	154.662	23.368	10.579	42.702	34.533	25.024	318	0	119.043	222.388
NOx [kg/a]	62.894	27.404	237	22.549	108.996	23.918	29.829	53.662	81.153	13.015	3.299	0	251.282	175.673
NMVOC [kg/a]	21.808	9.502	67	3.327	14.806	5.714	1.438	9.067	7.091	723	1.139	0	50.086	24.596
Dust [kg/a]	1.441	628	43	12.211	44.120	7.163	4.473	1.213	16.704	980	89	0	42.752	46.313
PCDD/F [kg/a]	0	0	0	8,06E-11	2,79E-08	0	2,04E-02	2,04E-02	5,79E-02	0	0	0	7,83E-02	2,04E-02
HCl [kg/a]	8,51E+00	3,71E+00	5,46E+00	1,52E+03	7,75E+03	9,54E+02	1,44E+03	5,80E+02	1,40E+03	1,43E+03	2,32E+00	0	5,34E+03	9,76E+03
CFC [kg/a]	2,39E-05	1,04E-05	3,66E-06	1,01E-03	3,31E-03	6,34E-04	2,99E-04	9,19E-04	9,77E-04	4,33E-04	2,48E-06	0	2,96E-03	4,66E-03
Cd [kg/a]	4,05E-02	1,76E-02	4,75E-04	2,21E-01	4,38E-01	7,18E-02	4,27E+00	5,89E-01	2,10E-01	1,90E-01	2,23E-03	0	4,83E+00	1,22E+00
Hg [kg/a]	4,16E-03	1,81E-03	1,02E-03	3,20E-01	8,15E-01	1,77E-01	3,44E+00	4,39E+00	1,89E+00	1,57E+00	5,62E-04	0	5,83E+00	6,77E+00
Pb [kg/a]	2,23E-01	9,70E-02	4,21E-03	4,18E+01	2,57E+01	6,75E-01	4,99E+01	2,62E+01	9,57E-01	7,47E+00	1,28E-02	0	9,36E+01	5,93E+01
Zn [kg/a]	1,33E+00	5,81E-01	1,16E-02	2,40E+00	7,06E+00	1,65E+00	6,52E-01	5,18E+00	8,31E+00	1,43E+01	7,22E-02	0	1,50E+01	2,65E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	157	68	1	16.219	1.227.707	46	51.209	56.016	224.457	178	521.806	0	813.963	1.283.901
NH4 [kg/a]	139	61	0	26	96	41	6	97	1.520	58	105.006	0	106.799	251
Cd [kg/a]	7,04E-02	3,07E-02	8,62E-04	1,89E-01	8,92E-01	1,31E-01	5,54E-02	1,97E+00	2,03E-01	2,07E+00	1,62E+01	0	1,69E+01	4,94E+00
Hg [kg/a]	6,26E-04	2,73E-04	2,42E-05	8,50E-02	1,43E-01	4,06E-03	1,87E-03	1,31E-03	9,60E-03	5,68E-02	2,08E+01	0	2,09E+01	2,01E-01
Pb [kg/a]	1,72E-01	7,47E-02	6,34E-02	1,75E+01	8,25E+01	1,10E+01	5,23E+00	1,96E+02	1,64E+01	2,00E+02	2,46E+02	0	2,96E+02	4,79E+02
Zn [kg/a]	7,41E-01	3,23E-01	1,24E-01	3,37E+01	1,57E+02	2,15E+01	1,01E+01	7,67E+02	3,24E+01	4,01E+02	9,33E+03	0	9,43E+03	1,33E+03
Cl- [kg/a]	3,38E+04	1,47E+04	1,88E+02	3,83E+04	1,33E+05	2,35E+04	7,80E+03	3,97E+05	1,94E+05	2,57E+05	8,75E+04	0	4,00E+05	7,87E+05

Model Region 1	FP3 - CK													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	8.178	70.365	0	44.596	0	30.304	0	0	0	83.078	70.365
CO2foss [t/a]	3.495	1.124	40	9.790	65.883	30.627	61.001	150.209	15.430	13.720	116	0	121.622	229.812
CH4 [kg/a]	4.255	1.367	79	17.695	45.281	52.100	11.628	322.476	23.159	260	147	0	110.429	368.016
CO [kg/a]	19.180	6.162	59	11.712	58.602	7.970	32.799	60.052	7.001	2.597	601	0	85.485	121.251
SO2 [kg/a]	5.267	1.692	142	29.346	63.183	281.646	54.629	279.617	22.184	8.990	191	0	395.097	351.790
NOx [kg/a]	62.894	20.208	237	16.621	70.583	69.111	3.755.266	3.811.523	50.857	4.675	1.979	0	3.977.172	3.886.782
NMVOC [kg/a]	21.808	7.007	67	1.987	5.131	43.017	4.336	47.070	4.792	260	683	0	83.698	52.461
Dust [kg/a]	1.441	463	43	9.133	11.703	29.236	17.020	11.957	10.426	352	53	0	67.816	24.011
PCDD/F [kg/a]	0	0	0	1,31E-12	2,79E-08	7,72E-08	2,04E-04	2,04E-04	3,58E-02	0	0	0	3,60E-02	2,04E-04
HCl [kg/a]	8,51E+00	2,73E+00	5,46E+00	1,16E+03	3,88E+03	2,91E+03	1,88E+03	4,50E+03	8,68E+02	5,14E+02	1,39E+00	0	6,84E+03	8,90E+03
CFC [kg/a]	2,39E-05	7,67E-06	3,66E-06	7,73E-04	1,54E-03	2,12E-03	6,24E-04	2,00E-03	6,28E-04	1,56E-04	1,49E-06	0	4,18E-03	3,69E-03
Cd [kg/a]	4,05E-02	1,30E-02	4,75E-04	8,03E-02	2,04E-01	6,09E+00	1,33E-01	2,16E-01	1,09E-01	6,84E-02	1,34E-03	0	6,47E+00	4,89E-01
Hg [kg/a]	4,16E-03	1,34E-03	1,02E-03	2,41E-01	3,15E-01	5,47E-01	1,25E+01	9,79E+00	2,20E+00	5,65E-01	3,37E-04	0	1,55E+01	1,07E+01
Pb [kg/a]	2,23E-01	7,15E-02	4,21E-03	2,88E+01	1,79E+01	1,21E+01	4,32E+00	3,92E+01	6,07E-01	2,69E+00	7,70E-03	0	4,61E+01	5,97E+01
Zn [kg/a]	1,33E+00	4,28E-01	1,16E-02	1,68E+00	2,53E+00	1,51E+01	4,00E+00	1,05E+01	5,58E+00	5,14E+00	4,33E-02	0	2,82E+01	1,81E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	157	50	1	15.598	1.227.010	244	13	164	101.881	64	284.755	0	402.699	1.227.238
NH4 [kg/a]	139	45	0	16	22	280	12	288	897	21	57.303	0	58.693	331
Cd [kg/a]	7,04E-02	2,26E-02	8,62E-04	1,42E-01	4,05E-01	5,92E-01	1,16E-01	3,99E+00	1,21E-01	7,44E-01	8,83E+00	0	9,89E+00	5,14E+00
Hg [kg/a]	6,26E-04	2,01E-04	2,42E-05	5,60E-02	1,04E-01	1,34E-02	3,89E-03	5,20E-03	7,78E-03	2,04E-02	1,14E+01	0	1,14E+01	1,30E-01
Pb [kg/a]	1,72E-01	5,51E-02	6,34E-02	1,35E+01	3,94E+01	3,18E+01	1,09E+01	3,86E+02	1,02E+01	7,19E+01	1,34E+02	0	2,01E+02	4,98E+02
Zn [kg/a]	7,41E-01	2,38E-01	1,24E-01	2,60E+01	7,28E+01	6,56E+01	2,12E+01	9,68E+02	2,05E+01	1,44E+02	5,09E+03	0	5,23E+03	1,18E+03
Cl- [kg/a]	3,38E+04	1,09E+04	1,88E+02	2,64E+04	5,02E+04	1,81E+05	1,63E+04	6,07E+05	9,77E+04	9,24E+04	4,78E+04	0	4,14E+05	7,50E+05

Model Region 1	FP3 - CFB													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	8.178	70.365	0	44.746	0	30.304	0	0	0	83.228	70.365
CO2foss [t/a]	3.495	1.124	40	9.790	65.883	30.627	59.331	136.608	15.430	13.720	129	0	119.966	216.211
CH4 [kg/a]	4.255	1.367	79	17.695	45.281	52.100	7.572	406.742	23.159	260	164	0	106.389	452.282
CO [kg/a]	19.180	6.162	59	11.712	58.602	7.970	13.379	29.158	7.001	2.597	669	0	66.132	90.357
SO2 [kg/a]	5.267	1.692	142	29.346	63.183	281.646	16.500	79.402	22.184	8.990	213	0	356.989	151.575
NOx [kg/a]	62.894	20.208	237	16.621	70.583	69.111	45.960	88.402	50.857	4.675	2.205	0	268.091	163.660
NMVOC [kg/a]	21.808	7.007	67	1.987	5.131	43.017	2.026	15.473	4.792	260	761	0	81.465	20.864
Dust [kg/a]	1.441	463	43	9.133	11.703	29.236	6.348	1.915	10.426	352	59	0	57.150	13.969
PCDD/F [kg/a]	0	0	0	1,31E-12	2,79E-08	7,72E-08	3,68E-02	3,68E-02	3,58E-02	0	0	0	7,25E-02	3,68E-02
HCl [kg/a]	8,51E+00	2,73E+00	5,46E+00	1,16E+03	3,88E+03	2,91E+03	1,75E+03	8,96E+02	8,68E+02	5,14E+02	1,55E+00	0	6,71E+03	5,29E+03
CFC [kg/a]	2,39E-05	7,67E-06	3,66E-06	7,73E-04	1,54E-03	2,12E-03	4,06E-04	1,57E-03	6,28E-04	1,56E-04	1,66E-06	0	3,97E-03	3,27E-03
Cd [kg/a]	4,05E-02	1,30E-02	4,75E-04	8,03E-02	2,04E-01	6,09E+00	2,15E-01	2,51E-02	1,09E-01	6,84E-02	1,49E-03	0	6,55E+00	2,98E-01
Hg [kg/a]	4,16E-03	1,34E-03	1,02E-03	2,41E-01	3,15E-01	5,47E-01	5,03E-01	5,16E-01	2,20E+00	5,65E-01	3,76E-04	0	3,50E+00	1,40E+00
Pb [kg/a]	2,23E-01	7,15E-02	4,21E-03	2,88E+01	1,79E+01	1,21E+01	1,33E+00	4,82E+00	6,07E-01	2,69E+00	8,58E-03	0	4,31E+01	2,54E+01
Zn [kg/a]	1,33E+00	4,28E-01	1,16E-02	1,68E+00	2,53E+00	1,51E+01	8,80E+00	1,01E+01	5,58E+00	5,14E+00	4,82E-02	0	3,30E+01	1,78E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	157	50	1	15.598	1.227.010	244	73.713	95.586	101.881	64	396.209	0	587.852	1.322.661
NH4 [kg/a]	139	45	0	16	22	280	33	204	897	21	79.731	0	81.142	247
Cd [kg/a]	7,04E-02	2,26E-02	8,62E-04	1,42E-01	4,05E-01	5,92E-01	1,64E+00	3,59E+00	1,21E-01	7,44E-01	1,23E+01	0	1,49E+01	4,74E+00
Hg [kg/a]	6,26E-04	2,01E-04	2,42E-05	5,60E-02	1,04E-01	1,34E-02	3,32E-02	2,74E-02	7,78E-03	2,04E-02	1,58E+01	0	1,59E+01	1,52E-01
Pb [kg/a]	1,72E-01	5,51E-02	6,34E-02	1,35E+01	3,94E+01	3,18E+01	1,64E+01	3,38E+02	1,02E+01	7,19E+01	1,87E+02	0	2,59E+02	4,50E+02
Zn [kg/a]	7,41E-01	2,38E-01	1,24E-01	2,60E+01	7,28E+01	6,56E+01	4,01E+01	1,31E+03	2,05E+01	1,44E+02	7,09E+03	0	7,24E+03	1,53E+03
Cl- [kg/a]	3,38E+04	1,09E+04	1,88E+02	2,64E+04	5,02E+04	1,81E+05	2,70E+05	7,18E+05	9,77E+04	9,24E+04	6,63E+04	0	6,86E+05	8,60E+05

Model Region 1	FP3 - PC													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	8.178	70.365	0	44.746	0	30.304	0	0	0	83.228	70.365
CO2foss [t/a]	3.495	1.124	40	9.790	65.883	30.627	61.064	136.608	15.430	13.720	129	0	121.699	216.211
CH4 [kg/a]	4.255	1.367	79	17.695	45.281	52.100	11.357	406.742	23.159	260	164	0	110.176	452.282
CO [kg/a]	19.180	6.162	59	11.712	58.602	7.970	13.664	29.158	7.001	2.597	671	0	66.419	90.357
SO2 [kg/a]	5.267	1.692	142	29.346	63.183	281.646	21.577	72.866	22.184	8.990	213	0	362.067	145.039
NOx [kg/a]	62.894	20.208	237	16.621	70.583	69.111	49.437	88.402	50.857	4.675	2.209	0	271.573	163.660
NMVOC [kg/a]	21.808	7.007	67	1.987	5.131	43.017	2.398	15.473	4.792	260	763	0	81.839	20.864
Dust [kg/a]	1.441	463	43	9.133	11.703	29.236	8.564	1.915	10.426	352	59	0	59.366	13.969
PCDD/F [kg/a]	0	0	0	1,31E-12	2,79E-08	7,72E-08	3,68E-02	3,68E-02	3,58E-02	0	0	0	7,25E-02	3,68E-02
HCl [kg/a]	8,51E+00	2,73E+00	5,46E+00	1,16E+03	3,88E+03	2,91E+03	2,64E+03	9,89E+02	8,68E+02	5,14E+02	1,55E+00	0	7,60E+03	5,39E+03
CFC [kg/a]	2,39E-05	7,67E-06	3,66E-06	7,73E-04	1,54E-03	2,12E-03	6,09E-04	1,57E-03	6,28E-04	1,56E-04	1,66E-06	0	4,17E-03	3,27E-03
Cd [kg/a]	4,05E-02	1,30E-02	4,75E-04	8,03E-02	2,04E-01	6,09E+00	7,03E+00	1,01E+00	1,09E-01	6,84E-02	1,50E-03	0	1,34E+01	1,28E+00
Hg [kg/a]	4,16E-03	1,34E-03	1,02E-03	2,41E-01	3,15E-01	5,47E-01	9,05E+00	7,49E+00	2,20E+00	5,65E-01	3,77E-04	0	1,20E+01	8,37E+00
Pb [kg/a]	2,23E-01	7,15E-02	4,21E-03	2,88E+01	1,79E+01	1,21E+01	9,31E+01	4,46E+01	6,07E-01	2,69E+00	8,59E-03	0	1,35E+02	6,52E+01
Zn [kg/a]	1,33E+00	4,28E-01	1,16E-02	1,68E+00	2,53E+00	1,51E+01	1,33E+00	8,84E+00	5,58E+00	5,14E+00	4,83E-02	0	2,55E+01	1,65E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	157	50	1	15.598	1.227.010	244	73.717	95.586	101.881	64	398.438	0	590.085	1.322.661
NH4 [kg/a]	139	45	0	16	22	280	12	165	897	21	80.180	0	81.569	208
Cd [kg/a]	7,04E-02	2,26E-02	8,62E-04	1,42E-01	4,05E-01	5,92E-01	1,13E-01	3,37E+00	1,21E-01	7,44E-01	1,24E+01	0	1,34E+01	4,52E+00
Hg [kg/a]	6,26E-04	2,01E-04	2,42E-05	5,60E-02	1,04E-01	1,34E-02	3,80E-03	2,23E-03	7,78E-03	2,04E-02	1,59E+01	0	1,60E+01	1,27E-01
Pb [kg/a]	1,72E-01	5,51E-02	6,34E-02	1,35E+01	3,94E+01	3,18E+01	1,07E+01	3,34E+02	1,02E+01	7,19E+01	1,88E+02	0	2,54E+02	4,46E+02
Zn [kg/a]	7,41E-01	2,38E-01	1,24E-01	2,60E+01	7,28E+01	6,56E+01	2,07E+01	1,31E+03	2,05E+01	1,44E+02	7,13E+03	0	7,26E+03	1,53E+03
Cl- [kg/a]	3,38E+04	1,09E+04	1,88E+02	2,64E+04	5,02E+04	1,81E+05	1,59E+04	6,77E+05	9,77E+04	9,24E+04	6,66E+04	0	4,32E+05	8,19E+05

Model Region 1	FP3 - gasPC													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	8.178	70.365	0	44.746	0	30.304	0	0	0	83.228	70.365
CO2foss [t/a]	3.495	1.124	40	9.790	65.883	30.627	59.888	136.608	15.430	13.720	129	0	120.523	216.211
CH4 [kg/a]	4.255	1.367	79	17.695	45.281	52.100	8.788	406.742	23.159	260	164	0	107.607	452.282
CO [kg/a]	19.180	6.162	59	11.712	58.602	7.970	13.470	29.158	7.001	2.597	671	0	66.225	90.357
SO2 [kg/a]	5.267	1.692	142	29.346	63.183	281.646	16.696	72.866	22.184	8.990	213	0	357.187	145.039
NOx [kg/a]	62.894	20.208	237	16.621	70.583	69.111	47.078	88.402	50.857	4.675	2.209	0	269.213	163.660
NMVOC [kg/a]	21.808	7.007	67	1.987	5.131	43.017	2.145	15.473	4.792	260	763	0	81.586	20.864
Dust [kg/a]	1.441	463	43	9.133	11.703	29.236	7.060	1.915	10.426	352	59	0	57.862	13.969
PCDD/F [kg/a]	0	0	0	1,31E-12	2,79E-08	7,72E-08	3,68E-02	3,68E-02	3,58E-02	0	0	0	7,25E-02	3,68E-02
HCl [kg/a]	8,51E+00	2,73E+00	5,46E+00	1,16E+03	3,88E+03	2,91E+03	2,43E+03	9,89E+02	8,68E+02	5,14E+02	1,55E+00	0	7,39E+03	5,39E+03
CFC [kg/a]	2,39E-05	7,67E-06	3,66E-06	7,73E-04	1,54E-03	2,12E-03	4,71E-04	1,57E-03	6,28E-04	1,56E-04	1,66E-06	0	4,03E-03	3,27E-03
Cd [kg/a]	4,05E-02	1,30E-02	4,75E-04	8,03E-02	2,04E-01	6,09E+00	7,02E+00	1,01E+00	1,09E-01	6,84E-02	1,50E-03	0	1,34E+01	1,28E+00
Hg [kg/a]	4,16E-03	1,34E-03	1,02E-03	2,41E-01	3,15E-01	5,47E-01	9,02E+00	7,49E+00	2,20E+00	5,65E-01	3,77E-04	0	1,20E+01	8,37E+00
Pb [kg/a]	2,23E-01	7,15E-02	4,21E-03	2,88E+01	1,79E+01	1,21E+01	9,29E+01	4,46E+01	6,07E-01	2,69E+00	8,59E-03	0	1,35E+02	6,52E+01
Zn [kg/a]	1,33E+00	4,28E-01	1,16E-02	1,68E+00	2,53E+00	1,51E+01	1,03E+00	8,84E+00	5,58E+00	5,14E+00	4,83E-02	0	2,52E+01	1,65E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	157	50	1	15.598	1.227.010	244	73.714	95.586	101.881	64	398.438	0	590.082	1.322.661
NH4 [kg/a]	139	45	0	16	22	280	9	165	897	21	80.180	0	81.566	208
Cd [kg/a]	7,04E-02	2,26E-02	8,62E-04	1,42E-01	4,05E-01	5,92E-01	8,75E-02	3,37E+00	1,21E-01	7,44E-01	1,24E+01	0	1,34E+01	4,52E+00
Hg [kg/a]	6,26E-04	2,01E-04	2,42E-05	5,60E-02	1,04E-01	1,34E-02	2,94E-03	2,23E-03	7,78E-03	2,04E-02	1,59E+01	0	1,60E+01	1,27E-01
Pb [kg/a]	1,72E-01	5,51E-02	6,34E-02	1,35E+01	3,94E+01	3,18E+01	8,26E+00	3,34E+02	1,02E+01	7,19E+01	1,88E+02	0	2,52E+02	4,46E+02
Zn [kg/a]	7,41E-01	2,38E-01	1,24E-01	2,60E+01	7,28E+01	6,56E+01	1,60E+01	1,31E+03	2,05E+01	1,44E+02	7,13E+03	0	7,25E+03	1,53E+03
Cl- [kg/a]	3,38E+04	1,09E+04	1,88E+02	2,64E+04	5,02E+04	1,81E+05	1,23E+04	6,77E+05	9,77E+04	9,24E+04	6,66E+04	0	4,29E+05	8,19E+05

11.2.2 Model Region 2

Model Region 2	BS (baseline)													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	13.866	69.407	0	0	0	0	0	61.398	0	75.264	69.407
CO2foss [t/a]	5.579	1.324	1.336	20.702	87.043	0	0	0	0	0	78.953	15.492	107.893	102.534
CH4 [kg/a]	6.791	1.610	2.599	38.482	100.379	0	0	0	0	0	3.610.716	33.843	3.660.198	134.222
CO [kg/a]	30.615	7.260	1.974	13.591	63.596	0	0	0	0	0	4.821	2.550	58.260	66.147
SO2 [kg/a]	8.407	1.994	4.672	67.571	172.495	0	0	0	0	0	1.636	64.295	84.279	236.791
NOx [kg/a]	100.391	23.806	7.949	37.348	117.406	0	0	0	0	0	15.920	31.082	185.414	148.488
NMVOC [kg/a]	34.810	8.255	2.273	4.954	16.992	0	0	0	0	0	5.484	3.329	55.776	20.321
Dust [kg/a]	2.300	545	1.422	19.074	38.421	0	0	0	0	0	458	19.814	23.801	58.235
PCDD/F [kg/a]	0	0	0	7,68E-10	3,57E-08	0	0	0	0	0	0	0	7,68E-10	3,57E-08
HCl [kg/a]	1,36E+01	3,22E+00	1,79E+02	2,48E+03	7,06E+03	0	0	0	0	0	1,56E+01	2,75E+03	2,69E+03	9,82E+03
CFC [kg/a]	3,81E-05	9,04E-06	1,20E-04	1,66E-03	3,69E-03	0	0	0	0	0	1,49E-05	1,82E-03	1,85E-03	5,50E-03
Cd [kg/a]	6,46E-02	1,53E-02	1,57E-02	2,51E-01	1,09E+00	0	0	0	0	0	1,10E-02	1,83E-01	3,58E-01	1,28E+00
Hg [kg/a]	6,64E-03	1,57E-03	3,34E-02	4,94E-01	9,24E-01	0	0	0	0	0	1,39E-02	5,08E-01	5,49E-01	1,43E+00
Pb [kg/a]	3,55E-01	8,42E-02	1,39E-01	4,20E+01	3,58E+01	0	0	0	0	0	6,47E-02	1,82E+00	4,26E+01	3,77E+01
Zn [kg/a]	2,13E+00	5,05E-01	3,83E-01	3,75E+00	8,50E+00	0	0	0	0	0	3,54E-01	3,96E+00	7,12E+00	1,25E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	250	59	17	46.205	1.154.038	0	0	0	0	0	2.940.889	38	2.987.421	1.154.076
NH4 [kg/a]	222	53	15	37	100	0	0	0	0	0	472.569	35	472.895	135
Cd [kg/a]	1,12E-01	2,66E-02	2,85E-02	3,08E-01	8,34E-01	0	0	0	0	0	1,10E+02	3,37E-01	1,11E+02	1,17E+00
Hg [kg/a]	9,99E-04	2,37E-04	7,95E-04	6,51E-02	1,23E-01	0	0	0	0	0	1,05E+02	1,13E-02	1,05E+02	1,34E-01
Pb [kg/a]	2,74E-01	6,49E-02	2,08E+00	2,88E+01	7,65E+01	0	0	0	0	0	1,30E+03	3,18E+01	1,33E+03	1,08E+02
Zn [kg/a]	1,18E+00	2,80E-01	4,07E+00	5,58E+01	1,46E+02	0	0	0	0	0	4,64E+04	6,16E+01	4,64E+04	2,07E+02
Cl- [kg/a]	5,40E+04	1,28E+04	6,27E+03	5,16E+04	1,27E+05	0	0	0	0	0	5,07E+05	4,74E+04	6,32E+05	1,74E+05

Model Region 2	I - coal													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	13.866	69.407	0	0	0	70.041	0	0	0	83.907	69.407
CO2foss [t/a]	5.579	1.426	1.336	25.031	97.447	0	0	0	101.093	138.703	207	0	134.672	236.150
CH4 [kg/a]	6.791	1.735	2.599	45.891	139.373	0	0	0	38.243	2.626	263	0	95.523	141.999
CO [kg/a]	30.615	7.823	1.974	29.640	130.078	0	0	0	23.640	26.258	1.076	0	94.768	156.336
SO2 [kg/a]	8.407	2.148	4.672	78.400	186.960	0	0	0	45.136	90.880	342	0	139.105	277.840
NOx [kg/a]	100.391	25.651	7.949	44.254	129.125	0	0	0	103.473	47.265	3.546	0	285.265	176.390
NMVOC [kg/a]	34.810	8.895	2.273	5.665	17.831	0	0	0	13.932	2.626	1.224	0	66.799	20.456
Dust [kg/a]	2.300	588	1.422	23.119	43.367	0	0	0	20.946	3.558	95	0	48.471	46.926
PCDD/F [kg/a]	0	0	0	7,68E-10	3,57E-08	0	0	0	7,23E-02	0	0	0	7,23E-02	3,57E-08
HCl [kg/a]	1,36E+01	3,47E+00	1,79E+02	2,92E+03	1,07E+04	0	0	0	1,76E+03	5,20E+03	2,49E+00	0	4,88E+03	1,59E+04
CFC [kg/a]	3,81E-05	9,74E-06	1,20E-04	1,95E-03	3,89E-03	0	0	0	1,28E-03	1,57E-03	2,67E-06	0	3,40E-03	5,47E-03
Cd [kg/a]	6,46E-02	1,65E-02	1,57E-02	2,84E-01	1,25E+00	0	0	0	4,84E-01	6,91E-01	2,40E-03	0	8,67E-01	1,94E+00
Hg [kg/a]	6,64E-03	1,70E-03	3,34E-02	6,10E-01	9,99E-01	0	0	0	5,20E+00	5,71E+00	6,05E-04	0	5,85E+00	6,71E+00
Pb [kg/a]	3,55E-01	9,08E-02	1,39E-01	7,69E+01	5,23E+01	0	0	0	1,23E+00	2,71E+01	1,38E-02	0	7,87E+01	7,95E+01
Zn [kg/a]	2,13E+00	5,44E-01	3,83E-01	4,38E+00	8,98E+00	0	0	0	2,56E+01	5,19E+01	7,76E-02	0	3,31E+01	6,09E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	250	64	17	47.898	1.155.732	0	0	0	401.413	645	591.772	0	1.041.413	1.156.377
NH4 [kg/a]	222	57	15	44	111	0	0	0	1.486	211	95.092	0	96.915	322
Cd [kg/a]	1,12E-01	2,87E-02	2,85E-02	3,61E-01	1,19E+00	0	0	0	3,26E-01	7,52E+00	2,46E+01	0	2,55E+01	8,71E+00
Hg [kg/a]	9,99E-04	2,55E-04	7,95E-04	1,42E-01	1,99E-01	0	0	0	1,28E-02	2,06E-01	2,34E+01	0	2,35E+01	4,05E-01
Pb [kg/a]	2,74E-01	7,00E-02	2,08E+00	3,39E+01	1,12E+02	0	0	0	2,06E+01	7,27E+02	2,90E+02	0	3,47E+02	8,39E+02
Zn [kg/a]	1,18E+00	3,02E-01	4,07E+00	6,54E+01	2,17E+02	0	0	0	4,07E+01	1,46E+03	1,04E+04	0	1,05E+04	1,67E+03
Cl- [kg/a]	5,40E+04	1,38E+04	6,27E+03	6,84E+04	1,72E+05	0	0	0	3,78E+05	9,35E+05	1,13E+05	0	6,34E+05	1,11E+06

Model Region 2	I - gas													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	13.866	69.407	0	0	0	70.041	0	0	0	83.907	69.407
CO2foss [t/a]	5.579	1.426	1.336	25.031	97.447	0	0	0	101.093	79.599	241	0	134.706	177.046
CH4 [kg/a]	6.791	1.735	2.599	45.891	139.373	0	0	0	38.243	6.060	306	0	95.566	145.433
CO [kg/a]	30.615	7.823	1.974	29.640	130.078	0	0	0	23.640	121.192	1.253	0	94.944	251.269
SO2 [kg/a]	8.407	2.148	4.672	78.400	186.960	0	0	0	45.136	626	398	0	139.162	187.585
NOx [kg/a]	100.391	25.651	7.949	44.254	129.125	0	0	0	103.473	121.192	4.128	0	285.847	250.317
NMVOC [kg/a]	34.810	8.895	2.273	5.665	17.831	0	0	0	13.932	6.060	1.425	0	67.000	23.890
Dust [kg/a]	2.300	588	1.422	23.119	43.367	0	0	0	20.946	606	111	0	48.487	43.973
PCDD/F [kg/a]	0	0	0	7,68E-10	3,57E-08	0	0	0	7,23E-02	0	0	0	7,23E-02	3,57E-08
HCl [kg/a]	1,36E+01	3,47E+00	1,79E+02	2,92E+03	1,07E+04	0	0	0	1,76E+03	9,43E+01	2,90E+00	0	4,88E+03	1,08E+04
CFC [kg/a]	3,81E-05	9,74E-06	1,20E-04	1,95E-03	3,89E-03	0	0	0	1,28E-03	2,36E-04	3,10E-06	0	3,40E-03	4,13E-03
Cd [kg/a]	6,46E-02	1,65E-02	1,57E-02	2,84E-01	1,25E+00	0	0	0	4,84E-01	3,49E-02	2,79E-03	0	8,68E-01	1,29E+00
Hg [kg/a]	6,64E-03	1,70E-03	3,34E-02	6,10E-01	9,99E-01	0	0	0	5,20E+00	2,22E+00	7,04E-04	0	5,85E+00	3,22E+00
Pb [kg/a]	3,55E-01	9,08E-02	1,39E-01	7,69E+01	5,23E+01	0	0	0	1,23E+00	5,50E-01	1,61E-02	0	7,87E+01	5,29E+01
Zn [kg/a]	2,13E+00	5,44E-01	3,83E-01	4,38E+00	8,98E+00	0	0	0	2,56E+01	8,87E-01	9,03E-02	0	3,31E+01	9,87E+00
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	250	64	17	47.898	1.155.732	0	0	0	401.413	38	688.931	0	1.138.572	1.155.770
NH4 [kg/a]	222	57	15	44	111	0	0	0	1.486	98	110.704	0	112.528	209
Cd [kg/a]	1,12E-01	2,87E-02	2,85E-02	3,61E-01	1,19E+00	0	0	0	3,26E-01	6,84E-01	2,87E+01	0	2,95E+01	1,87E+00
Hg [kg/a]	9,99E-04	2,55E-04	7,95E-04	1,42E-01	1,99E-01	0	0	0	1,28E-02	1,19E-01	2,72E+01	0	2,74E+01	3,18E-01
Pb [kg/a]	2,74E-01	7,00E-02	2,08E+00	3,39E+01	1,12E+02	0	0	0	2,06E+01	6,83E+01	3,37E+02	0	3,94E+02	1,80E+02
Zn [kg/a]	1,18E+00	3,02E-01	4,07E+00	6,54E+01	2,17E+02	0	0	0	4,07E+01	1,36E+02	1,21E+04	0	1,22E+04	3,53E+02
Cl- [kg/a]	5,40E+04	1,38E+04	6,27E+03	6,84E+04	1,72E+05	0	0	0	3,78E+05	9,61E+04	1,32E+05	0	6,52E+05	2,68E+05

Model Region 2	I - mix													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	13.866	69.407	0	0	0	70.041	31	0	0	83.907	69.438
CO2foss [t/a]	5.579	1.426	1.336	25.031	97.447	0	0	0	101.093	135.763	241	0	134.706	233.210
CH4 [kg/a]	6.791	1.735	2.599	45.891	139.373	0	0	0	38.243	342.722	306	0	95.566	482.095
CO [kg/a]	30.615	7.823	1.974	29.640	130.078	0	0	0	23.640	176.566	1.253	0	94.944	306.644
SO2 [kg/a]	8.407	2.148	4.672	78.400	186.960	0	0	0	45.136	590.620	398	0	139.162	777.580
NOx [kg/a]	100.391	25.651	7.949	44.254	129.125	0	0	0	103.473	271.911	4.128	0	285.847	401.036
NMVOC [kg/a]	34.810	8.895	2.273	5.665	17.831	0	0	0	13.932	87.923	1.425	0	67.000	105.753
Dust [kg/a]	2.300	588	1.422	23.119	43.367	0	0	0	20.946	119.539	111	0	48.487	162.907
PCDD/F [kg/a]	0	0	0	7,68E-10	3,57E-08	0	0	0	7,23E-02	0	0	0	7,23E-02	3,57E-08
HCl [kg/a]	1,36E+01	3,47E+00	1,79E+02	2,92E+03	1,07E+04	0	0	0	1,76E+03	2,34E+04	2,90E+00	0	4,88E+03	3,41E+04
CFC [kg/a]	3,81E-05	9,74E-06	1,20E-04	1,95E-03	3,89E-03	0	0	0	1,28E-03	9,37E-03	3,10E-06	0	3,40E-03	1,33E-02
Cd [kg/a]	6,46E-02	1,65E-02	1,57E-02	2,84E-01	1,25E+00	0	0	0	4,84E-01	5,99E+00	2,79E-03	0	8,68E-01	7,24E+00
Hg [kg/a]	6,64E-03	1,70E-03	3,34E-02	6,10E-01	9,99E-01	0	0	0	5,20E+00	3,69E+00	7,04E-04	0	5,85E+00	4,69E+00
Pb [kg/a]	3,55E-01	9,08E-02	1,39E-01	7,69E+01	5,23E+01	0	0	0	1,23E+00	4,09E+01	1,61E-02	0	7,87E+01	9,32E+01
Zn [kg/a]	2,13E+00	5,44E-01	3,83E-01	4,38E+00	8,98E+00	0	0	0	2,56E+01	1,85E+02	9,03E-02	0	3,31E+01	1,94E+02
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	250	64	17	47.898	1.155.732	0	0	0	401.413	749	688.931	0	1.138.572	1.156.481
NH4 [kg/a]	222	57	15	44	111	0	0	0	1.486	683	110.704	0	112.528	794
Cd [kg/a]	1,12E-01	2,87E-02	2,85E-02	3,61E-01	1,19E+00	0	0	0	3,26E-01	2,77E+00	2,87E+01	0	2,95E+01	3,96E+00
Hg [kg/a]	9,99E-04	2,55E-04	7,95E-04	1,42E-01	1,99E-01	0	0	0	1,28E-02	9,45E-02	2,72E+01	0	2,74E+01	2,93E-01
Pb [kg/a]	2,74E-01	7,00E-02	2,08E+00	3,39E+01	1,12E+02	0	0	0	2,06E+01	2,32E+02	3,37E+02	0	3,94E+02	3,44E+02
Zn [kg/a]	1,18E+00	3,02E-01	4,07E+00	6,54E+01	2,17E+02	0	0	0	4,07E+01	4,57E+02	1,21E+04	0	1,22E+04	6,74E+02
Cl- [kg/a]	5,40E+04	1,38E+04	6,27E+03	6,84E+04	1,72E+05	0	0	0	3,78E+05	4,98E+05	1,32E+05	0	6,52E+05	6,71E+05

Model Region 2	FP1 - CK													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	13.866	69.407	0	25.018	0	45.270	0	0	0	84.155	69.407
CO2foss [t/a]	5.579	1.929	1.336	24.787	93.467	5.033	44.580	82.355	55.008	75.778	148	0	138.399	251.599
CH4 [kg/a]	6.791	2.347	2.599	46.521	120.936	9.512	4.652	176.803	25.990	1.435	188	0	98.600	299.174
CO [kg/a]	30.615	10.580	1.974	20.589	91.341	8.983	21.830	32.924	14.026	14.346	767	0	109.363	138.611
SO2 [kg/a]	8.407	2.905	4.672	81.720	188.206	16.837	24.870	153.305	30.675	49.651	244	0	170.330	391.162
NOx [kg/a]	100.391	34.693	7.949	44.810	126.479	34.591	1.864.731	1.897.157	70.321	25.822	2.528	0	2.160.014	2.049.459
NMVOC [kg/a]	34.810	12.030	2.273	5.786	18.148	10.311	2.605	25.807	8.857	1.435	873	0	77.545	45.390
Dust [kg/a]	2.300	795	1.422	23.649	43.717	5.109	7.797	6.030	14.235	1.944	68	0	55.375	51.691
PCDD/F [kg/a]	0	0	0	7,73E-10	3,57E-08	0	1,01E-04	1,01E-04	4,91E-02	0	0	0	4,92E-02	1,02E-04
HCl [kg/a]	1,36E+01	4,69E+00	1,79E+02	3,06E+03	8,92E+03	6,25E+02	8,82E+02	2,47E+03	1,20E+03	2,84E+03	1,77E+00	0	5,97E+03	1,42E+04
CFC [kg/a]	3,81E-05	1,32E-05	1,20E-04	2,05E-03	4,00E-03	4,21E-04	2,50E-04	1,09E-03	8,67E-04	8,59E-04	1,90E-06	0	3,76E-03	5,96E-03
Cd [kg/a]	6,46E-02	2,23E-02	1,57E-02	2,99E-01	1,18E+00	5,91E-02	6,68E-02	1,18E-01	2,71E-01	3,78E-01	1,71E-03	0	8,00E-01	1,68E+00
Hg [kg/a]	6,64E-03	2,30E-03	3,34E-02	6,16E-01	1,02E+00	1,17E-01	6,45E+00	5,37E+00	3,07E+00	3,12E+00	4,31E-04	0	1,03E+01	9,51E+00
Pb [kg/a]	3,55E-01	1,23E-01	1,39E-01	5,66E+01	4,29E+01	5,08E-01	2,18E+00	2,15E+01	8,39E-01	1,48E+01	9,83E-03	0	6,08E+01	7,92E+01
Zn [kg/a]	2,13E+00	7,35E-01	3,83E-01	4,60E+00	9,24E+00	1,48E+00	1,99E+00	5,74E+00	1,68E+01	2,84E+01	5,53E-02	0	2,82E+01	4,33E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	250	86	17	46.908	1.154.744	77	5	90	232.358	353	421.790	0	701.492	1.155.186
NH4 [kg/a]	222	77	15	45	111	69	5	158	1.084	115	67.777	0	69.294	384
Cd [kg/a]	1,12E-01	3,88E-02	2,85E-02	3,79E-01	1,03E+00	1,07E-01	4,63E-02	2,19E+00	2,07E-01	4,11E+00	1,75E+01	0	1,85E+01	7,32E+00
Hg [kg/a]	9,99E-04	3,45E-04	7,95E-04	9,84E-02	1,55E-01	2,84E-03	1,56E-03	2,85E-03	8,72E-03	1,13E-01	1,67E+01	0	1,68E+01	2,71E-01
Pb [kg/a]	2,74E-01	9,46E-02	2,08E+00	3,56E+01	9,52E+01	7,26E+00	4,37E+00	2,12E+02	1,40E+01	3,97E+02	2,06E+02	0	2,70E+02	7,04E+02
Zn [kg/a]	1,18E+00	4,09E-01	4,07E+00	6,87E+01	1,83E+02	1,42E+01	8,47E+00	5,30E+02	2,76E+01	7,96E+02	7,39E+03	0	7,51E+03	1,51E+03
Cl- [kg/a]	5,40E+04	1,87E+04	6,27E+03	6,56E+04	1,53E+05	2,55E+04	6,52E+03	3,33E+05	2,29E+05	5,11E+05	8,08E+04	0	4,86E+05	9,96E+05

Model Region 2	FP1 - CFB													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	13.866	69.407	0	25.102	0	45.270	0	0	0	84.239	69.407
CO2foss [t/a]	5.579	1.929	1.336	24.787	93.467	5.033	44.722	74.898	55.008	75.778	158	0	138.552	244.142
CH4 [kg/a]	6.791	2.347	2.599	46.521	120.936	9.512	4.652	223.003	25.990	1.435	201	0	98.613	345.374
CO [kg/a]	30.615	10.580	1.974	20.589	91.341	8.983	8.968	15.986	14.026	14.346	820	0	96.554	121.673
SO2 [kg/a]	8.407	2.905	4.672	81.720	188.206	16.837	9.879	43.533	30.675	49.651	261	0	155.356	281.390
NOx [kg/a]	100.391	34.693	7.949	44.810	126.479	34.591	28.236	51.046	70.321	25.822	2.702	0	323.694	203.347
NMVOC [kg/a]	34.810	12.030	2.273	5.786	18.148	10.311	1.319	8.483	8.857	1.435	933	0	76.319	28.066
Dust [kg/a]	2.300	795	1.422	23.649	43.717	5.109	3.900	1.176	14.235	1.944	73	0	51.482	46.837
PCDD/F [kg/a]	0	0	0	7,73E-10	3,57E-08	0	1,83E-02	1,83E-02	4,91E-02	0	0	0	6,74E-02	1,83E-02
HCl [kg/a]	1,36E+01	4,69E+00	1,79E+02	3,06E+03	8,92E+03	6,25E+02	9,88E+02	4,91E+02	1,20E+03	2,84E+03	1,90E+00	0	6,07E+03	1,23E+04
CFC [kg/a]	3,81E-05	1,32E-05	1,20E-04	2,05E-03	4,00E-03	4,21E-04	2,50E-04	8,60E-04	8,67E-04	8,59E-04	2,03E-06	0	3,76E-03	5,72E-03
Cd [kg/a]	6,46E-02	2,23E-02	1,57E-02	2,99E-01	1,18E+00	5,91E-02	1,29E-01	1,38E-02	2,71E-01	3,78E-01	1,83E-03	0	8,62E-01	1,57E+00
Hg [kg/a]	6,64E-03	2,30E-03	3,34E-02	6,16E-01	1,02E+00	1,17E-01	2,71E-01	2,83E-01	3,07E+00	3,12E+00	4,61E-04	0	4,12E+00	4,42E+00
Pb [kg/a]	3,55E-01	1,23E-01	1,39E-01	5,66E+01	4,29E+01	5,08E-01	7,32E-01	2,64E+00	8,39E-01	1,48E+01	1,05E-02	0	5,93E+01	6,03E+01
Zn [kg/a]	2,13E+00	7,35E-01	3,83E-01	4,60E+00	9,24E+00	1,48E+00	4,87E+00	5,55E+00	1,68E+01	2,84E+01	5,91E-02	0	3,11E+01	4,32E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	250	86	17	46.908	1.154.744	77	49.596	52.407	232.358	353	501.206	0	830.500	1.207.503
NH4 [kg/a]	222	77	15	45	111	69	16	112	1.084	115	80.538	0	82.066	338
Cd [kg/a]	1,12E-01	3,88E-02	2,85E-02	3,79E-01	1,03E+00	1,07E-01	9,83E-01	1,97E+00	2,07E-01	4,11E+00	2,09E+01	0	2,27E+01	7,11E+00
Hg [kg/a]	9,99E-04	3,45E-04	7,95E-04	9,84E-02	1,55E-01	2,84E-03	1,74E-02	1,50E-02	8,72E-03	1,13E-01	1,98E+01	0	1,99E+01	2,83E-01
Pb [kg/a]	2,74E-01	9,46E-02	2,08E+00	3,56E+01	9,52E+01	7,26E+00	9,19E+00	1,85E+02	1,40E+01	3,97E+02	2,45E+02	0	3,14E+02	6,78E+02
Zn [kg/a]	1,18E+00	4,09E-01	4,07E+00	6,87E+01	1,83E+02	1,42E+01	2,29E+01	7,20E+02	2,76E+01	7,96E+02	8,78E+03	0	8,92E+03	1,70E+03
Cl- [kg/a]	5,40E+04	1,87E+04	6,27E+03	6,56E+04	1,53E+05	2,55E+04	1,46E+05	3,94E+05	2,29E+05	5,11E+05	9,58E+04	0	6,41E+05	1,06E+06

Model Region 2	FP1 - PC													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	13.866	69.407	0	19.341	0	47.256	0	0	0	80.464	69.407
CO2foss [t/a]	5.579	2.032	1.336	24.751	93.402	9.599	41.319	77.900	55.998	77.599	156	0	140.770	248.901
CH4 [kg/a]	6.791	2.472	2.599	46.455	120.704	19.945	5.697	231.941	26.743	1.469	199	0	110.899	354.114
CO [kg/a]	30.615	11.143	1.974	20.496	90.965	9.565	7.819	16.627	14.441	14.691	812	0	96.865	122.282
SO2 [kg/a]	8.407	3.060	4.672	81.612	188.102	27.852	10.823	41.551	31.563	50.844	258	0	168.246	280.497
NOx [kg/a]	100.391	36.539	7.949	44.749	126.402	39.512	24.797	47.732	72.357	26.443	2.676	0	328.969	200.577
NMVOC [kg/a]	34.810	12.670	2.273	5.780	18.142	11.001	1.299	8.823	9.116	1.469	924	0	77.872	28.434
Dust [kg/a]	2.300	837	1.422	23.611	43.682	8.373	4.296	960	14.647	1.991	72	0	55.559	46.633
PCDD/F [kg/a]	0	0	0	7,73E-10	3,57E-08	1,01E-09	1,84E-02	1,84E-02	5,05E-02	0	0	0	6,90E-02	1,84E-02
HCl [kg/a]	1,36E+01	4,94E+00	1,79E+02	3,06E+03	8,90E+03	1,08E+03	1,42E+03	5,64E+02	1,23E+03	2,91E+03	1,88E+00	0	6,99E+03	1,24E+04
CFC [kg/a]	3,81E-05	1,39E-05	1,20E-04	2,05E-03	4,00E-03	7,60E-04	3,06E-04	8,94E-04	8,92E-04	8,80E-04	2,01E-06	0	4,18E-03	5,77E-03
Cd [kg/a]	6,46E-02	2,35E-02	1,57E-02	2,99E-01	1,18E+00	8,87E-02	4,70E+00	5,73E-01	2,77E-01	3,87E-01	1,81E-03	0	5,47E+00	2,14E+00
Hg [kg/a]	6,64E-03	2,42E-03	3,34E-02	6,15E-01	1,02E+00	2,10E-01	2,65E+00	4,27E+00	3,32E+00	3,20E+00	4,56E-04	0	6,85E+00	8,48E+00
Pb [kg/a]	3,55E-01	1,29E-01	1,39E-01	5,64E+01	4,28E+01	8,09E-01	4,86E+01	2,55E+01	8,63E-01	1,52E+01	1,04E-02	0	1,07E+02	8,34E+01
Zn [kg/a]	2,13E+00	7,74E-01	3,83E-01	4,59E+00	9,23E+00	2,10E+00	6,67E-01	5,04E+00	1,78E+01	2,90E+01	5,85E-02	0	2,85E+01	4,33E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	250	91	17	46.898	1.154.734	79	42.534	54.507	239.268	361	499.830	0	828.968	1.209.602
NH4 [kg/a]	222	81	15	45	111	70	6	94	1.121	118	80.317	0	81.877	324
Cd [kg/a]	1,12E-01	4,09E-02	2,85E-02	3,78E-01	1,02E+00	1,61E-01	5,67E-02	1,92E+00	2,13E-01	4,21E+00	2,08E+01	0	2,18E+01	7,15E+00
Hg [kg/a]	9,99E-04	3,64E-04	7,95E-04	9,80E-02	1,55E-01	8,05E-03	1,91E-03	1,27E-03	8,97E-03	1,15E-01	1,97E+01	0	1,99E+01	2,72E-01
Pb [kg/a]	2,74E-01	9,97E-02	2,08E+00	3,55E+01	9,50E+01	1,26E+01	5,35E+00	1,91E+02	1,44E+01	4,07E+02	2,45E+02	0	3,15E+02	6,92E+02
Zn [kg/a]	1,18E+00	4,30E-01	4,07E+00	6,86E+01	1,82E+02	2,46E+01	1,04E+01	7,47E+02	2,84E+01	8,15E+02	8,75E+03	0	8,89E+03	1,74E+03
Cl- [kg/a]	5,40E+04	1,97E+04	6,27E+03	6,55E+04	1,53E+05	3,28E+04	7,98E+03	3,86E+05	2,37E+05	5,23E+05	9,55E+04	0	5,19E+05	1,06E+06

Model Region 2	FP1 - gasPC													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	13.866	69.407	0	25.102	0	45.270	0	0	0	84.239	69.407
CO2foss [t/a]	5.579	1.929	1.336	24.787	93.467	5.033	45.065	74.898	55.008	75.778	158	0	138.894	244.142
CH4 [kg/a]	6.791	2.347	2.599	46.521	120.936	9.512	5.399	223.003	25.990	1.435	201	0	99.361	345.374
CO [kg/a]	30.615	10.580	1.974	20.589	91.341	8.983	9.025	15.986	14.026	14.346	821	0	96.612	121.673
SO2 [kg/a]	8.407	2.905	4.672	81.720	188.206	16.837	10.258	39.950	30.675	49.651	261	0	155.735	277.807
NOx [kg/a]	100.391	34.693	7.949	44.810	126.479	34.591	28.923	51.046	70.321	25.822	2.706	0	324.384	203.347
NMVOC [kg/a]	34.810	12.030	2.273	5.786	18.148	10.311	1.393	8.483	8.857	1.435	934	0	76.394	28.066
Dust [kg/a]	2.300	795	1.422	23.649	43.717	5.109	4.337	1.176	14.235	1.944	73	0	51.920	46.837
PCDD/F [kg/a]	0	0	0	7,73E-10	3,57E-08	0	1,83E-02	1,83E-02	4,91E-02	0	0	0	6,74E-02	1,83E-02
HCl [kg/a]	1,36E+01	4,69E+00	1,79E+02	3,06E+03	8,92E+03	6,25E+02	1,37E+03	5,42E+02	1,20E+03	2,84E+03	1,90E+00	0	6,45E+03	1,23E+04
CFC [kg/a]	3,81E-05	1,32E-05	1,20E-04	2,05E-03	4,00E-03	4,21E-04	2,90E-04	8,60E-04	8,67E-04	8,59E-04	2,03E-06	0	3,80E-03	5,72E-03
Cd [kg/a]	6,46E-02	2,23E-02	1,57E-02	2,99E-01	1,18E+00	5,91E-02	4,19E+00	5,51E-01	2,71E-01	3,78E-01	1,83E-03	0	4,93E+00	2,11E+00
Hg [kg/a]	6,64E-03	2,30E-03	3,34E-02	6,16E-01	1,02E+00	1,17E-01	4,68E+00	4,10E+00	3,07E+00	3,12E+00	4,61E-04	0	8,52E+00	8,24E+00
Pb [kg/a]	3,55E-01	1,23E-01	1,39E-01	5,66E+01	4,29E+01	5,08E-01	4,85E+01	2,45E+01	8,39E-01	1,48E+01	1,05E-02	0	1,07E+02	8,22E+01
Zn [kg/a]	2,13E+00	7,35E-01	3,83E-01	4,60E+00	9,24E+00	1,48E+00	6,32E-01	4,85E+00	1,68E+01	2,84E+01	5,92E-02	0	2,68E+01	4,25E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	250	86	17	46.908	1.154.744	77	49.597	52.407	232.358	353	502.795	0	832.089	1.207.503
NH4 [kg/a]	222	77	15	45	111	69	6	91	1.084	115	80.794	0	82.311	317
Cd [kg/a]	1,12E-01	3,88E-02	2,85E-02	3,79E-01	1,03E+00	1,07E-01	5,37E-02	1,85E+00	2,07E-01	4,11E+00	2,09E+01	0	2,18E+01	6,98E+00
Hg [kg/a]	9,99E-04	3,45E-04	7,95E-04	9,84E-02	1,55E-01	2,84E-03	1,81E-03	1,22E-03	8,72E-03	1,13E-01	1,99E+01	0	2,00E+01	2,69E-01
Pb [kg/a]	2,74E-01	9,46E-02	2,08E+00	3,56E+01	9,52E+01	7,26E+00	5,07E+00	1,83E+02	1,40E+01	3,97E+02	2,46E+02	0	3,10E+02	6,76E+02
Zn [kg/a]	1,18E+00	4,09E-01	4,07E+00	6,87E+01	1,83E+02	1,42E+01	9,83E+00	7,18E+02	2,76E+01	7,96E+02	8,81E+03	0	8,93E+03	1,70E+03
Cl- [kg/a]	5,40E+04	1,87E+04	6,27E+03	6,56E+04	1,53E+05	2,55E+04	7,57E+03	3,71E+05	2,29E+05	5,11E+05	9,61E+04	0	5,03E+05	1,03E+06

Model Region 2	FP2 - CK													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	13.866	69.407	0	28.480	0	41.841	0	0	0	84.187	69.407
CO2foss [t/a]	5.579	2.129	1.336	25.947	106.513	5.751	56.217	106.080	42.982	61.086	136	0	140.077	273.680
CH4 [kg/a]	6.791	2.590	2.599	48.432	148.604	11.930	5.488	227.738	23.507	1.156	173	0	101.510	377.498
CO [kg/a]	30.615	11.677	1.974	21.992	98.326	4.429	26.578	42.410	11.938	11.564	707	0	109.910	152.300
SO2 [kg/a]	8.407	3.207	4.672	87.559	250.357	22.138	29.963	197.471	27.744	40.025	225	0	183.914	487.853
NOx [kg/a]	100.391	38.292	7.949	46.998	151.471	21.997	2.379.704	2.421.935	63.603	20.816	2.331	0	2.661.263	2.594.222
NMVOC [kg/a]	34.810	13.278	2.273	6.532	24.893	5.177	3.156	33.242	7.786	1.156	805	0	73.816	59.291
Dust [kg/a]	2.300	877	1.422	24.607	65.812	6.788	9.689	7.708	12.875	1.567	63	0	58.622	75.087
PCDD/F [kg/a]	0	0	0	8,30E-10	3,57E-08	0	1,30E-04	1,30E-04	4,44E-02	0	0	0	4,46E-02	1,30E-04
HCl [kg/a]	1,36E+01	5,18E+00	1,79E+02	3,17E+03	1,10E+04	9,07E+02	1,10E+03	3,18E+03	1,08E+03	2,29E+03	1,64E+00	0	6,45E+03	1,64E+04
CFC [kg/a]	3,81E-05	1,45E-05	1,20E-04	2,12E-03	5,21E-03	6,02E-04	2,94E-04	1,41E-03	7,84E-04	6,92E-04	1,75E-06	0	3,98E-03	7,31E-03
Cd [kg/a]	6,46E-02	2,46E-02	1,57E-02	3,89E-01	1,32E+00	6,78E-02	8,38E-02	1,52E-01	2,18E-01	3,04E-01	1,58E-03	0	8,65E-01	1,77E+00
Hg [kg/a]	6,64E-03	2,53E-03	3,34E-02	6,38E-01	1,36E+00	1,68E-01	5,20E+00	6,92E+00	2,29E+00	2,52E+00	3,97E-04	0	8,34E+00	1,08E+01
Pb [kg/a]	3,55E-01	1,35E-01	1,39E-01	5,94E+01	4,54E+01	6,39E-01	2,74E+00	2,77E+01	7,58E-01	1,20E+01	9,07E-03	0	6,42E+01	8,50E+01
Zn [kg/a]	2,13E+00	8,12E-01	3,83E-01	4,90E+00	1,24E+01	1,55E+00	2,01E+00	7,40E+00	1,53E+01	2,29E+01	5,10E-02	0	2,71E+01	4,26E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	250	95	17	47.036	1.154.927	42	6	116	195.331	284	388.935	0	631.713	1.155.326
NH4 [kg/a]	222	85	15	50	162	37	6	203	1.070	93	62.498	0	63.982	458
Cd [kg/a]	1,12E-01	4,28E-02	2,85E-02	3,95E-01	1,31E+00	1,24E-01	5,46E-02	2,82E+00	1,81E-01	3,31E+00	1,62E+01	0	1,71E+01	7,44E+00
Hg [kg/a]	9,99E-04	3,81E-04	7,95E-04	1,05E-01	1,69E-01	3,85E-03	1,84E-03	3,67E-03	7,88E-03	9,08E-02	1,54E+01	0	1,55E+01	2,63E-01
Pb [kg/a]	2,74E-01	1,04E-01	2,08E+00	3,67E+01	1,19E+02	1,05E+01	5,16E+00	2,73E+02	1,26E+01	3,20E+02	1,90E+02	0	2,58E+02	7,12E+02
Zn [kg/a]	1,18E+00	4,51E-01	4,07E+00	7,10E+01	2,29E+02	2,04E+01	9,99E+00	6,83E+02	2,50E+01	6,42E+02	6,81E+03	0	6,94E+03	1,55E+03
Cl- [kg/a]	5,40E+04	2,06E+04	6,27E+03	6,98E+04	2,03E+05	2,19E+04	7,69E+03	4,29E+05	1,91E+05	4,12E+05	7,45E+04	0	4,46E+05	1,04E+06

Model Region 2	FP2 - CFB													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	13.866	69.407	0	28.575	0	41.841	0	0	0	84.283	69.407
CO2foss [t/a]	5.579	2.129	1.336	25.947	106.513	5.751	56.397	96.475	42.982	61.086	146	0	140.267	264.074
CH4 [kg/a]	6.791	2.590	2.599	48.432	148.604	11.930	5.488	287.248	23.507	1.156	186	0	101.523	437.008
CO [kg/a]	30.615	11.677	1.974	21.992	98.326	4.429	10.911	20.592	11.938	11.564	760	0	94.296	130.482
SO2 [kg/a]	8.407	3.207	4.672	87.559	250.357	22.138	11.695	56.075	27.744	40.025	242	0	165.663	346.457
NOx [kg/a]	100.391	38.292	7.949	46.998	151.471	21.997	33.310	63.154	63.603	20.816	2.504	0	315.043	235.441
NMVOC [kg/a]	34.810	13.278	2.273	6.532	24.893	5.177	1.590	10.927	7.786	1.156	865	0	72.309	36.976
Dust [kg/a]	2.300	877	1.422	24.607	65.812	6.788	4.601	1.388	12.875	1.567	67	0	53.538	68.766
PCDD/F [kg/a]	0	0	0	8,30E-10	3,57E-08	0	2,33E-02	2,33E-02	4,44E-02	0	0	0	6,77E-02	2,33E-02
HCl [kg/a]	1,36E+01	5,18E+00	1,79E+02	3,17E+03	1,10E+04	9,07E+02	1,23E+03	6,33E+02	1,08E+03	2,29E+03	1,76E+00	0	6,59E+03	1,39E+04
CFC [kg/a]	3,81E-05	1,45E-05	1,20E-04	2,12E-03	5,21E-03	6,02E-04	2,94E-04	1,11E-03	7,84E-04	6,92E-04	1,88E-06	0	3,98E-03	7,01E-03
Cd [kg/a]	6,46E-02	2,46E-02	1,57E-02	3,89E-01	1,32E+00	6,78E-02	1,65E-01	1,78E-02	2,18E-01	3,04E-01	1,69E-03	0	9,46E-01	1,64E+00
Hg [kg/a]	6,64E-03	2,53E-03	3,34E-02	6,38E-01	1,36E+00	1,68E-01	2,44E-01	3,64E-01	2,29E+00	2,52E+00	4,27E-04	0	3,38E+00	4,24E+00
Pb [kg/a]	3,55E-01	1,35E-01	1,39E-01	5,94E+01	4,54E+01	6,39E-01	9,05E-01	3,40E+00	7,58E-01	1,20E+01	9,74E-03	0	6,23E+01	6,07E+01
Zn [kg/a]	2,13E+00	8,12E-01	3,83E-01	4,90E+00	1,24E+01	1,55E+00	4,74E+00	7,15E+00	1,53E+01	2,29E+01	5,48E-02	0	2,98E+01	4,24E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	250	95	17	47.036	1.154.927	42	60.414	67.505	195.331	284	482.621	0	785.807	1.222.716
NH4 [kg/a]	222	85	15	50	162	37	18	144	1.070	93	77.552	0	79.048	399
Cd [kg/a]	1,12E-01	4,28E-02	2,85E-02	3,95E-01	1,31E+00	1,24E-01	1,27E+00	2,54E+00	1,81E-01	3,31E+00	2,01E+01	0	2,22E+01	7,16E+00
Hg [kg/a]	9,99E-04	3,81E-04	7,95E-04	1,05E-01	1,69E-01	3,85E-03	1,45E-02	1,93E-02	7,88E-03	9,08E-02	1,91E+01	0	1,92E+01	2,79E-01
Pb [kg/a]	2,74E-01	1,04E-01	2,08E+00	3,67E+01	1,19E+02	1,05E+01	1,13E+01	2,39E+02	1,26E+01	3,20E+02	2,36E+02	0	3,10E+02	6,78E+02
Zn [kg/a]	1,18E+00	4,51E-01	4,07E+00	7,10E+01	2,29E+02	2,04E+01	2,37E+01	9,28E+02	2,50E+01	6,42E+02	8,45E+03	0	8,60E+03	1,80E+03
Cl- [kg/a]	5,40E+04	2,06E+04	6,27E+03	6,98E+04	2,03E+05	2,19E+04	1,88E+05	5,07E+05	1,91E+05	4,12E+05	9,22E+04	0	6,44E+05	1,12E+06

Model Region 2	FP2 - PC													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	13.866	69.407	0	28.575	0	41.841	0	0	0	84.283	69.407
CO2foss [t/a]	5.579	2.129	1.336	25.947	106.513	5.751	57.653	96.475	42.982	61.086	146	0	141.523	264.074
CH4 [kg/a]	6.791	2.590	2.599	48.432	148.604	11.930	8.231	287.248	23.507	1.156	186	0	104.267	437.008
CO [kg/a]	30.615	11.677	1.974	21.992	98.326	4.429	11.118	20.592	11.938	11.564	761	0	94.503	130.482
SO2 [kg/a]	8.407	3.207	4.672	87.559	250.357	22.138	15.638	51.460	27.744	40.025	242	0	169.606	341.841
NOx [kg/a]	100.391	38.292	7.949	46.998	151.471	21.997	35.830	63.154	63.603	20.816	2.508	0	317.566	235.441
NMVOC [kg/a]	34.810	13.278	2.273	6.532	24.893	5.177	1.859	10.927	7.786	1.156	866	0	72.580	36.976
Dust [kg/a]	2.300	877	1.422	24.607	65.812	6.788	6.207	1.388	12.875	1.567	67	0	55.144	68.766
PCDD/F [kg/a]	0	0	0	8,30E-10	3,57E-08	0	2,33E-02	2,33E-02	4,44E-02	0	0	0	6,77E-02	2,33E-02
HCl [kg/a]	1,36E+01	5,18E+00	1,79E+02	3,17E+03	1,10E+04	9,07E+02	1,87E+03	6,99E+02	1,08E+03	2,29E+03	1,76E+00	0	7,22E+03	1,40E+04
CFC [kg/a]	3,81E-05	1,45E-05	1,20E-04	2,12E-03	5,21E-03	6,02E-04	4,42E-04	1,11E-03	7,84E-04	6,92E-04	1,89E-06	0	4,12E-03	7,01E-03
Cd [kg/a]	6,46E-02	2,46E-02	1,57E-02	3,89E-01	1,32E+00	6,78E-02	5,45E+00	7,10E-01	2,18E-01	3,04E-01	1,70E-03	0	6,24E+00	2,33E+00
Hg [kg/a]	6,64E-03	2,53E-03	3,34E-02	6,38E-01	1,36E+00	1,68E-01	3,81E+00	5,29E+00	2,29E+00	2,52E+00	4,27E-04	0	6,95E+00	9,16E+00
Pb [kg/a]	3,55E-01	1,35E-01	1,39E-01	5,94E+01	4,54E+01	6,39E-01	6,15E+01	3,15E+01	7,58E-01	1,20E+01	9,76E-03	0	1,23E+02	8,88E+01
Zn [kg/a]	2,13E+00	8,12E-01	3,83E-01	4,90E+00	1,24E+01	1,55E+00	9,64E-01	6,24E+00	1,53E+01	2,29E+01	5,49E-02	0	2,61E+01	4,15E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	250	95	17	47.036	1.154.927	42	60.417	67.505	195.331	284	484.495	0	787.684	1.222.716
NH4 [kg/a]	222	85	15	50	162	37	8	117	1.070	93	77.853	0	79.340	372
Cd [kg/a]	1,12E-01	4,28E-02	2,85E-02	3,95E-01	1,31E+00	1,24E-01	8,19E-02	2,38E+00	1,81E-01	3,31E+00	2,02E+01	0	2,11E+01	7,00E+00
Hg [kg/a]	9,99E-04	3,81E-04	7,95E-04	1,05E-01	1,69E-01	3,85E-03	2,76E-03	1,58E-03	7,88E-03	9,08E-02	1,91E+01	0	1,93E+01	2,61E-01
Pb [kg/a]	2,74E-01	1,04E-01	2,08E+00	3,67E+01	1,19E+02	1,05E+01	7,74E+00	2,36E+02	1,26E+01	3,20E+02	2,37E+02	0	3,07E+02	6,75E+02
Zn [kg/a]	1,18E+00	4,51E-01	4,07E+00	7,10E+01	2,29E+02	2,04E+01	1,50E+01	9,25E+02	2,50E+01	6,42E+02	8,49E+03	0	8,62E+03	1,80E+03
Cl- [kg/a]	5,40E+04	2,06E+04	6,27E+03	6,98E+04	2,03E+05	2,19E+04	1,15E+04	4,78E+05	1,91E+05	4,12E+05	9,25E+04	0	4,68E+05	1,09E+06

Model Region 2	FP2 - gasPC													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	13.866	69.407	0	28.575	0	41.841	0	0	0	84.283	69.407
CO2foss [t/a]	5.579	2.129	1.336	25.947	106.513	5.751	56.801	96.475	42.982	61.086	146	0	140.671	264.074
CH4 [kg/a]	6.791	2.590	2.599	48.432	148.604	11.930	6.369	287.248	23.507	1.156	186	0	102.405	437.008
CO [kg/a]	30.615	11.677	1.974	21.992	98.326	4.429	10.977	20.592	11.938	11.564	761	0	94.363	130.482
SO2 [kg/a]	8.407	3.207	4.672	87.559	250.357	22.138	12.101	51.460	27.744	40.025	242	0	166.069	341.841
NOx [kg/a]	100.391	38.292	7.949	46.998	151.471	21.997	34.120	63.154	63.603	20.816	2.508	0	315.856	235.441
NMVOC [kg/a]	34.810	13.278	2.273	6.532	24.893	5.177	1.676	10.927	7.786	1.156	866	0	72.397	36.976
Dust [kg/a]	2.300	877	1.422	24.607	65.812	6.788	5.117	1.388	12.875	1.567	67	0	54.054	68.766
PCDD/F [kg/a]	0	0	0	8,30E-10	3,57E-08	0	2,33E-02	2,33E-02	4,44E-02	0	0	0	6,77E-02	2,33E-02
HCl [kg/a]	1,36E+01	5,18E+00	1,79E+02	3,17E+03	1,10E+04	9,07E+02	1,72E+03	6,99E+02	1,08E+03	2,29E+03	1,76E+00	0	7,07E+03	1,40E+04
CFC [kg/a]	3,81E-05	1,45E-05	1,20E-04	2,12E-03	5,21E-03	6,02E-04	3,42E-04	1,11E-03	7,84E-04	6,92E-04	1,89E-06	0	4,02E-03	7,01E-03
Cd [kg/a]	6,46E-02	2,46E-02	1,57E-02	3,89E-01	1,32E+00	6,78E-02	5,44E+00	7,10E-01	2,18E-01	3,04E-01	1,70E-03	0	6,23E+00	2,33E+00
Hg [kg/a]	6,64E-03	2,53E-03	3,34E-02	6,38E-01	1,36E+00	1,68E-01	3,78E+00	5,29E+00	2,29E+00	2,52E+00	4,27E-04	0	6,92E+00	9,16E+00
Pb [kg/a]	3,55E-01	1,35E-01	1,39E-01	5,94E+01	4,54E+01	6,39E-01	6,14E+01	3,15E+01	7,58E-01	1,20E+01	9,76E-03	0	1,23E+02	8,88E+01
Zn [kg/a]	2,13E+00	8,12E-01	3,83E-01	4,90E+00	1,24E+01	1,55E+00	7,46E-01	6,24E+00	1,53E+01	2,29E+01	5,49E-02	0	2,58E+01	4,15E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	250	95	17	47.036	1.154.927	42	60.415	67.505	195.331	284	484.495	0	787.682	1.222.716
NH4 [kg/a]	222	85	15	50	162	37	6	117	1.070	93	77.853	0	79.338	372
Cd [kg/a]	1,12E-01	4,28E-02	2,85E-02	3,95E-01	1,31E+00	1,24E-01	6,34E-02	2,38E+00	1,81E-01	3,31E+00	2,02E+01	0	2,11E+01	7,00E+00
Hg [kg/a]	9,99E-04	3,81E-04	7,95E-04	1,05E-01	1,69E-01	3,85E-03	2,13E-03	1,58E-03	7,88E-03	9,08E-02	1,91E+01	0	1,93E+01	2,61E-01
Pb [kg/a]	2,74E-01	1,04E-01	2,08E+00	3,67E+01	1,19E+02	1,05E+01	5,99E+00	2,36E+02	1,26E+01	3,20E+02	2,37E+02	0	3,05E+02	6,75E+02
Zn [kg/a]	1,18E+00	4,51E-01	4,07E+00	7,10E+01	2,29E+02	2,04E+01	1,16E+01	9,25E+02	2,50E+01	6,42E+02	8,49E+03	0	8,62E+03	1,80E+03
Cl- [kg/a]	5,40E+04	2,06E+04	6,27E+03	6,98E+04	2,03E+05	2,19E+04	8,92E+03	4,78E+05	1,91E+05	4,12E+05	9,25E+04	0	4,65E+05	1,09E+06

Model Region 2	FP3 - CK													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	13.866	69.407	0	38.983	0	22.067	0	0	0	74.916	69.407
CO2foss [t/a]	5.579	1.832	1.336	23.463	90.151	25.639	73.511	160.307	19.687	26.190	93	0	151.139	276.648
CH4 [kg/a]	6.791	2.228	2.599	44.075	110.652	43.614	11.493	344.154	16.246	496	118	0	127.165	455.302
CO [kg/a]	30.615	10.045	1.974	17.328	77.972	6.672	35.004	64.089	6.136	4.958	483	0	108.258	147.019
SO2 [kg/a]	8.407	2.759	4.672	77.503	179.251	235.775	53.397	298.415	18.094	17.160	154	0	400.760	494.826
NOx [kg/a]	100.391	32.941	7.949	42.507	121.684	57.855	3.711.610	3.772.490	41.246	8.925	1.591	0	3.996.089	3.903.099
NMVOC [kg/a]	34.810	11.422	2.273	5.501	17.361	36.011	4.544	50.234	4.717	496	549	0	99.827	68.091
Dust [kg/a]	2.300	755	1.422	22.287	40.608	24.475	16.822	11.955	8.342	672	43	0	76.445	53.235
PCDD/F [kg/a]	0	0	0	7,68E-10	3,57E-08	6,46E-08	2,02E-04	2,02E-04	2,87E-02	0	0	0	2,89E-02	2,02E-04
HCl [kg/a]	1,36E+01	4,46E+00	1,79E+02	2,90E+03	8,01E+03	2,44E+03	1,96E+03	4,81E+03	6,99E+02	9,81E+02	1,12E+00	0	8,19E+03	1,38E+04
CFC [kg/a]	3,81E-05	1,25E-05	1,20E-04	1,94E-03	3,84E-03	1,78E-03	6,17E-04	2,13E-03	5,11E-04	2,97E-04	1,20E-06	0	5,02E-03	6,26E-03
Cd [kg/a]	6,46E-02	2,12E-02	1,57E-02	2,80E-01	1,14E+00	5,10E+00	1,44E-01	2,30E-01	1,18E-01	1,31E-01	1,08E-03	0	5,74E+00	1,50E+00
Hg [kg/a]	6,64E-03	2,18E-03	3,34E-02	5,79E-01	9,69E-01	4,58E-01	1,21E+01	1,05E+01	2,54E+00	1,08E+00	2,71E-04	0	1,57E+01	1,25E+01
Pb [kg/a]	3,55E-01	1,17E-01	1,39E-01	4,97E+01	3,95E+01	1,02E+01	4,70E+00	4,18E+01	4,93E-01	5,13E+00	6,19E-03	0	6,56E+01	8,64E+01
Zn [kg/a]	2,13E+00	6,98E-01	3,83E-01	4,35E+00	8,83E+00	1,26E+01	4,01E+00	1,12E+01	1,02E+01	9,80E+00	3,48E-02	0	3,45E+01	2,98E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	250	82	17	46.572	1.154.403	204	13	175	93.157	122	265.522	0	405.816	1.154.700
NH4 [kg/a]	222	73	15	42	105	235	12	308	607	40	42.667	0	43.873	452
Cd [kg/a]	1,12E-01	3,68E-02	2,85E-02	3,59E-01	9,29E-01	4,96E-01	1,14E-01	4,26E+00	1,11E-01	1,42E+00	1,10E+01	0	1,23E+01	6,61E+00
Hg [kg/a]	9,99E-04	3,28E-04	7,95E-04	8,29E-02	1,40E-01	1,12E-02	3,85E-03	5,55E-03	5,45E-03	3,89E-02	1,05E+01	0	1,06E+01	1,84E-01
Pb [kg/a]	2,74E-01	8,98E-02	2,08E+00	3,37E+01	8,59E+01	2,66E+01	1,08E+01	4,12E+02	8,19E+00	1,37E+02	1,30E+02	0	2,12E+02	6,35E+02
Zn [kg/a]	1,18E+00	3,88E-01	4,07E+00	6,51E+01	1,64E+02	5,50E+01	2,09E+01	1,03E+03	1,62E+01	2,75E+02	4,65E+03	0	4,81E+03	1,47E+03
Cl- [kg/a]	5,40E+04	1,77E+04	6,27E+03	6,09E+04	1,39E+05	1,51E+05	1,61E+04	6,48E+05	9,82E+04	1,76E+05	5,08E+04	0	4,55E+05	9,64E+05

Model Region 2	FP3 - CFB													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	13.866	69.407	0	39.114	0	22.067	0	0	0	75.047	69.407
CO2foss [t/a]	5.579	1.832	1.336	23.463	90.151	25.639	71.905	145.792	19.687	26.190	103	0	149.543	262.133
CH4 [kg/a]	6.791	2.228	2.599	44.075	110.652	43.614	7.484	434.085	16.246	496	131	0	123.169	545.233
CO [kg/a]	30.615	10.045	1.974	17.328	77.972	6.672	14.261	31.118	6.136	4.958	537	0	87.569	114.048
SO2 [kg/a]	8.407	2.759	4.672	77.503	179.251	235.775	16.269	84.740	18.094	17.160	171	0	363.649	281.151
NOx [kg/a]	100.391	32.941	7.949	42.507	121.684	57.855	45.426	91.269	41.246	8.925	1.771	0	330.084	221.877
NMVOC [kg/a]	34.810	11.422	2.273	5.501	17.361	36.011	2.106	16.513	4.717	496	611	0	97.451	34.370
Dust [kg/a]	2.300	755	1.422	22.287	40.608	24.475	6.274	1.893	8.342	672	48	0	65.902	43.172
PCDD/F [kg/a]	0	0	0	7,68E-10	3,57E-08	6,46E-08	3,63E-02	3,63E-02	2,87E-02	0	0	0	6,50E-02	3,63E-02
HCl [kg/a]	1,36E+01	4,46E+00	1,79E+02	2,90E+03	8,01E+03	2,44E+03	1,85E+03	9,56E+02	6,99E+02	9,81E+02	1,24E+00	0	8,08E+03	9,94E+03
CFC [kg/a]	3,81E-05	1,25E-05	1,20E-04	1,94E-03	3,84E-03	1,78E-03	4,01E-04	1,67E-03	5,11E-04	2,97E-04	1,33E-06	0	4,80E-03	5,81E-03
Cd [kg/a]	6,46E-02	2,12E-02	1,57E-02	2,80E-01	1,14E+00	5,10E+00	2,46E-01	2,68E-02	1,18E-01	1,31E-01	1,20E-03	0	5,85E+00	1,29E+00
Hg [kg/a]	6,64E-03	2,18E-03	3,34E-02	5,79E-01	9,69E-01	4,58E-01	4,89E-01	5,50E-01	2,54E+00	1,08E+00	3,02E-04	0	4,11E+00	2,60E+00
Pb [kg/a]	3,55E-01	1,17E-01	1,39E-01	4,97E+01	3,95E+01	1,02E+01	1,42E+00	5,14E+00	4,93E-01	5,13E+00	6,89E-03	0	6,24E+01	4,97E+01
Zn [kg/a]	2,13E+00	6,98E-01	3,83E-01	4,35E+00	8,83E+00	1,26E+01	8,87E+00	1,08E+01	1,02E+01	9,80E+00	3,87E-02	0	3,93E+01	2,94E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	250	82	17	46.572	1.154.403	204	78.827	102.012	93.157	122	393.285	0	612.394	1.256.537
NH4 [kg/a]	222	73	15	42	105	235	31	218	607	40	63.196	0	64.421	362
Cd [kg/a]	1,12E-01	3,68E-02	2,85E-02	3,59E-01	9,29E-01	4,96E-01	1,92E+00	3,84E+00	1,11E-01	1,42E+00	1,64E+01	0	1,94E+01	6,19E+00
Hg [kg/a]	9,99E-04	3,28E-04	7,95E-04	8,29E-02	1,40E-01	1,12E-02	3,22E-02	2,92E-02	5,45E-03	3,89E-02	1,55E+01	0	1,57E+01	2,08E-01
Pb [kg/a]	2,74E-01	8,98E-02	2,08E+00	3,37E+01	8,59E+01	2,66E+01	1,72E+01	3,61E+02	8,19E+00	1,37E+02	1,93E+02	0	2,81E+02	5,84E+02
Zn [kg/a]	1,18E+00	3,88E-01	4,07E+00	6,51E+01	1,64E+02	5,50E+01	4,03E+01	1,40E+03	1,62E+01	2,75E+02	6,89E+03	0	7,07E+03	1,84E+03
Cl- [kg/a]	5,40E+04	1,77E+04	6,27E+03	6,09E+04	1,39E+05	1,51E+05	2,95E+05	7,66E+05	9,82E+04	1,76E+05	7,50E+04	0	7,59E+05	1,08E+06

Model Region 2	FP3 - PC													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	13.866	69.407	0	39.114	0	22.067	0	0	0	75.047	69.407
CO2foss [t/a]	5.579	1.832	1.336	23.463	90.151	25.639	73.618	145.792	19.687	26.190	104	0	151.256	262.133
CH4 [kg/a]	6.791	2.228	2.599	44.075	110.652	43.614	11.225	434.085	16.246	496	132	0	126.911	545.233
CO [kg/a]	30.615	10.045	1.974	17.328	77.972	6.672	14.543	31.118	6.136	4.958	539	0	87.852	114.048
SO2 [kg/a]	8.407	2.759	4.672	77.503	179.251	235.775	21.326	77.765	18.094	17.160	171	0	368.706	274.176
NOx [kg/a]	100.391	32.941	7.949	42.507	121.684	57.855	48.862	91.269	41.246	8.925	1.774	0	333.524	221.877
NMVOC [kg/a]	34.810	11.422	2.273	5.501	17.361	36.011	2.474	16.513	4.717	496	613	0	97.820	34.370
Dust [kg/a]	2.300	755	1.422	22.287	40.608	24.475	8.465	1.893	8.342	672	48	0	68.093	43.172
PCDD/F [kg/a]	0	0	0	7,68E-10	3,57E-08	6,46E-08	3,63E-02	3,63E-02	2,87E-02	0	0	0	6,50E-02	3,63E-02
HCl [kg/a]	1,36E+01	4,46E+00	1,79E+02	2,90E+03	8,01E+03	2,44E+03	2,80E+03	1,06E+03	6,99E+02	9,81E+02	1,25E+00	0	9,04E+03	1,00E+04
CFC [kg/a]	3,81E-05	1,25E-05	1,20E-04	1,94E-03	3,84E-03	1,78E-03	6,02E-04	1,67E-03	5,11E-04	2,97E-04	1,33E-06	0	5,00E-03	5,81E-03
Cd [kg/a]	6,46E-02	2,12E-02	1,57E-02	2,80E-01	1,14E+00	5,10E+00	8,28E+00	1,07E+00	1,18E-01	1,31E-01	1,20E-03	0	1,39E+01	2,34E+00
Hg [kg/a]	6,64E-03	2,18E-03	3,34E-02	5,79E-01	9,69E-01	4,58E-01	8,77E+00	7,99E+00	2,54E+00	1,08E+00	3,02E-04	0	1,24E+01	1,00E+01
Pb [kg/a]	3,55E-01	1,17E-01	1,39E-01	4,97E+01	3,95E+01	1,02E+01	1,03E+02	4,76E+01	4,93E-01	5,13E+00	6,90E-03	0	1,64E+02	9,22E+01
Zn [kg/a]	2,13E+00	6,98E-01	3,83E-01	4,35E+00	8,83E+00	1,26E+01	1,31E+00	9,44E+00	1,02E+01	9,80E+00	3,88E-02	0	3,18E+01	2,81E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	250	82	17	46.572	1.154.403	204	78.831	102.012	93.157	122	395.840	0	614.954	1.256.537
NH4 [kg/a]	222	73	15	42	105	235	11	177	607	40	63.607	0	64.812	321
Cd [kg/a]	1,12E-01	3,68E-02	2,85E-02	3,59E-01	9,29E-01	4,96E-01	1,12E-01	3,59E+00	1,11E-01	1,42E+00	1,65E+01	0	1,77E+01	5,94E+00
Hg [kg/a]	9,99E-04	3,28E-04	7,95E-04	8,29E-02	1,40E-01	1,12E-02	3,76E-03	2,38E-03	5,45E-03	3,89E-02	1,56E+01	0	1,57E+01	1,81E-01
Pb [kg/a]	2,74E-01	8,98E-02	2,08E+00	3,37E+01	8,59E+01	2,66E+01	1,05E+01	3,57E+02	8,19E+00	1,37E+02	1,94E+02	0	2,75E+02	5,80E+02
Zn [kg/a]	1,18E+00	3,88E-01	4,07E+00	6,51E+01	1,64E+02	5,50E+01	2,04E+01	1,40E+03	1,62E+01	2,75E+02	6,93E+03	0	7,09E+03	1,84E+03
Cl- [kg/a]	5,40E+04	1,77E+04	6,27E+03	6,09E+04	1,39E+05	1,51E+05	1,57E+04	7,22E+05	9,82E+04	1,76E+05	7,55E+04	0	4,80E+05	1,04E+06

Model Region 2	FP3 - gasPC													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	13.866	69.407	0	39.114	0	22.067	0	0	0	75.047	69.407
CO2foss [t/a]	5.579	1.832	1.336	23.463	90.151	25.639	72.456	145.792	19.687	26.190	104	0	150.094	262.133
CH4 [kg/a]	6.791	2.228	2.599	44.075	110.652	43.614	8.686	434.085	16.246	496	132	0	124.372	545.233
CO [kg/a]	30.615	10.045	1.974	17.328	77.972	6.672	14.351	31.118	6.136	4.958	539	0	87.660	114.048
SO2 [kg/a]	8.407	2.759	4.672	77.503	179.251	235.775	16.502	77.765	18.094	17.160	171	0	363.883	274.176
NOx [kg/a]	100.391	32.941	7.949	42.507	121.684	57.855	46.530	91.269	41.246	8.925	1.774	0	331.192	221.877
NMVOC [kg/a]	34.810	11.422	2.273	5.501	17.361	36.011	2.224	16.513	4.717	496	613	0	97.570	34.370
Dust [kg/a]	2.300	755	1.422	22.287	40.608	24.475	6.978	1.893	8.342	672	48	0	66.606	43.172
PCDD/F [kg/a]	0	0	0	7,68E-10	3,57E-08	6,46E-08	3,63E-02	3,63E-02	2,87E-02	0	0	0	6,50E-02	3,63E-02
HCl [kg/a]	1,36E+01	4,46E+00	1,79E+02	2,90E+03	8,01E+03	2,44E+03	2,59E+03	1,06E+03	6,99E+02	9,81E+02	1,25E+00	0	8,83E+03	1,00E+04
CFC [kg/a]	3,81E-05	1,25E-05	1,20E-04	1,94E-03	3,84E-03	1,78E-03	4,66E-04	1,67E-03	5,11E-04	2,97E-04	1,33E-06	0	4,87E-03	5,81E-03
Cd [kg/a]	6,46E-02	2,12E-02	1,57E-02	2,80E-01	1,14E+00	5,10E+00	8,27E+00	1,07E+00	1,18E-01	1,31E-01	1,20E-03	0	1,39E+01	2,34E+00
Hg [kg/a]	6,64E-03	2,18E-03	3,34E-02	5,79E-01	9,69E-01	4,58E-01	8,74E+00	7,99E+00	2,54E+00	1,08E+00	3,02E-04	0	1,24E+01	1,00E+01
Pb [kg/a]	3,55E-01	1,17E-01	1,39E-01	4,97E+01	3,95E+01	1,02E+01	1,03E+02	4,76E+01	4,93E-01	5,13E+00	6,90E-03	0	1,63E+02	9,22E+01
Zn [kg/a]	2,13E+00	6,98E-01	3,83E-01	4,35E+00	8,83E+00	1,26E+01	1,02E+00	9,44E+00	1,02E+01	9,80E+00	3,88E-02	0	3,15E+01	2,81E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	250	82	17	46.572	1.154.403	204	78.828	102.012	93.157	122	395.840	0	614.951	1.256.537
NH4 [kg/a]	222	73	15	42	105	235	9	177	607	40	63.607	0	64.810	321
Cd [kg/a]	1,12E-01	3,68E-02	2,85E-02	3,59E-01	9,29E-01	4,96E-01	8,65E-02	3,59E+00	1,11E-01	1,42E+00	1,65E+01	0	1,77E+01	5,94E+00
Hg [kg/a]	9,99E-04	3,28E-04	7,95E-04	8,29E-02	1,40E-01	1,12E-02	2,91E-03	2,38E-03	5,45E-03	3,89E-02	1,56E+01	0	1,57E+01	1,81E-01
Pb [kg/a]	2,74E-01	8,98E-02	2,08E+00	3,37E+01	8,59E+01	2,66E+01	8,16E+00	3,57E+02	8,19E+00	1,37E+02	1,94E+02	0	2,73E+02	5,80E+02
Zn [kg/a]	1,18E+00	3,88E-01	4,07E+00	6,51E+01	1,64E+02	5,50E+01	1,58E+01	1,40E+03	1,62E+01	2,75E+02	6,93E+03	0	7,09E+03	1,84E+03
Cl- [kg/a]	5,40E+04	1,77E+04	6,27E+03	6,09E+04	1,39E+05	1,51E+05	1,22E+04	7,22E+05	9,82E+04	1,76E+05	7,55E+04	0	4,76E+05	1,04E+06

11.2.3 Model Region 3

Model Region 3	BS (baseline)													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	7.993	69.583	0	0	0	0	0	84.981	0	92.973	69.583
CO2foss [t/a]	4.908	1.016	269	14.582	76.296	0	0	0	0	0	106.772	21.465	127.546	97.761
CH4 [kg/a]	5.974	1.236	523	27.286	73.140	0	0	0	0	0	5.002.126	46.892	5.037.144	120.032
CO [kg/a]	26.931	5.571	395	9.454	47.704	0	0	0	0	0	6.476	3.534	48.827	51.238
SO2 [kg/a]	7.396	1.530	940	46.433	120.982	0	0	0	0	0	2.197	89.085	58.496	210.067
NOx [kg/a]	88.311	18.269	1.594	26.626	97.469	0	0	0	0	0	21.386	43.066	156.186	140.535
NMVOC [kg/a]	30.622	6.335	455	3.260	9.706	0	0	0	0	0	7.366	4.612	48.038	14.318
Dust [kg/a]	2.023	419	286	13.298	29.202	0	0	0	0	0	616	27.453	16.642	56.655
PCDD/F [kg/a]	0	0	0	1,59E-11	2,64E-08	0	0	0	0	0	0	0	1,59E-11	2,64E-08
HCl [kg/a]	1,19E+01	2,47E+00	3,61E+01	1,73E+03	5,43E+03	0	0	0	0	0	2,10E+01	3,81E+03	1,80E+03	9,24E+03
CFC [kg/a]	3,35E-05	6,94E-06	2,42E-05	1,16E-03	3,01E-03	0	0	0	0	0	2,00E-05	2,52E-03	1,25E-03	5,52E-03
Cd [kg/a]	5,68E-02	1,18E-02	3,16E-03	1,36E-01	3,26E-01	0	0	0	0	0	1,48E-02	2,53E-01	2,22E-01	5,79E-01
Hg [kg/a]	5,84E-03	1,21E-03	6,72E-03	3,46E-01	7,33E-01	0	0	0	0	0	1,87E-02	7,03E-01	3,79E-01	1,44E+00
Pb [kg/a]	3,12E-01	6,46E-02	2,79E-02	3,10E+01	2,67E+01	0	0	0	0	0	8,69E-02	2,52E+00	3,15E+01	2,92E+01
Zn [kg/a]	1,87E+00	3,87E-01	7,70E-02	2,55E+00	5,82E+00	0	0	0	0	0	4,75E-01	5,49E+00	5,36E+00	1,13E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	220	46	3	31.355	1.167.659	0	0	0	0	0	4.481.407	53	4.513.032	1.167.712
NH4 [kg/a]	195	40	3	24	55	0	0	0	0	0	541.806	48	542.069	103
Cd [kg/a]	9,88E-02	2,04E-02	5,73E-03	2,14E-01	6,21E-01	0	0	0	0	0	2,16E+02	4,67E-01	2,16E+02	1,09E+00
Hg [kg/a]	8,79E-04	1,82E-04	1,60E-04	4,57E-02	9,98E-02	0	0	0	0	0	1,40E+02	1,57E-02	1,40E+02	1,15E-01
Pb [kg/a]	2,41E-01	4,98E-02	4,19E-01	2,02E+01	5,90E+01	0	0	0	0	0	1,88E+03	4,41E+01	1,90E+03	1,03E+02
Zn [kg/a]	1,04E+00	2,15E-01	8,20E-01	3,90E+01	1,11E+02	0	0	0	0	0	6,19E+04	8,54E+01	6,19E+04	1,96E+02
Cl- [kg/a]	4,75E+04	9,83E+03	1,26E+03	3,53E+04	8,49E+04	0	0	0	0	0	7,29E+05	6,57E+04	8,23E+05	1,51E+05

Model Region 3	I - coal													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	7.993	69.583	0	0	0	97.033	0	0	0	105.025	69.583
CO2foss [t/a]	4.908	1.118	269	20.409	90.299	0	0	0	136.877	244.742	262	0	163.843	335.041
CH4 [kg/a]	5.974	1.361	523	37.259	125.625	0	0	0	50.950	4.633	333	0	96.399	130.258
CO [kg/a]	26.931	6.134	395	31.056	137.185	0	0	0	32.235	46.333	1.362	0	98.113	183.518
SO2 [kg/a]	7.396	1.685	940	61.008	140.450	0	0	0	61.622	160.358	433	0	133.084	300.808
NOx [kg/a]	88.311	20.115	1.594	35.921	113.243	0	0	0	139.672	83.399	4.487	0	290.100	196.641
NMVOC [kg/a]	30.622	6.975	455	4.216	10.834	0	0	0	20.374	4.633	1.549	0	64.190	15.467
Dust [kg/a]	2.023	461	286	18.742	35.859	0	0	0	28.213	6.279	120	0	49.846	42.137
PCDD/F [kg/a]	0	0	0	1,59E-11	2,64E-08	0	0	0	9,73E-02	0	0	0	9,73E-02	2,64E-08
HCl [kg/a]	1,19E+01	2,72E+00	3,61E+01	2,33E+03	1,04E+04	0	0	0	2,37E+03	9,17E+03	3,15E+00	0	4,76E+03	1,95E+04
CFC [kg/a]	3,35E-05	7,64E-06	2,42E-05	1,56E-03	3,28E-03	0	0	0	1,73E-03	2,77E-03	3,37E-06	0	3,35E-03	6,06E-03
Cd [kg/a]	5,68E-02	1,29E-02	3,16E-03	1,81E-01	5,43E-01	0	0	0	6,64E-01	1,22E+00	3,04E-03	0	9,21E-01	1,76E+00
Hg [kg/a]	5,84E-03	1,33E-03	6,72E-03	5,02E-01	8,34E-01	0	0	0	6,68E+00	1,01E+01	7,65E-04	0	7,19E+00	1,09E+01
Pb [kg/a]	3,12E-01	7,12E-02	2,79E-02	7,79E+01	4,88E+01	0	0	0	1,68E+00	4,79E+01	1,75E-02	0	8,00E+01	9,67E+01
Zn [kg/a]	1,87E+00	4,26E-01	7,70E-02	3,40E+00	6,47E+00	0	0	0	4,11E+01	9,16E+01	9,82E-02	0	4,69E+01	9,81E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	220	50	3	33.634	1.169.938	0	0	0	549.015	1.139	849.264	0	1.432.186	1.171.076
NH4 [kg/a]	195	44	3	33	70	0	0	0	1.914	372	102.678	0	104.868	442
Cd [kg/a]	9,88E-02	2,25E-02	5,73E-03	2,85E-01	1,10E+00	0	0	0	4,51E-01	1,33E+01	4,54E+01	0	4,63E+01	1,44E+01
Hg [kg/a]	8,79E-04	2,00E-04	1,60E-04	1,49E-01	2,02E-01	0	0	0	1,64E-02	3,64E-01	2,94E+01	0	2,96E+01	5,66E-01
Pb [kg/a]	2,41E-01	5,49E-02	4,19E-01	2,71E+01	1,07E+02	0	0	0	2,77E+01	1,28E+03	3,96E+02	0	4,52E+02	1,39E+03
Zn [kg/a]	1,04E+00	2,37E-01	8,20E-01	5,20E+01	2,07E+02	0	0	0	5,48E+01	2,57E+03	1,30E+04	0	1,31E+04	2,78E+03
Cl- [kg/a]	4,75E+04	1,08E+04	1,26E+03	5,79E+04	1,46E+05	0	0	0	5,00E+05	1,65E+06	1,54E+05	0	7,71E+05	1,80E+06

Model Region 3	I - gas													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	7.993	69.583	0	0	0	97.033	0	0	0	105.025	69.583
CO2foss [t/a]	4.908	1.118	269	20.409	90.299	0	0	0	136.877	140.453	322	0	163.903	230.752
CH4 [kg/a]	5.974	1.361	523	37.259	125.625	0	0	0	50.950	10.692	409	0	96.476	136.317
CO [kg/a]	26.931	6.134	395	31.056	137.185	0	0	0	32.235	213.843	1.674	0	98.425	351.028
SO2 [kg/a]	7.396	1.685	940	61.008	140.450	0	0	0	61.622	1.104	532	0	133.183	141.554
NOx [kg/a]	88.311	20.115	1.594	35.921	113.243	0	0	0	139.672	213.843	5.515	0	291.128	327.085
NMVOC [kg/a]	30.622	6.975	455	4.216	10.834	0	0	0	20.374	10.692	1.904	0	64.545	21.526
Dust [kg/a]	2.023	461	286	18.742	35.859	0	0	0	28.213	1.069	148	0	49.873	36.928
PCDD/F [kg/a]	0	0	0	1,59E-11	2,64E-08	0	0	0	9,73E-02	0	0	0	9,73E-02	2,64E-08
HCl [kg/a]	1,19E+01	2,72E+00	3,61E+01	2,33E+03	1,04E+04	0	0	0	2,37E+03	1,66E+02	3,87E+00	0	4,76E+03	1,05E+04
CFC [kg/a]	3,35E-05	7,64E-06	2,42E-05	1,56E-03	3,28E-03	0	0	0	1,73E-03	4,17E-04	4,15E-06	0	3,36E-03	3,70E-03
Cd [kg/a]	5,68E-02	1,29E-02	3,16E-03	1,81E-01	5,43E-01	0	0	0	6,64E-01	6,16E-02	3,73E-03	0	9,21E-01	6,04E-01
Hg [kg/a]	5,84E-03	1,33E-03	6,72E-03	5,02E-01	8,34E-01	0	0	0	6,68E+00	3,92E+00	9,40E-04	0	7,19E+00	4,76E+00
Pb [kg/a]	3,12E-01	7,12E-02	2,79E-02	7,79E+01	4,88E+01	0	0	0	1,68E+00	9,70E-01	2,15E-02	0	8,01E+01	4,98E+01
Zn [kg/a]	1,87E+00	4,26E-01	7,70E-02	3,40E+00	6,47E+00	0	0	0	4,11E+01	1,56E+00	1,21E-01	0	4,70E+01	8,04E+00
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	220	50	3	33.634	1.169.938	0	0	0	549.015	67	1.043.701	0	1.626.624	1.170.005
NH4 [kg/a]	195	44	3	33	70	0	0	0	1.914	174	126.185	0	128.376	244
Cd [kg/a]	9,88E-02	2,25E-02	5,73E-03	2,85E-01	1,10E+00	0	0	0	4,51E-01	1,21E+00	5,58E+01	0	5,67E+01	2,31E+00
Hg [kg/a]	8,79E-04	2,00E-04	1,60E-04	1,49E-01	2,02E-01	0	0	0	1,64E-02	2,10E-01	3,61E+01	0	3,63E+01	4,12E-01
Pb [kg/a]	2,41E-01	5,49E-02	4,19E-01	2,71E+01	1,07E+02	0	0	0	2,77E+01	1,20E+02	4,87E+02	0	5,43E+02	2,28E+02
Zn [kg/a]	1,04E+00	2,37E-01	8,20E-01	5,20E+01	2,07E+02	0	0	0	5,48E+01	2,40E+02	1,60E+04	0	1,61E+04	4,47E+02
Cl- [kg/a]	4,75E+04	1,08E+04	1,26E+03	5,79E+04	1,46E+05	0	0	0	5,00E+05	1,70E+05	1,89E+05	0	8,07E+05	3,16E+05

Model Region 3	I - mix													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	7.993	69.583	0	0	0	97.033	51	0	0	105.025	69.634
CO2foss [t/a]	4.908	1.118	269	20.409	90.299	0	0	0	136.877	271.779	322	0	163.903	362.079
CH4 [kg/a]	5.974	1.361	523	37.259	125.625	0	0	0	50.950	623.781	409	0	96.476	749.406
CO [kg/a]	26.931	6.134	395	31.056	137.185	0	0	0	32.235	286.466	1.674	0	98.425	423.652
SO2 [kg/a]	7.396	1.685	940	61.008	140.450	0	0	0	61.622	1.193.277	532	0	133.183	1.333.727
NOx [kg/a]	88.311	20.115	1.594	35.921	113.243	0	0	0	139.672	542.087	5.515	0	291.128	655.330
NMVOC [kg/a]	30.622	6.975	455	4.216	10.834	0	0	0	20.374	173.403	1.904	0	64.545	184.237
Dust [kg/a]	2.023	461	286	18.742	35.859	0	0	0	28.213	268.205	148	0	49.873	304.064
PCDD/F [kg/a]	0	0	0	1,59E-11	2,64E-08	0	0	0	9,73E-02	0	0	0	9,73E-02	2,64E-08
HCl [kg/a]	1,19E+01	2,72E+00	3,61E+01	2,33E+03	1,04E+04	0	0	0	2,37E+03	4,04E+04	3,87E+00	0	4,76E+03	5,08E+04
CFC [kg/a]	3,35E-05	7,64E-06	2,42E-05	1,56E-03	3,28E-03	0	0	0	1,73E-03	2,26E-02	4,15E-06	0	3,36E-03	2,59E-02
Cd [kg/a]	5,68E-02	1,29E-02	3,16E-03	1,81E-01	5,43E-01	0	0	0	6,64E-01	1,20E+01	3,73E-03	0	9,21E-01	1,25E+01
Hg [kg/a]	5,84E-03	1,33E-03	6,72E-03	5,02E-01	8,34E-01	0	0	0	6,68E+00	7,46E+00	9,40E-04	0	7,19E+00	8,29E+00
Pb [kg/a]	3,12E-01	7,12E-02	2,79E-02	7,79E+01	4,88E+01	0	0	0	1,68E+00	6,24E+01	2,15E-02	0	8,01E+01	1,11E+02
Zn [kg/a]	1,87E+00	4,26E-01	7,70E-02	3,40E+00	6,47E+00	0	0	0	4,11E+01	3,46E+02	1,21E-01	0	4,70E+01	3,53E+02
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	220	50	3	33.634	1.169.938	0	0	0	549.015	1.547	1.043.701	0	1.626.624	1.171.485
NH4 [kg/a]	195	44	3	33	70	0	0	0	1.914	1.397	126.185	0	128.376	1.467
Cd [kg/a]	9,88E-02	2,25E-02	5,73E-03	2,85E-01	1,10E+00	0	0	0	4,51E-01	5,20E+00	5,58E+01	0	5,67E+01	6,30E+00
Hg [kg/a]	8,79E-04	2,00E-04	1,60E-04	1,49E-01	2,02E-01	0	0	0	1,64E-02	1,94E-01	3,61E+01	0	3,63E+01	3,97E-01
Pb [kg/a]	2,41E-01	5,49E-02	4,19E-01	2,71E+01	1,07E+02	0	0	0	2,77E+01	4,27E+02	4,87E+02	0	5,43E+02	5,35E+02
Zn [kg/a]	1,04E+00	2,37E-01	8,20E-01	5,20E+01	2,07E+02	0	0	0	5,48E+01	8,36E+02	1,60E+04	0	1,61E+04	1,04E+03
Cl- [kg/a]	4,75E+04	1,08E+04	1,26E+03	5,79E+04	1,46E+05	0	0	0	5,00E+05	9,90E+05	1,89E+05	0	8,07E+05	1,14E+06

Model Region 3	FP1 - CK													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	7.993	69.583	0	31.436	0	65.910	0	0	0	105.338	69.583
CO2foss [t/a]	4.908	1.816	269	20.911	87.490	6.925	48.048	93.358	86.866	155.094	195	0	169.937	335.941
CH4 [kg/a]	5.974	2.210	523	39.427	110.233	13.012	5.438	200.425	36.536	2.936	248	0	103.368	313.594
CO [kg/a]	26.931	9.961	395	22.671	100.926	12.780	24.922	37.323	21.211	29.361	1.015	0	119.886	167.610
SO2 [kg/a]	7.396	2.735	940	67.242	145.966	22.959	28.341	173.788	44.189	101.620	323	0	174.125	421.374
NOx [kg/a]	88.311	32.662	1.594	37.912	112.601	48.857	2.168.429	2.205.037	100.159	52.850	3.343	0	2.481.267	2.370.487
NMVOC [kg/a]	30.622	11.326	455	4.512	11.524	14.663	2.986	29.255	14.039	2.936	1.154	0	79.757	43.715
Dust [kg/a]	2.023	748	286	20.155	37.663	6.961	9.084	6.984	20.231	3.979	90	0	59.579	48.626
PCDD/F [kg/a]	0	0	0	2,33E-11	2,64E-08	0	1,18E-04	1,18E-04	6,98E-02	0	0	0	6,99E-02	1,18E-04
HCl [kg/a]	1,19E+01	4,42E+00	3,61E+01	2,59E+03	8,81E+03	8,47E+02	9,98E+02	2,80E+03	1,70E+03	5,81E+03	2,35E+00	0	6,19E+03	1,74E+04
CFC [kg/a]	3,35E-05	1,24E-05	2,42E-05	1,73E-03	3,48E-03	5,70E-04	2,92E-04	1,24E-03	1,24E-03	1,76E-03	2,51E-06	0	3,90E-03	6,48E-03
Cd [kg/a]	5,68E-02	2,10E-02	3,16E-03	2,07E-01	4,85E-01	8,13E-02	7,46E-02	1,34E-01	4,31E-01	7,73E-01	2,26E-03	0	8,77E-01	1,39E+00
Hg [kg/a]	5,84E-03	2,16E-03	6,72E-03	5,31E-01	8,80E-01	1,58E-01	6,84E+00	6,09E+00	3,75E+00	6,39E+00	5,70E-04	0	1,13E+01	1,34E+01
Pb [kg/a]	3,12E-01	1,16E-01	2,79E-02	5,90E+01	4,01E+01	6,95E-01	2,42E+00	2,43E+01	1,20E+00	3,04E+01	1,30E-02	0	6,38E+01	9,48E+01
Zn [kg/a]	1,87E+00	6,92E-01	7,70E-02	3,80E+00	6,95E+00	2,05E+00	2,24E+00	6,51E+00	2,84E+01	5,81E+01	7,31E-02	0	3,92E+01	7,15E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	220	81	3	32.705	1.169.013	110	6	102	355.939	722	632.758	0	1.021.823	1.169.836
NH4 [kg/a]	195	72	3	36	73	98	6	179	1.439	236	76.502	0	78.351	488
Cd [kg/a]	9,88E-02	3,65E-02	5,73E-03	3,18E-01	9,67E-01	1,47E-01	5,41E-02	2,48E+00	3,12E-01	8,41E+00	3,38E+01	0	3,48E+01	1,19E+01
Hg [kg/a]	8,79E-04	3,25E-04	1,60E-04	1,09E-01	1,62E-01	3,86E-03	1,82E-03	3,23E-03	1,18E-02	2,31E-01	2,19E+01	0	2,20E+01	3,96E-01
Pb [kg/a]	2,41E-01	8,91E-02	4,19E-01	3,01E+01	9,29E+01	9,83E+00	5,11E+00	2,40E+02	1,98E+01	8,13E+02	2,95E+02	0	3,61E+02	1,15E+03
Zn [kg/a]	1,04E+00	3,85E-01	8,20E-01	5,80E+01	1,78E+02	1,93E+01	9,90E+00	6,01E+02	3,93E+01	1,63E+03	9,70E+03	0	9,83E+03	2,41E+03
Cl- [kg/a]	4,75E+04	1,76E+04	1,26E+03	5,75E+04	1,31E+05	3,57E+04	7,62E+03	3,77E+05	3,34E+05	1,04E+06	1,14E+05	0	6,16E+05	1,55E+06

Model Region 3	FP1 - CFB													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	7.993	69.583	0	31.542	0	65.910	0	0	0	105.444	69.583
CO2foss [t/a]	4.908	1.913	269	20.911	87.490	6.925	48.202	84.905	86.866	155.094	208	0	170.200	327.488
CH4 [kg/a]	5.974	2.328	523	39.427	110.233	13.012	5.438	252.799	36.536	2.936	264	0	103.502	365.967
CO [kg/a]	26.931	10.495	395	22.671	100.926	12.780	10.244	18.122	21.211	29.361	1.080	0	105.808	148.409
SO2 [kg/a]	7.396	2.882	940	67.242	145.966	22.959	11.501	49.350	44.189	101.620	343	0	157.453	296.936
NOx [kg/a]	88.311	34.415	1.594	37.912	112.601	48.857	33.008	58.714	100.159	52.850	3.558	0	347.814	224.165
NMVOC [kg/a]	30.622	11.933	455	4.512	11.524	14.663	1.518	9.617	14.039	2.936	1.228	0	78.971	24.076
Dust [kg/a]	2.023	788	286	20.155	37.663	6.961	4.559	1.375	20.231	3.979	96	0	55.100	43.017
PCDD/F [kg/a]	0	0	0	2,33E-11	2,64E-08	0	2,12E-02	2,12E-02	6,98E-02	0	0	0	9,10E-02	2,12E-02
HCl [kg/a]	1,19E+01	4,66E+00	3,61E+01	2,59E+03	8,81E+03	8,47E+02	1,12E+03	5,57E+02	1,70E+03	5,81E+03	2,50E+00	0	6,31E+03	1,52E+04
CFC [kg/a]	3,35E-05	1,31E-05	2,42E-05	1,73E-03	3,48E-03	5,70E-04	2,92E-04	9,75E-04	1,24E-03	1,76E-03	2,67E-06	0	3,90E-03	6,21E-03
Cd [kg/a]	5,68E-02	2,21E-02	3,16E-03	2,07E-01	4,85E-01	8,13E-02	1,42E-01	1,56E-02	4,31E-01	7,73E-01	2,41E-03	0	9,46E-01	1,27E+00
Hg [kg/a]	5,84E-03	2,28E-03	6,72E-03	5,31E-01	8,80E-01	1,58E-01	2,95E-01	3,21E-01	3,75E+00	6,39E+00	6,07E-04	0	4,75E+00	7,59E+00
Pb [kg/a]	3,12E-01	1,22E-01	2,79E-02	5,90E+01	4,01E+01	6,95E-01	8,25E-01	3,00E+00	1,20E+00	3,04E+01	1,38E-02	0	6,22E+01	7,34E+01
Zn [kg/a]	1,87E+00	7,29E-01	7,70E-02	3,80E+00	6,95E+00	2,05E+00	5,44E+00	6,29E+00	2,84E+01	5,81E+01	7,78E-02	0	4,25E+01	7,13E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	220	86	3	32.705	1.169.013	110	56.599	59.409	355.939	722	738.051	0	1.183.714	1.229.143
NH4 [kg/a]	195	76	3	36	73	98	18	127	1.439	236	89.231	0	91.097	436
Cd [kg/a]	9,88E-02	3,85E-02	5,73E-03	3,18E-01	9,67E-01	1,47E-01	1,07E+00	2,23E+00	3,12E-01	8,41E+00	3,95E+01	0	4,15E+01	1,16E+01
Hg [kg/a]	8,79E-04	3,42E-04	1,60E-04	1,09E-01	1,62E-01	3,86E-03	1,86E-02	1,70E-02	1,18E-02	2,31E-01	2,56E+01	0	2,57E+01	4,10E-01
Pb [kg/a]	2,41E-01	9,39E-02	4,19E-01	3,01E+01	9,29E+01	9,83E+00	1,04E+01	2,10E+02	1,98E+01	8,13E+02	3,44E+02	0	4,15E+02	1,12E+03
Zn [kg/a]	1,04E+00	4,05E-01	8,20E-01	5,80E+01	1,78E+02	1,93E+01	2,59E+01	8,17E+02	3,93E+01	1,63E+03	1,13E+04	0	1,15E+04	2,62E+03
Cl- [kg/a]	4,75E+04	1,85E+04	1,26E+03	5,75E+04	1,31E+05	3,57E+04	1,62E+05	4,46E+05	3,34E+05	1,04E+06	1,33E+05	0	7,90E+05	1,62E+06

Model Region 3	FP1 - PC													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	7.993	69.583	0	24.754	0	67.971	0	0	0	100.718	69.583
CO2foss [t/a]	4.908	2.016	269	20.833	87.353	12.282	44.664	89.078	87.885	157.457	205	0	173.061	333.888
CH4 [kg/a]	5.974	2.453	523	39.280	109.740	25.250	6.690	265.225	37.330	2.981	261	0	117.761	377.945
CO [kg/a]	26.931	11.058	395	22.475	100.130	13.462	8.951	19.013	21.642	29.808	1.068	0	105.982	148.952
SO2 [kg/a]	7.396	3.037	940	67.003	145.741	35.880	12.710	47.514	45.149	103.168	339	0	172.454	296.423
NOx [kg/a]	88.311	36.261	1.594	37.776	112.435	54.630	29.122	55.187	102.334	53.655	3.518	0	353.545	221.277
NMVOC [kg/a]	30.622	12.573	455	4.498	11.511	15.472	1.503	10.089	14.334	2.981	1.214	0	80.672	24.581
Dust [kg/a]	2.023	831	286	20.073	37.587	10.790	5.045	1.128	20.671	4.039	94	0	59.814	42.755
PCDD/F [kg/a]	0	0	0	2,33E-11	2,64E-08	1,19E-09	2,17E-02	2,17E-02	7,13E-02	0	0	0	9,29E-02	2,17E-02
HCl [kg/a]	1,19E+01	4,90E+00	3,61E+01	2,58E+03	8,76E+03	1,38E+03	1,61E+03	6,45E+02	1,74E+03	5,90E+03	2,47E+00	0	7,37E+03	1,53E+04
CFC [kg/a]	3,35E-05	1,38E-05	2,42E-05	1,72E-03	3,48E-03	9,68E-04	3,59E-04	1,02E-03	1,27E-03	1,78E-03	2,64E-06	0	4,39E-03	6,29E-03
Cd [kg/a]	5,68E-02	2,33E-02	3,16E-03	2,06E-01	4,83E-01	1,16E-01	5,14E+00	6,56E-01	4,38E-01	7,85E-01	2,38E-03	0	5,98E+00	1,92E+00
Hg [kg/a]	5,84E-03	2,40E-03	6,72E-03	5,29E-01	8,79E-01	2,67E-01	2,95E+00	4,88E+00	4,03E+00	6,48E+00	6,00E-04	0	7,79E+00	1,22E+01
Pb [kg/a]	3,12E-01	1,28E-01	2,79E-02	5,86E+01	3,99E+01	1,05E+00	5,45E+01	2,91E+01	1,23E+00	3,08E+01	1,37E-02	0	1,16E+02	9,98E+01
Zn [kg/a]	1,87E+00	7,68E-01	7,70E-02	3,78E+00	6,94E+00	2,77E+00	7,83E-01	5,77E+00	2,96E+01	5,89E+01	7,69E-02	0	3,97E+01	7,16E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	220	90	3	32.685	1.168.992	112	48.617	62.329	363.069	733	734.853	0	1.179.649	1.232.054
NH4 [kg/a]	195	80	3	36	73	99	7	108	1.479	239	88.844	0	90.744	420
Cd [kg/a]	9,88E-02	4,06E-02	5,73E-03	3,17E-01	9,62E-01	2,10E-01	6,66E-02	2,20E+00	3,19E-01	8,54E+00	3,93E+01	0	4,04E+01	1,17E+01
Hg [kg/a]	8,79E-04	3,61E-04	1,60E-04	1,08E-01	1,61E-01	9,98E-03	2,24E-03	1,46E-03	1,20E-02	2,34E-01	2,54E+01	0	2,56E+01	3,97E-01
Pb [kg/a]	2,41E-01	9,89E-02	4,19E-01	3,00E+01	9,24E+01	1,61E+01	6,29E+00	2,18E+02	2,03E+01	8,25E+02	3,43E+02	0	4,16E+02	1,14E+03
Zn [kg/a]	1,04E+00	4,27E-01	8,20E-01	5,77E+01	1,77E+02	3,15E+01	1,22E+01	8,54E+02	4,01E+01	1,65E+03	1,13E+04	0	1,14E+04	2,68E+03
Cl- [kg/a]	4,75E+04	1,95E+04	1,26E+03	5,72E+04	1,31E+05	4,41E+04	9,37E+03	4,41E+05	3,43E+05	1,06E+06	1,33E+05	0	6,55E+05	1,63E+06

Model Region 3	FP1 - gasPC													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	7.993	69.583	0	31.542	0	65.910	0	0	0	105.444	69.583
CO2foss [t/a]	4.908	1.816	269	20.911	87.490	6.925	48.602	84.905	86.866	155.094	208	0	170.503	327.488
CH4 [kg/a]	5.974	2.210	523	39.427	110.233	13.012	6.312	252.799	36.536	2.936	264	0	104.258	365.967
CO [kg/a]	26.931	9.961	395	22.671	100.926	12.780	10.310	18.122	21.211	29.361	1.081	0	105.341	148.409
SO2 [kg/a]	7.396	2.735	940	67.242	145.966	22.959	11.991	45.288	44.189	101.620	344	0	157.796	292.874
NOx [kg/a]	88.311	32.662	1.594	37.912	112.601	48.857	33.811	58.714	100.159	52.850	3.563	0	346.868	224.165
NMVOC [kg/a]	30.622	11.326	455	4.512	11.524	14.663	1.604	9.617	14.039	2.936	1.230	0	78.451	24.076
Dust [kg/a]	2.023	748	286	20.155	37.663	6.961	5.071	1.375	20.231	3.979	96	0	55.572	43.017
PCDD/F [kg/a]	0	0	0	2,33E-11	2,64E-08	0	2,12E-02	2,12E-02	6,98E-02	0	0	0	9,10E-02	2,12E-02
HCl [kg/a]	1,19E+01	4,42E+00	3,61E+01	2,59E+03	8,81E+03	8,47E+02	1,54E+03	6,15E+02	1,70E+03	5,81E+03	2,50E+00	0	6,73E+03	1,52E+04
CFC [kg/a]	3,35E-05	1,24E-05	2,42E-05	1,73E-03	3,48E-03	5,70E-04	3,39E-04	9,75E-04	1,24E-03	1,76E-03	2,68E-06	0	3,95E-03	6,21E-03
Cd [kg/a]	5,68E-02	2,10E-02	3,16E-03	2,07E-01	4,85E-01	8,13E-02	4,56E+00	6,25E-01	4,31E-01	7,73E-01	2,41E-03	0	5,36E+00	1,88E+00
Hg [kg/a]	5,84E-03	2,16E-03	6,72E-03	5,31E-01	8,80E-01	1,58E-01	4,96E+00	4,65E+00	3,75E+00	6,39E+00	6,07E-04	0	9,42E+00	1,19E+01
Pb [kg/a]	3,12E-01	1,16E-01	2,79E-02	5,90E+01	4,01E+01	6,95E-01	5,36E+01	2,77E+01	1,20E+00	3,04E+01	1,39E-02	0	1,15E+02	9,81E+01
Zn [kg/a]	1,87E+00	6,92E-01	7,70E-02	3,80E+00	6,95E+00	2,05E+00	7,39E-01	5,50E+00	2,84E+01	5,81E+01	7,79E-02	0	3,77E+01	7,05E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	220	81	3	32.705	1.169.013	110	56.600	59.409	355.939	722	740.157	0	1.185.816	1.229.143
NH4 [kg/a]	195	72	3	36	73	98	6	103	1.439	236	89.486	0	91.336	412
Cd [kg/a]	9,88E-02	3,65E-02	5,73E-03	3,18E-01	9,67E-01	1,47E-01	6,28E-02	2,09E+00	3,12E-01	8,41E+00	3,96E+01	0	4,06E+01	1,15E+01
Hg [kg/a]	8,79E-04	3,25E-04	1,60E-04	1,09E-01	1,62E-01	3,86E-03	2,11E-03	1,39E-03	1,18E-02	2,31E-01	2,56E+01	0	2,58E+01	3,94E-01
Pb [kg/a]	2,41E-01	8,91E-02	4,19E-01	3,01E+01	9,29E+01	9,83E+00	5,93E+00	2,08E+02	1,98E+01	8,13E+02	3,45E+02	0	4,12E+02	1,11E+03
Zn [kg/a]	1,04E+00	3,85E-01	8,20E-01	5,80E+01	1,78E+02	1,93E+01	1,15E+01	8,14E+02	3,93E+01	1,63E+03	1,13E+04	0	1,15E+04	2,62E+03
Cl- [kg/a]	4,75E+04	1,76E+04	1,26E+03	5,75E+04	1,31E+05	3,57E+04	8,84E+03	4,21E+05	3,34E+05	1,04E+06	1,34E+05	0	6,36E+05	1,60E+06

Model Region 3	FP2 - CK													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	7.993	69.583	0	36.110	0	61.277	0	0	0	105.380	69.583
CO2foss [t/a]	4.908	2.129	269	22.585	106.885	7.946	71.718	137.060	62.567	119.003	177	0	172.297	362.949
CH4 [kg/a]	5.974	2.590	523	42.179	151.201	16.462	6.993	294.248	32.105	2.253	225	0	107.052	447.702
CO [kg/a]	26.931	11.677	395	24.577	110.577	6.244	33.836	54.795	17.314	22.529	919	0	121.893	187.901
SO2 [kg/a]	7.396	3.207	940	75.819	238.590	30.527	37.620	255.141	38.830	77.972	292	0	194.631	571.703
NOx [kg/a]	88.311	38.292	1.594	41.082	149.864	30.769	3.032.771	3.087.424	88.013	40.552	3.028	0	3.323.858	3.277.840
NMVOC [kg/a]	30.622	13.278	455	5.620	21.527	7.294	4.019	42.950	11.939	2.253	1.045	0	74.272	66.729
Dust [kg/a]	2.023	877	286	21.529	70.546	9.359	12.348	9.845	17.778	3.053	81	0	64.282	83.444
PCDD/F [kg/a]	0	0	0	1,09E-10	2,64E-08	0	1,65E-04	1,65E-04	6,13E-02	0	0	0	6,15E-02	1,65E-04
HCl [kg/a]	1,19E+01	5,18E+00	3,61E+01	2,74E+03	1,19E+04	1,25E+03	1,38E+03	4,11E+03	1,49E+03	4,46E+03	2,12E+00	0	6,92E+03	2,04E+04
CFC [kg/a]	3,35E-05	1,45E-05	2,42E-05	1,83E-03	5,29E-03	8,29E-04	3,75E-04	1,82E-03	1,09E-03	1,35E-03	2,28E-06	0	4,20E-03	8,46E-03
Cd [kg/a]	5,68E-02	2,46E-02	3,16E-03	3,41E-01	6,86E-01	9,36E-02	1,08E-01	1,97E-01	3,20E-01	5,93E-01	2,05E-03	0	9,50E-01	1,48E+00
Hg [kg/a]	5,84E-03	2,53E-03	6,72E-03	5,63E-01	1,39E+00	2,31E-01	6,09E+00	8,94E+00	2,48E+00	4,90E+00	5,16E-04	0	9,38E+00	1,52E+01
Pb [kg/a]	3,12E-01	1,35E-01	2,79E-02	6,27E+01	4,36E+01	8,82E-01	3,46E+00	3,57E+01	1,06E+00	2,33E+01	1,18E-02	0	6,86E+01	1,03E+02
Zn [kg/a]	1,87E+00	8,12E-01	7,70E-02	4,24E+00	1,16E+01	2,15E+00	2,57E+00	9,56E+00	2,48E+01	4,45E+01	6,62E-02	0	3,65E+01	6,57E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	220	95	3	32.877	1.169.265	59	8	149	286.514	554	572.990	0	892.766	1.169.969
NH4 [kg/a]	195	85	3	43	148	53	7	263	1.376	181	69.276	0	71.038	592
Cd [kg/a]	9,88E-02	4,28E-02	5,73E-03	3,41E-01	1,38E+00	1,71E-01	6,96E-02	3,64E+00	2,60E-01	6,45E+00	3,06E+01	0	3,16E+01	1,15E+01
Hg [kg/a]	8,79E-04	3,81E-04	1,60E-04	1,17E-01	1,81E-01	5,30E-03	2,34E-03	4,75E-03	1,03E-02	1,77E-01	1,98E+01	0	2,00E+01	3,63E-01
Pb [kg/a]	2,41E-01	1,04E-01	4,19E-01	3,17E+01	1,28E+02	1,45E+01	6,57E+00	3,52E+02	1,74E+01	6,24E+02	2,67E+02	0	3,38E+02	1,10E+03
Zn [kg/a]	1,04E+00	4,51E-01	8,20E-01	6,12E+01	2,47E+02	2,81E+01	1,27E+01	8,83E+02	3,45E+01	1,25E+03	8,79E+03	0	8,92E+03	2,38E+03
Cl- [kg/a]	4,75E+04	2,06E+04	1,26E+03	6,36E+04	2,06E+05	3,05E+04	9,80E+03	5,54E+05	2,66E+05	8,02E+05	1,04E+05	0	5,42E+05	1,56E+06

Model Region 3	FP2 - CFB													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	7.993	69.583	0	36.231	0	61.277	0	0	0	105.501	69.583
CO2foss [t/a]	4.908	2.226	269	22.585	106.885	7.946	71.948	124.650	62.567	119.003	189	0	172.637	350.538
CH4 [kg/a]	5.974	2.709	523	42.179	151.201	16.462	6.993	371.138	32.105	2.253	241	0	107.186	524.592
CO [kg/a]	26.931	12.212	395	24.577	110.577	6.244	13.891	26.606	17.314	22.529	984	0	102.548	159.711
SO2 [kg/a]	7.396	3.354	940	75.819	238.590	30.527	14.868	72.452	38.830	77.972	313	0	172.047	389.013
NOx [kg/a]	88.311	40.044	1.594	41.082	149.864	30.769	42.451	81.100	88.013	40.552	3.242	0	335.505	271.515
NMVOC [kg/a]	30.622	13.885	455	5.620	21.527	7.294	2.024	14.118	11.939	2.253	1.119	0	72.959	37.898
Dust [kg/a]	2.023	917	286	21.529	70.546	9.359	5.863	1.769	17.778	3.053	87	0	57.843	75.368
PCDD/F [kg/a]	0	0	0	1,09E-10	2,64E-08	0	2,97E-02	2,97E-02	6,13E-02	0	0	0	9,10E-02	2,97E-02
HCl [kg/a]	1,19E+01	5,42E+00	3,61E+01	2,74E+03	1,19E+04	1,25E+03	1,55E+03	8,18E+02	1,49E+03	4,46E+03	2,28E+00	0	7,09E+03	1,71E+04
CFC [kg/a]	3,35E-05	1,52E-05	2,42E-05	1,83E-03	5,29E-03	8,29E-04	3,75E-04	1,43E-03	1,09E-03	1,35E-03	2,44E-06	0	4,20E-03	8,07E-03
Cd [kg/a]	5,68E-02	2,58E-02	3,16E-03	3,41E-01	6,86E-01	9,36E-02	2,14E-01	2,29E-02	3,20E-01	5,93E-01	2,19E-03	0	1,06E+00	1,30E+00
Hg [kg/a]	5,84E-03	2,65E-03	6,72E-03	5,63E-01	1,39E+00	2,31E-01	2,94E-01	4,71E-01	2,48E+00	4,90E+00	5,53E-04	0	3,58E+00	6,76E+00
Pb [kg/a]	3,12E-01	1,42E-01	2,79E-02	6,27E+01	4,36E+01	8,82E-01	1,15E+00	4,40E+00	1,06E+00	2,33E+01	1,26E-02	0	6,63E+01	7,13E+01
Zn [kg/a]	1,87E+00	8,49E-01	7,70E-02	4,24E+00	1,16E+01	2,15E+00	6,07E+00	9,24E+00	2,48E+01	4,45E+01	7,09E-02	0	4,01E+01	6,54E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	220	100	3	32.877	1.169.265	59	76.911	87.219	286.514	554	708.405	0	1.105.089	1.257.038
NH4 [kg/a]	195	89	3	43	148	53	22	186	1.376	181	85.647	0	87.428	515
Cd [kg/a]	9,88E-02	4,48E-02	5,73E-03	3,41E-01	1,38E+00	1,71E-01	1,66E+00	3,28E+00	2,60E-01	6,45E+00	3,79E+01	0	4,05E+01	1,11E+01
Hg [kg/a]	8,79E-04	3,98E-04	1,60E-04	1,17E-01	1,81E-01	5,30E-03	1,72E-02	2,50E-02	1,03E-02	1,77E-01	2,45E+01	0	2,47E+01	3,83E-01
Pb [kg/a]	2,41E-01	1,09E-01	4,19E-01	3,17E+01	1,28E+02	1,45E+01	1,43E+01	3,09E+02	1,74E+01	6,24E+02	3,31E+02	0	4,09E+02	1,06E+03
Zn [kg/a]	1,04E+00	4,72E-01	8,20E-01	6,12E+01	2,47E+02	2,81E+01	3,02E+01	1,20E+03	3,45E+01	1,25E+03	1,09E+04	0	1,10E+04	2,70E+03
Cl- [kg/a]	4,75E+04	2,15E+04	1,26E+03	6,36E+04	2,06E+05	3,05E+04	2,35E+05	6,55E+05	2,66E+05	8,02E+05	1,28E+05	0	7,93E+05	1,66E+06

Model Region 3	FP2 - PC													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	7.993	69.583	0	36.231	0	61.277	0	0	0	105.501	69.583
CO2foss [t/a]	4.908	2.129	269	22.585	106.885	7.946	73.549	124.650	62.567	119.003	190	0	174.141	350.538
CH4 [kg/a]	5.974	2.590	523	42.179	151.201	16.462	10.490	371.138	32.105	2.253	241	0	110.565	524.592
CO [kg/a]	26.931	11.677	395	24.577	110.577	6.244	14.154	26.606	17.314	22.529	985	0	102.278	159.711
SO2 [kg/a]	7.396	3.207	940	75.819	238.590	30.527	19.929	66.488	38.830	77.972	313	0	176.962	383.050
NOx [kg/a]	88.311	38.292	1.594	41.082	149.864	30.769	45.662	81.100	88.013	40.552	3.246	0	336.968	271.515
NMVOC [kg/a]	30.622	13.278	455	5.620	21.527	7.294	2.368	14.118	11.939	2.253	1.121	0	72.697	37.898
Dust [kg/a]	2.023	877	286	21.529	70.546	9.359	7.910	1.769	17.778	3.053	87	0	59.850	75.368
PCDD/F [kg/a]	0	0	0	1,09E-10	2,64E-08	0	2,97E-02	2,97E-02	6,13E-02	0	0	0	9,10E-02	2,97E-02
HCl [kg/a]	1,19E+01	5,18E+00	3,61E+01	2,74E+03	1,19E+04	1,25E+03	2,35E+03	9,03E+02	1,49E+03	4,46E+03	2,28E+00	0	7,88E+03	1,72E+04
CFC [kg/a]	3,35E-05	1,45E-05	2,42E-05	1,83E-03	5,29E-03	8,29E-04	5,63E-04	1,43E-03	1,09E-03	1,35E-03	2,44E-06	0	4,39E-03	8,07E-03
Cd [kg/a]	5,68E-02	2,46E-02	3,16E-03	3,41E-01	6,86E-01	9,36E-02	7,12E+00	9,17E-01	3,20E-01	5,93E-01	2,20E-03	0	7,96E+00	2,20E+00
Hg [kg/a]	5,84E-03	2,53E-03	6,72E-03	5,63E-01	1,39E+00	2,31E-01	4,47E+00	6,83E+00	2,48E+00	4,90E+00	5,53E-04	0	7,76E+00	1,31E+01
Pb [kg/a]	3,12E-01	1,35E-01	2,79E-02	6,27E+01	4,36E+01	8,82E-01	7,77E+01	4,07E+01	1,06E+00	2,33E+01	1,26E-02	0	1,43E+02	1,08E+02
Zn [kg/a]	1,87E+00	8,12E-01	7,70E-02	4,24E+00	1,16E+01	2,15E+00	1,23E+00	8,07E+00	2,48E+01	4,45E+01	7,10E-02	0	3,52E+01	6,42E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	220	95	3	32.877	1.169.265	59	76.915	87.219	286.514	554	711.114	0	1.107.797	1.257.038
NH4 [kg/a]	195	85	3	43	148	53	11	151	1.376	181	85.974	0	87.740	480
Cd [kg/a]	9,88E-02	4,28E-02	5,73E-03	3,41E-01	1,38E+00	1,71E-01	1,04E-01	3,07E+00	2,60E-01	6,45E+00	3,80E+01	0	3,91E+01	1,09E+01
Hg [kg/a]	8,79E-04	3,81E-04	1,60E-04	1,17E-01	1,81E-01	5,30E-03	3,51E-03	2,04E-03	1,03E-02	1,77E-01	2,46E+01	0	2,48E+01	3,60E-01
Pb [kg/a]	2,41E-01	1,04E-01	4,19E-01	3,17E+01	1,28E+02	1,45E+01	9,86E+00	3,05E+02	1,74E+01	6,24E+02	3,32E+02	0	4,06E+02	1,06E+03
Zn [kg/a]	1,04E+00	4,51E-01	8,20E-01	6,12E+01	2,47E+02	2,81E+01	1,91E+01	1,19E+03	3,45E+01	1,25E+03	1,09E+04	0	1,10E+04	2,69E+03
Cl- [kg/a]	4,75E+04	2,06E+04	1,26E+03	6,36E+04	2,06E+05	3,05E+04	1,47E+04	6,18E+05	2,66E+05	8,02E+05	1,28E+05	0	5,72E+05	1,63E+06

Model Region 3	FP2 - gasPC													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	7.993	69.583	0	36.231	0	61.277	0	0	0	105.501	69.583
CO2foss [t/a]	4.908	2.129	269	22.585	106.885	7.946	72.463	124.650	62.567	119.003	190	0	173.055	350.538
CH4 [kg/a]	5.974	2.590	523	42.179	151.201	16.462	8.117	371.138	32.105	2.253	241	0	108.192	524.592
CO [kg/a]	26.931	11.677	395	24.577	110.577	6.244	13.976	26.606	17.314	22.529	985	0	102.099	159.711
SO2 [kg/a]	7.396	3.207	940	75.819	238.590	30.527	15.422	66.488	38.830	77.972	313	0	172.454	383.050
NOx [kg/a]	88.311	38.292	1.594	41.082	149.864	30.769	43.483	81.100	88.013	40.552	3.246	0	334.789	271.515
NMVOC [kg/a]	30.622	13.278	455	5.620	21.527	7.294	2.135	14.118	11.939	2.253	1.121	0	72.464	37.898
Dust [kg/a]	2.023	877	286	21.529	70.546	9.359	6.521	1.769	17.778	3.053	87	0	58.461	75.368
PCDD/F [kg/a]	0	0	0	1,09E-10	2,64E-08	0	2,97E-02	2,97E-02	6,13E-02	0	0	0	9,10E-02	2,97E-02
HCl [kg/a]	1,19E+01	5,18E+00	3,61E+01	2,74E+03	1,19E+04	1,25E+03	2,16E+03	9,03E+02	1,49E+03	4,46E+03	2,28E+00	0	7,69E+03	1,72E+04
CFC [kg/a]	3,35E-05	1,45E-05	2,42E-05	1,83E-03	5,29E-03	8,29E-04	4,35E-04	1,43E-03	1,09E-03	1,35E-03	2,44E-06	0	4,26E-03	8,07E-03
Cd [kg/a]	5,68E-02	2,46E-02	3,16E-03	3,41E-01	6,86E-01	9,36E-02	7,11E+00	9,17E-01	3,20E-01	5,93E-01	2,20E-03	0	7,95E+00	2,20E+00
Hg [kg/a]	5,84E-03	2,53E-03	6,72E-03	5,63E-01	1,39E+00	2,31E-01	4,43E+00	6,83E+00	2,48E+00	4,90E+00	5,53E-04	0	7,72E+00	1,31E+01
Pb [kg/a]	3,12E-01	1,35E-01	2,79E-02	6,27E+01	4,36E+01	8,82E-01	7,76E+01	4,07E+01	1,06E+00	2,33E+01	1,26E-02	0	1,43E+02	1,08E+02
Zn [kg/a]	1,87E+00	8,12E-01	7,70E-02	4,24E+00	1,16E+01	2,15E+00	9,50E-01	8,07E+00	2,48E+01	4,45E+01	7,10E-02	0	3,49E+01	6,42E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	220	95	3	32.877	1.169.265	59	76.912	87.219	286.514	554	711.114	0	1.107.794	1.257.038
NH4 [kg/a]	195	85	3	43	148	53	8	151	1.376	181	85.974	0	87.737	480
Cd [kg/a]	9,88E-02	4,28E-02	5,73E-03	3,41E-01	1,38E+00	1,71E-01	8,08E-02	3,07E+00	2,60E-01	6,45E+00	3,80E+01	0	3,90E+01	1,09E+01
Hg [kg/a]	8,79E-04	3,81E-04	1,60E-04	1,17E-01	1,81E-01	5,30E-03	2,72E-03	2,04E-03	1,03E-02	1,77E-01	2,46E+01	0	2,48E+01	3,60E-01
Pb [kg/a]	2,41E-01	1,04E-01	4,19E-01	3,17E+01	1,28E+02	1,45E+01	7,63E+00	3,05E+02	1,74E+01	6,24E+02	3,32E+02	0	4,04E+02	1,06E+03
Zn [kg/a]	1,04E+00	4,51E-01	8,20E-01	6,12E+01	2,47E+02	2,81E+01	1,48E+01	1,19E+03	3,45E+01	1,25E+03	1,09E+04	0	1,10E+04	2,69E+03
Cl- [kg/a]	4,75E+04	2,06E+04	1,26E+03	6,36E+04	2,06E+05	3,05E+04	1,14E+04	6,18E+05	2,66E+05	8,02E+05	1,28E+05	0	5,69E+05	1,63E+06

Model Region 3	FP3 - CK													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	7.993	69.583	0	57.515	0	26.567	0	0	0	92.075	69.583
CO2foss [t/a]	4.908	1.621	269	18.736	82.246	35.715	104.555	234.801	21.249	37.334	109	0	187.163	354.381
CH4 [kg/a]	5.974	1.972	523	35.390	93.863	60.755	16.641	504.083	20.587	707	138	0	141.980	598.653
CO [kg/a]	26.931	8.892	395	17.422	79.444	9.294	50.425	93.871	7.158	7.068	566	0	121.083	180.383
SO2 [kg/a]	7.396	2.442	940	60.286	132.038	328.437	75.460	437.088	22.294	24.462	180	0	497.435	593.587
NOx [kg/a]	88.311	29.157	1.594	34.117	105.059	80.592	5.374.309	5.463.658	49.991	12.722	1.865	0	5.659.937	5.581.438
NMVOC [kg/a]	30.622	10.110	455	4.048	10.321	50.164	6.554	73.578	6.325	707	644	0	108.921	84.605
Dust [kg/a]	2.023	668	286	17.903	32.841	34.094	24.358	17.342	10.080	958	50	0	89.463	51.141
PCDD/F [kg/a]	0	0	0	1,59E-11	2,64E-08	9,00E-08	2,92E-04	2,92E-04	3,46E-02	0	0	0	3,49E-02	2,92E-04
HCl [kg/a]	1,19E+01	3,94E+00	3,61E+01	2,32E+03	7,35E+03	3,40E+03	2,76E+03	7,04E+03	8,43E+02	1,40E+03	1,31E+00	0	9,37E+03	1,58E+04
CFC [kg/a]	3,35E-05	1,11E-05	2,42E-05	1,55E-03	3,22E-03	2,47E-03	8,93E-04	3,12E-03	6,27E-04	4,23E-04	1,40E-06	0	5,61E-03	6,76E-03
Cd [kg/a]	5,68E-02	1,88E-02	3,16E-03	1,76E-01	4,14E-01	7,10E+00	2,10E-01	3,38E-01	1,34E-01	1,86E-01	1,26E-03	0	7,70E+00	9,38E-01
Hg [kg/a]	5,84E-03	1,93E-03	6,72E-03	4,70E-01	8,02E-01	6,38E-01	1,53E+01	1,53E+01	2,97E+00	1,54E+00	3,18E-04	0	1,94E+01	1,76E+01
Pb [kg/a]	3,12E-01	1,03E-01	2,79E-02	4,78E+01	3,46E+01	1,41E+01	6,53E+00	6,12E+01	6,03E-01	7,31E+00	7,26E-03	0	6,95E+01	1,03E+02
Zn [kg/a]	1,87E+00	6,18E-01	7,70E-02	3,39E+00	6,31E+00	1,76E+01	5,59E+00	1,64E+01	1,47E+01	1,40E+01	4,08E-02	0	4,39E+01	3,67E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	220	73	3	32.164	1.168.465	284	19	256	105.735	174	353.017	0	491.516	1.168.895
NH4 [kg/a]	195	64	3	32	63	327	17	450	717	57	42.680	0	44.037	570
Cd [kg/a]	9,88E-02	3,26E-02	5,73E-03	2,85E-01	8,13E-01	6,91E-01	1,66E-01	6,24E+00	1,35E-01	2,02E+00	1,89E+01	0	2,03E+01	9,08E+00
Hg [kg/a]	8,79E-04	2,90E-04	1,60E-04	8,37E-02	1,37E-01	1,56E-02	5,57E-03	8,13E-03	6,67E-03	5,55E-02	1,22E+01	0	1,23E+01	2,00E-01
Pb [kg/a]	2,41E-01	7,95E-02	4,19E-01	2,69E+01	7,80E+01	3,71E+01	1,56E+01	6,04E+02	9,88E+00	1,96E+02	1,65E+02	0	2,55E+02	8,77E+02
Zn [kg/a]	1,04E+00	3,43E-01	8,20E-01	5,20E+01	1,49E+02	7,65E+01	3,03E+01	1,51E+03	1,97E+01	3,92E+02	5,41E+03	0	5,59E+03	2,05E+03
Cl- [kg/a]	4,75E+04	1,57E+04	1,26E+03	4,97E+04	1,10E+05	2,11E+05	2,33E+04	9,49E+05	1,11E+05	2,52E+05	6,38E+04	0	5,24E+05	1,31E+06

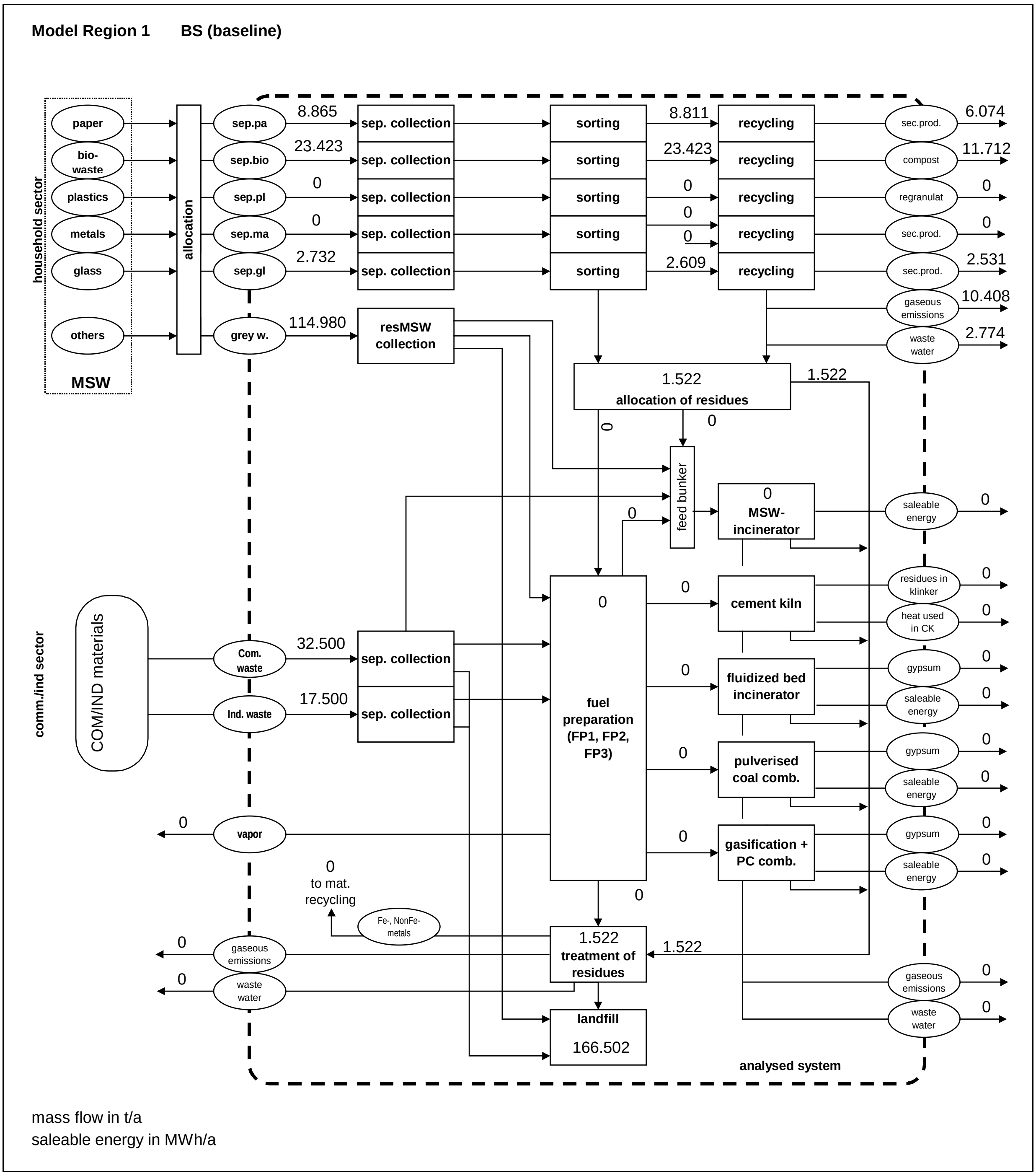
Model Region 3	FP3 - CFB													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	7.993	69.583	0	57.709	0	26.567	0	0	0	92.268	69.583
CO2foss [t/a]	4.908	1.621	269	18.736	82.246	35.715	102.224	213.541	21.249	37.334	124	0	184.846	333.121
CH4 [kg/a]	5.974	1.972	523	35.390	93.863	60.755	10.836	635.804	20.587	707	157	0	136.193	730.375
CO [kg/a]	26.931	8.892	395	17.422	79.444	9.294	20.545	45.578	7.158	7.068	642	0	91.279	132.090
SO2 [kg/a]	7.396	2.442	940	60.286	132.038	328.437	23.436	124.118	22.294	24.462	204	0	445.435	280.618
NOx [kg/a]	88.311	29.157	1.594	34.117	105.059	80.592	65.775	133.036	49.991	12.722	2.116	0	351.653	250.817
NMVOC [kg/a]	30.622	10.110	455	4.048	10.321	50.164	3.039	24.186	6.325	707	730	0	105.492	35.214
Dust [kg/a]	2.023	668	286	17.903	32.841	34.094	9.084	2.740	10.080	958	57	0	74.196	36.539
PCDD/F [kg/a]	0	0	0	1,59E-11	2,64E-08	9,00E-08	5,26E-02	5,26E-02	3,46E-02	0	0	0	8,72E-02	5,26E-02
HCl [kg/a]	1,19E+01	3,94E+00	3,61E+01	2,32E+03	7,35E+03	3,40E+03	2,58E+03	1,40E+03	8,43E+02	1,40E+03	1,48E+00	0	9,19E+03	1,01E+04
CFC [kg/a]	3,35E-05	1,11E-05	2,42E-05	1,55E-03	3,22E-03	2,47E-03	5,81E-04	2,45E-03	6,27E-04	4,23E-04	1,59E-06	0	5,30E-03	6,10E-03
Cd [kg/a]	5,68E-02	1,88E-02	3,16E-03	1,76E-01	4,14E-01	7,10E+00	3,58E-01	3,93E-02	1,34E-01	1,86E-01	1,43E-03	0	7,85E+00	6,40E-01
Hg [kg/a]	5,84E-03	1,93E-03	6,72E-03	4,70E-01	8,02E-01	6,38E-01	6,38E-01	8,06E-01	2,97E+00	1,54E+00	3,61E-04	0	4,73E+00	3,15E+00
Pb [kg/a]	3,12E-01	1,03E-01	2,79E-02	4,78E+01	3,46E+01	1,41E+01	1,99E+00	7,53E+00	6,03E-01	7,31E+00	8,23E-03	0	6,50E+01	4,94E+01
Zn [kg/a]	1,87E+00	6,18E-01	7,70E-02	3,39E+00	6,31E+00	1,76E+01	1,22E+01	1,58E+01	1,47E+01	1,40E+01	4,63E-02	0	5,05E+01	3,61E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	220	73	3	32.164	1.168.465	284	113.539	149.417	105.735	174	562.835	0	814.854	1.318.057
NH4 [kg/a]	195	64	3	32	63	327	43	319	717	57	68.046	0	69.428	439
Cd [kg/a]	9,88E-02	3,26E-02	5,73E-03	2,85E-01	8,13E-01	6,91E-01	2,80E+00	5,62E+00	1,35E-01	2,02E+00	3,01E+01	0	3,42E+01	8,46E+00
Hg [kg/a]	8,79E-04	2,90E-04	1,60E-04	8,37E-02	1,37E-01	1,56E-02	4,10E-02	4,28E-02	6,67E-03	5,55E-02	1,95E+01	0	1,96E+01	2,35E-01
Pb [kg/a]	2,41E-01	7,95E-02	4,19E-01	2,69E+01	7,80E+01	3,71E+01	2,43E+01	5,29E+02	9,88E+00	1,96E+02	2,63E+02	0	3,62E+02	8,03E+02
Zn [kg/a]	1,04E+00	3,43E-01	8,20E-01	5,20E+01	1,49E+02	7,65E+01	5,62E+01	2,05E+03	1,97E+01	3,92E+02	8,63E+03	0	8,84E+03	2,59E+03
Cl- [kg/a]	4,75E+04	1,57E+04	1,26E+03	4,97E+04	1,10E+05	2,11E+05	4,06E+05	1,12E+06	1,11E+05	2,52E+05	1,01E+05	0	9,43E+05	1,48E+06

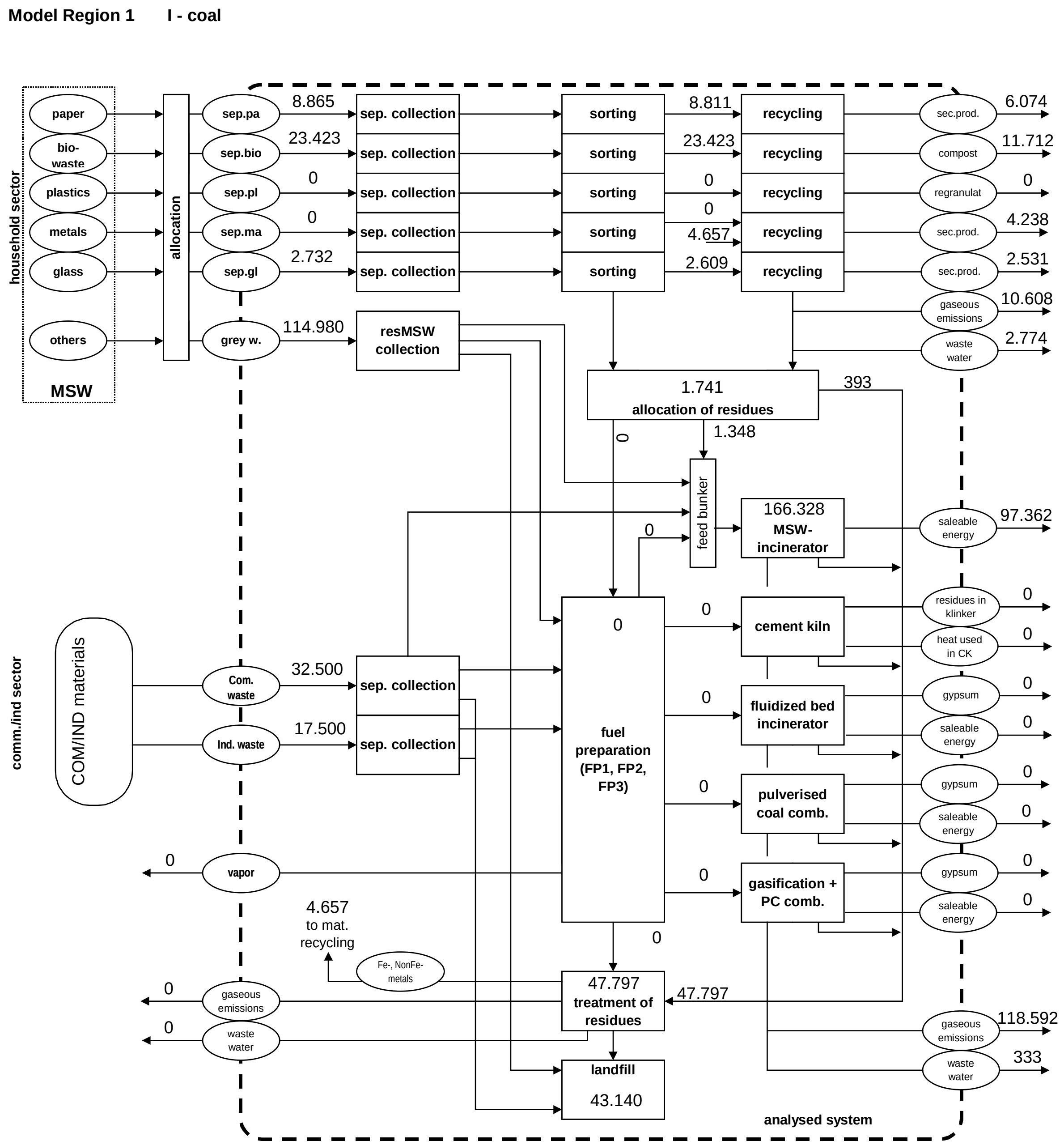
Model Region 3	FP3 - PC													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	7.993	69.583	0	57.709	0	26.567	0	0	0	92.268	69.583
CO2foss [t/a]	4.908	1.621	269	18.736	82.246	35.715	104.704	213.541	21.249	37.334	124	0	187.326	333.121
CH4 [kg/a]	5.974	1.972	523	35.390	93.863	60.755	16.254	635.804	20.587	707	157	0	141.612	730.375
CO [kg/a]	26.931	8.892	395	17.422	79.444	9.294	20.953	45.578	7.158	7.068	644	0	91.688	132.090
SO2 [kg/a]	7.396	2.442	940	60.286	132.038	328.437	30.879	113.902	22.294	24.462	205	0	452.879	270.402
NOx [kg/a]	88.311	29.157	1.594	34.117	105.059	80.592	70.751	133.036	49.991	12.722	2.121	0	356.634	250.817
NMVOC [kg/a]	30.622	10.110	455	4.048	10.321	50.164	3.572	24.186	6.325	707	732	0	106.027	35.214
Dust [kg/a]	2.023	668	286	17.903	32.841	34.094	12.256	2.740	10.080	958	57	0	77.368	36.539
PCDD/F [kg/a]	0	0	0	1,59E-11	2,64E-08	9,00E-08	5,26E-02	5,26E-02	3,46E-02	0	0	0	8,72E-02	5,26E-02
HCl [kg/a]	1,19E+01	3,94E+00	3,61E+01	2,32E+03	7,35E+03	3,40E+03	3,91E+03	1,55E+03	8,43E+02	1,40E+03	1,49E+00	0	1,05E+04	1,03E+04
CFC [kg/a]	3,35E-05	1,11E-05	2,42E-05	1,55E-03	3,22E-03	2,47E-03	8,72E-04	2,45E-03	6,27E-04	4,23E-04	1,59E-06	0	5,59E-03	6,10E-03
Cd [kg/a]	5,68E-02	1,88E-02	3,16E-03	1,76E-01	4,14E-01	7,10E+00	1,21E+01	1,57E+00	1,34E-01	1,86E-01	1,44E-03	0	1,96E+01	2,17E+00
Hg [kg/a]	5,84E-03	1,93E-03	6,72E-03	4,70E-01	8,02E-01	6,38E-01	1,11E+01	1,17E+01	2,97E+00	1,54E+00	3,61E-04	0	1,52E+01	1,40E+01
Pb [kg/a]	3,12E-01	1,03E-01	2,79E-02	4,78E+01	3,46E+01	1,41E+01	1,42E+02	6,98E+01	6,03E-01	7,31E+00	8,25E-03	0	2,05E+02	1,12E+02
Zn [kg/a]	1,87E+00	6,18E-01	7,70E-02	3,39E+00	6,31E+00	1,76E+01	1,90E+00	1,38E+01	1,47E+01	1,40E+01	4,64E-02	0	4,02E+01	3,41E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	220	73	3	32.164	1.168.465	284	113.545	149.417	105.735	174	567.031	0	819.057	1.318.057
NH4 [kg/a]	195	64	3	32	63	327	17	259	717	57	68.553	0	69.909	378
Cd [kg/a]	9,88E-02	3,26E-02	5,73E-03	2,85E-01	8,13E-01	6,91E-01	1,62E-01	5,27E+00	1,35E-01	2,02E+00	3,03E+01	0	3,17E+01	8,10E+00
Hg [kg/a]	8,79E-04	2,90E-04	1,60E-04	8,37E-02	1,37E-01	1,56E-02	5,44E-03	3,49E-03	6,67E-03	5,55E-02	1,96E+01	0	1,97E+01	1,96E-01
Pb [kg/a]	2,41E-01	7,95E-02	4,19E-01	2,69E+01	7,80E+01	3,71E+01	1,53E+01	5,23E+02	9,88E+00	1,96E+02	2,65E+02	0	3,55E+02	7,96E+02
Zn [kg/a]	1,04E+00	3,43E-01	8,20E-01	5,20E+01	1,49E+02	7,65E+01	2,96E+01	2,05E+03	1,97E+01	3,92E+02	8,69E+03	0	8,87E+03	2,59E+03
Cl- [kg/a]	4,75E+04	1,57E+04	1,26E+03	4,97E+04	1,10E+05	2,11E+05	2,28E+04	1,06E+06	1,11E+05	2,52E+05	1,02E+05	0	5,61E+05	1,42E+06

Model Region 3	FP3 - gasPC													
	collection	transport	sorting	material recycling (incl. composting)		fuel preparation	co-combustion		incineration		landfill		TOTAL	
Emissions Air	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
CO2biog [t/a]	0	0	0	7.993	69.583	0	57.709	0	26.567	0	0	0	92.268	69.583
CO2foss [t/a]	4.908	1.621	269	18.736	82.246	35.715	103.021	213.541	21.249	37.334	124	0	185.643	333.121
CH4 [kg/a]	5.974	1.972	523	35.390	93.863	60.755	12.578	635.804	20.587	707	157	0	137.935	730.375
CO [kg/a]	26.931	8.892	395	17.422	79.444	9.294	20.676	45.578	7.158	7.068	644	0	91.411	132.090
SO2 [kg/a]	7.396	2.442	940	60.286	132.038	328.437	23.895	113.902	22.294	24.462	205	0	445.894	270.402
NOx [kg/a]	88.311	29.157	1.594	34.117	105.059	80.592	67.375	133.036	49.991	12.722	2.121	0	353.257	250.817
NMVOC [kg/a]	30.622	10.110	455	4.048	10.321	50.164	3.210	24.186	6.325	707	732	0	105.665	35.214
Dust [kg/a]	2.023	668	286	17.903	32.841	34.094	10.104	2.740	10.080	958	57	0	75.216	36.539
PCDD/F [kg/a]	0	0	0	1,59E-11	2,64E-08	9,00E-08	5,26E-02	5,26E-02	3,46E-02	0	0	0	8,72E-02	5,26E-02
HCl [kg/a]	1,19E+01	3,94E+00	3,61E+01	2,32E+03	7,35E+03	3,40E+03	3,61E+03	1,55E+03	8,43E+02	1,40E+03	1,49E+00	0	1,02E+04	1,03E+04
CFC [kg/a]	3,35E-05	1,11E-05	2,42E-05	1,55E-03	3,22E-03	2,47E-03	6,75E-04	2,45E-03	6,27E-04	4,23E-04	1,59E-06	0	5,39E-03	6,10E-03
Cd [kg/a]	5,68E-02	1,88E-02	3,16E-03	1,76E-01	4,14E-01	7,10E+00	1,21E+01	1,57E+00	1,34E-01	1,86E-01	1,44E-03	0	1,95E+01	2,17E+00
Hg [kg/a]	5,84E-03	1,93E-03	6,72E-03	4,70E-01	8,02E-01	6,38E-01	1,10E+01	1,17E+01	2,97E+00	1,54E+00	3,61E-04	0	1,51E+01	1,40E+01
Pb [kg/a]	3,12E-01	1,03E-01	2,79E-02	4,78E+01	3,46E+01	1,41E+01	1,42E+02	6,98E+01	6,03E-01	7,31E+00	8,25E-03	0	2,05E+02	1,12E+02
Zn [kg/a]	1,87E+00	6,18E-01	7,70E-02	3,39E+00	6,31E+00	1,76E+01	1,47E+00	1,38E+01	1,47E+01	1,40E+01	4,64E-02	0	3,97E+01	3,41E+01
Water	caused	caused	caused	caused	saved	caused	caused	saved	caused	saved	caused	saved	caused	saved
COD [kg/a]	220	73	3	32.164	1.168.465	284	113.541	149.417	105.735	174	567.031	0	819.053	1.318.057
NH4 [kg/a]	195	64	3	32	63	327	13	259	717	57	68.553	0	69.906	378
Cd [kg/a]	9,88E-02	3,26E-02	5,73E-03	2,85E-01	8,13E-01	6,91E-01	1,25E-01	5,27E+00	1,35E-01	2,02E+00	3,03E+01	0	3,17E+01	8,10E+00
Hg [kg/a]	8,79E-04	2,90E-04	1,60E-04	8,37E-02	1,37E-01	1,56E-02	4,21E-03	3,49E-03	6,67E-03	5,55E-02	1,96E+01	0	1,97E+01	1,96E-01
Pb [kg/a]	2,41E-01	7,95E-02	4,19E-01	2,69E+01	7,80E+01	3,71E+01	1,18E+01	5,23E+02	9,88E+00	1,96E+02	2,65E+02	0	3,51E+02	7,96E+02
Zn [kg/a]	1,04E+00	3,43E-01	8,20E-01	5,20E+01	1,49E+02	7,65E+01	2,29E+01	2,05E+03	1,97E+01	3,92E+02	8,69E+03	0	8,87E+03	2,59E+03
Cl- [kg/a]	4,75E+04	1,57E+04	1,26E+03	4,97E+04	1,10E+05	2,11E+05	1,76E+04	1,06E+06	1,11E+05	2,52E+05	1,02E+05	0	5,56E+05	1,42E+06

11.3 Good Balances

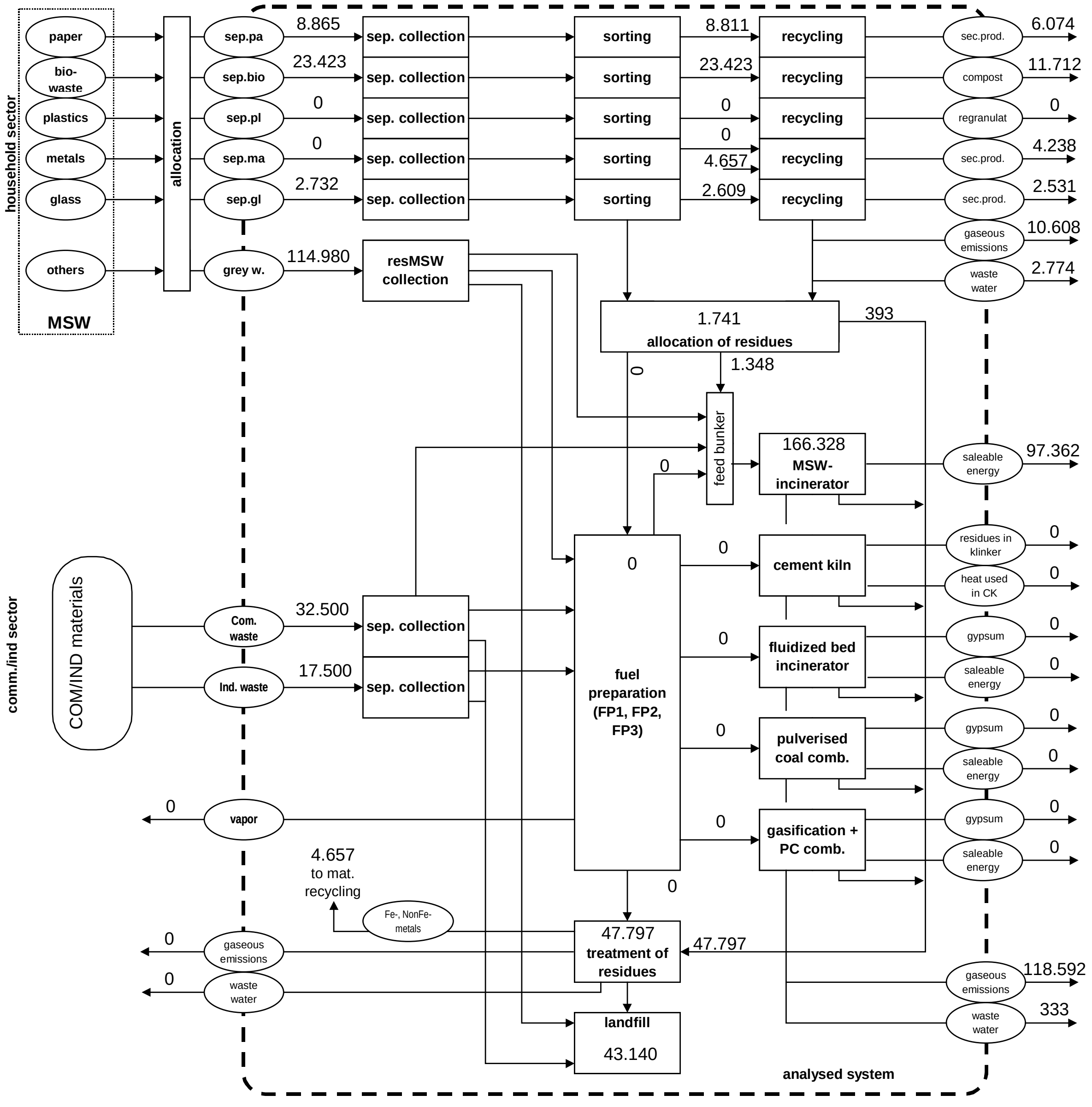
11.3.1 Model Region 1



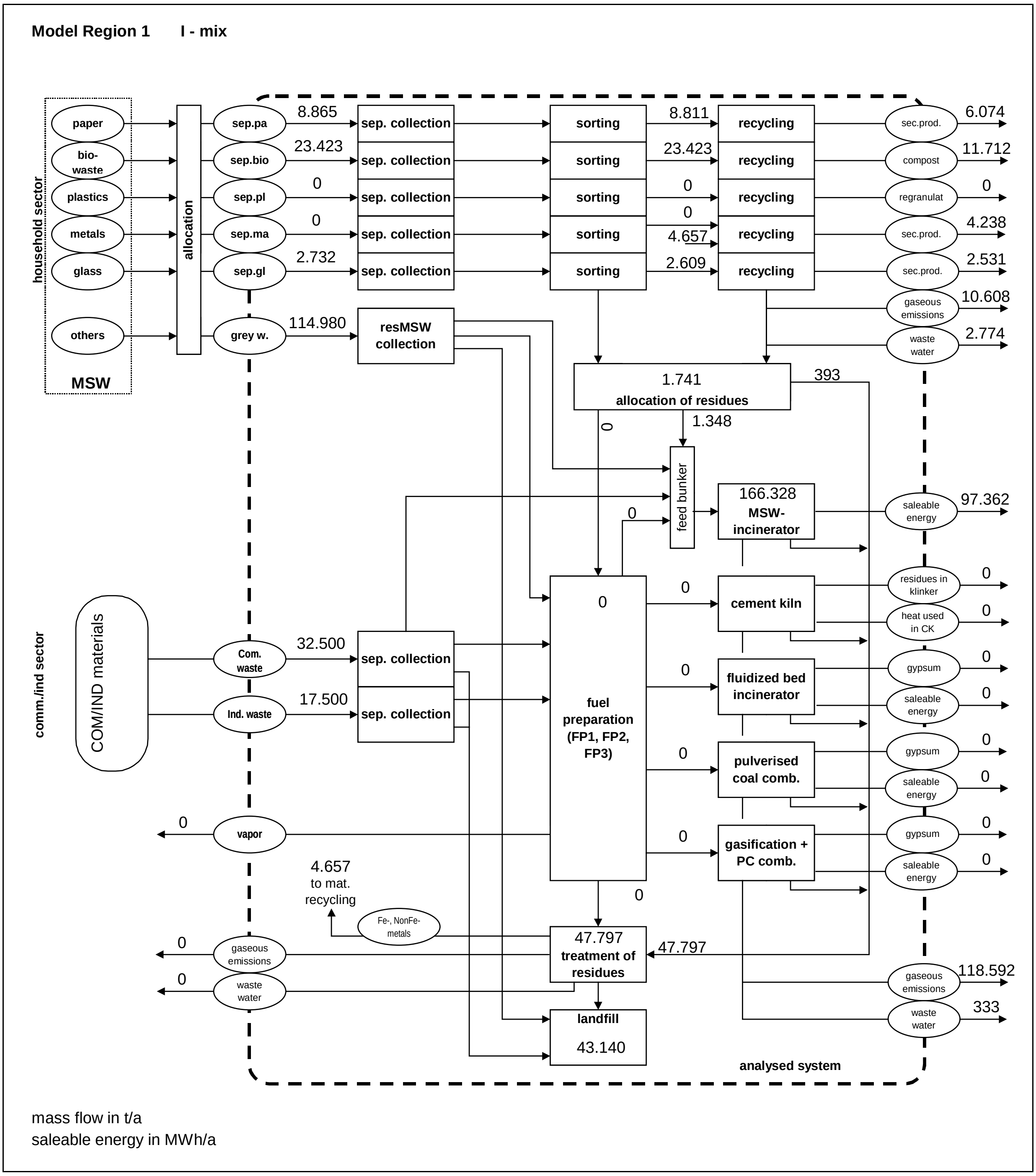


mass flow in t/a
saleable energy in MWh/a

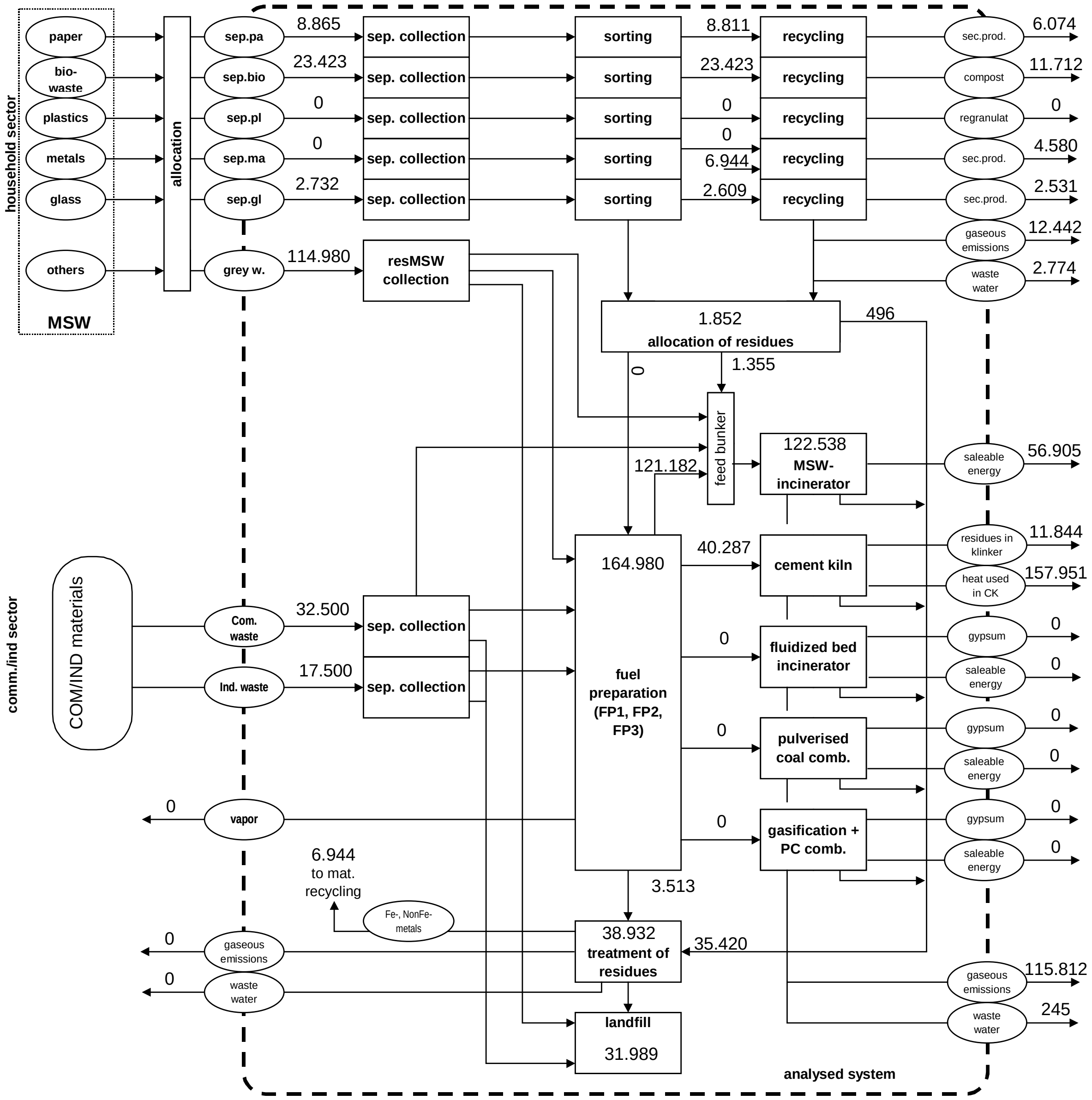
Model Region 1 I - gas



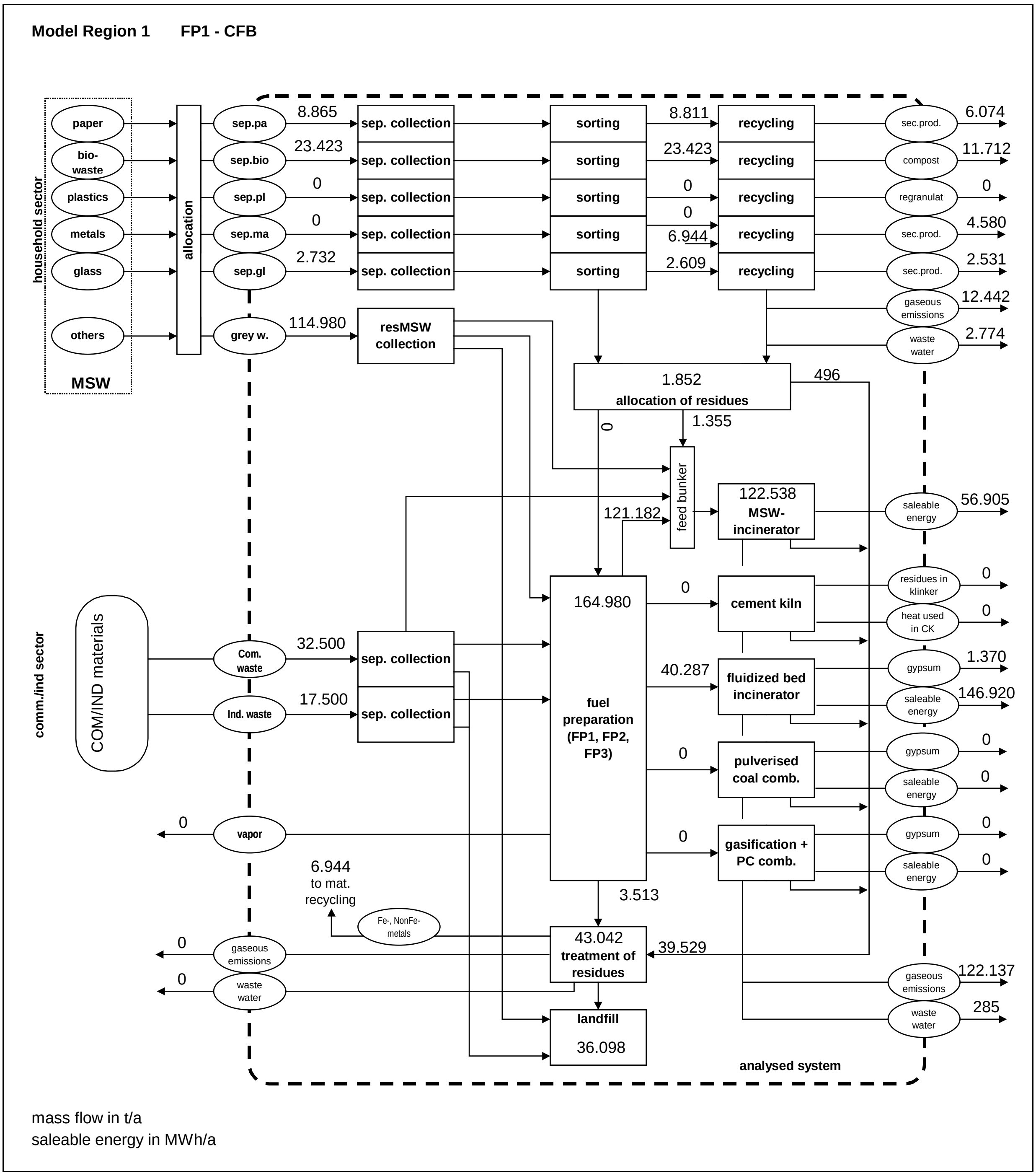
mass flow in t/a
saleable energy in MWh/a


Model Region 1 I - mix
household sector
paper
bio-waste
plastics
metals
glass
others
MSW
allocation
sep.pa
sep.bio
sep.pl
sep.ma
sep.gl
grey w.
8.865
23.423
0
0
2.732
114.980
sep. collection
sep. collection
sep. collection
sep. collection
sep. collection
resMSW collection
sorting
sorting
sorting
sorting
sorting
8.811
23.423
0
0
4.657
2.609
recycling
recycling
recycling
recycling
recycling
sec.prod.
compost
regranulat
sec.prod.
sec.prod.
gaseous emissions
waste water
6.074
11.712
0
4.238
2.531
10.608
2.774
1.741
allocation of residues
393
0
1.348
feed bunker
0
166.328
MSW-incinerator
saleable energy
97.362
comm./ind sector
COM/IND materials
Com. waste
Ind. waste
32.500
17.500
sep. collection
sep. collection
0
fuel preparation (FP1, FP2, FP3)
0
cement kiln
residues in klinker
0
heat used in CK
0
0
fluidized bed incinerator
gypsum
0
saleable energy
0
0
pulverised coal comb.
gypsum
0
saleable energy
0
0
vapor
0
gasification + PC comb.
gypsum
0
saleable energy
0
4.657
to mat. recycling
Fe-, NonFe-metals
0
0
gaseous emissions
0
waste water
47.797
treatment of residues
47.797
gaseous emissions
118.592
waste water
333
landfill
43.140
analysed system
mass flow in t/a
saleable energy in MWh/a

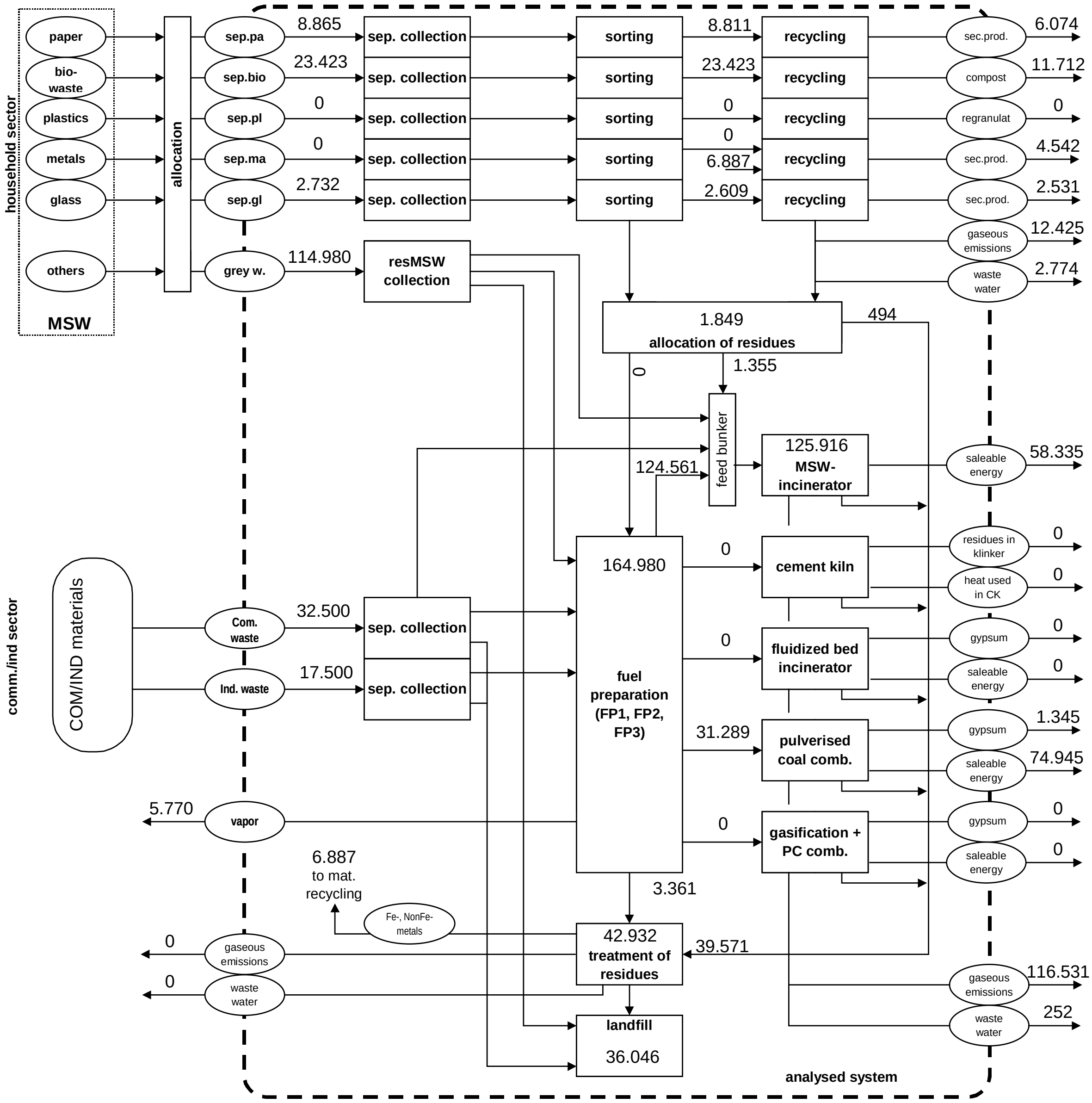
Model Region 1 FP1 - CK



mass flow in t/a
saleable energy in MWh/a

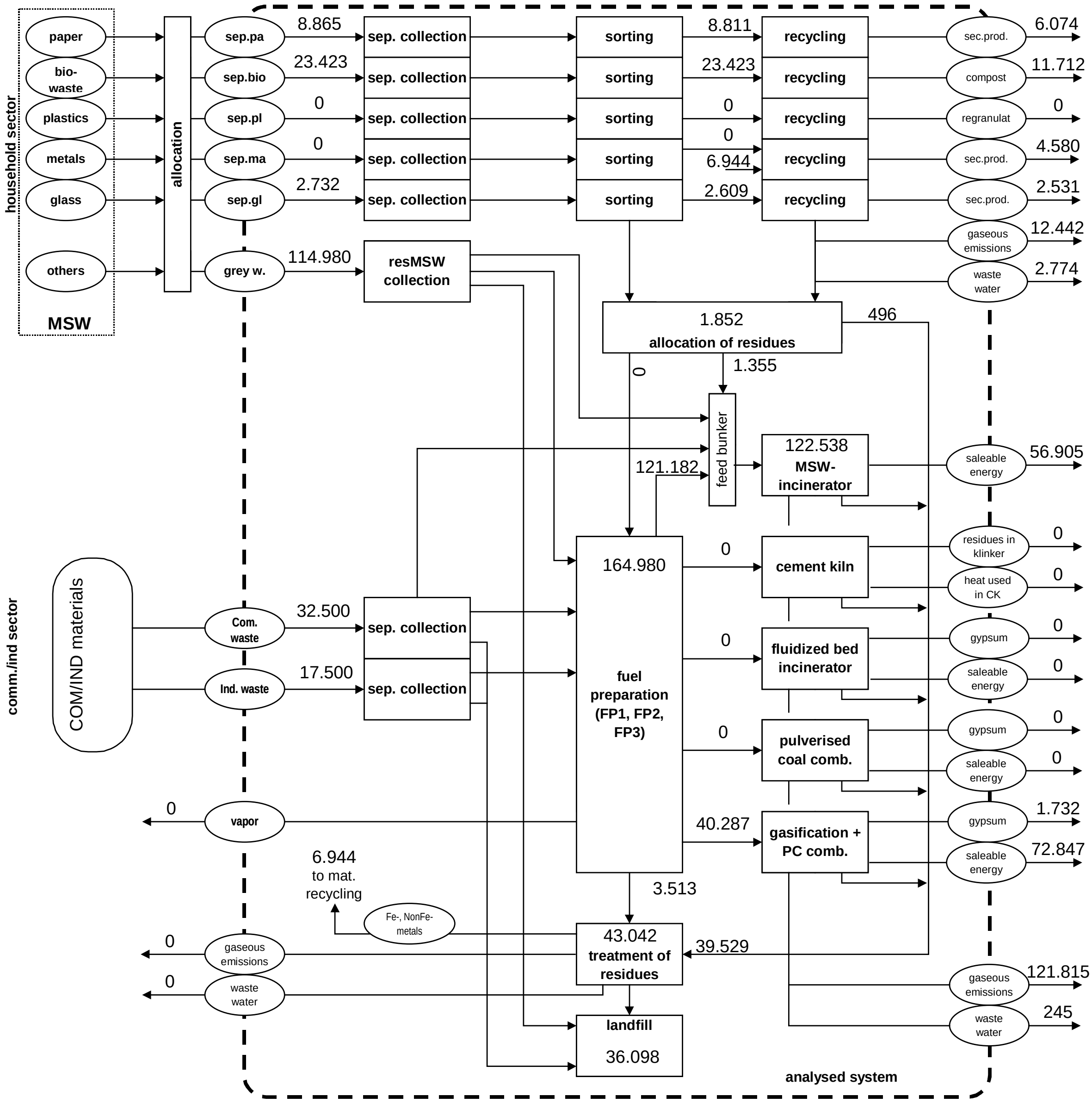

Model Region 1 FP1 - CFB
household sector
paper
bio-waste
plastics
metals
glass
others
MSW
allocation
sep.pa
sep.bio
sep.pl
sep.ma
sep.gl
grey w.
8.865
23.423
0
0
2.732
114.980
sep. collection
sep. collection
sep. collection
sep. collection
sep. collection
resMSW collection
sorting
sorting
sorting
sorting
sorting
8.811
23.423
0
0
6.944
2.609
recycling
recycling
recycling
recycling
recycling
sec.prod.
compost
regranulat
sec.prod.
sec.prod.
gaseous emissions
waste water
6.074
11.712
0
4.580
2.531
12.442
2.774
1.852
allocation of residues
496
0
1.355
feed bunker
121.182
122.538
MSW-incinerator
saleable energy
56.905
164.980
0
cement kiln
residues in klinker
0
heat used in CK
0
comm./ind sector
COM/IND materials
Com. waste
Ind. waste
32.500
17.500
sep. collection
sep. collection
fuel preparation (FP1, FP2, FP3)
40.287
fluidized bed incinerator
gypsum
1.370
saleable energy
146.920
0
pulverised coal comb.
gypsum
0
saleable energy
0
0
vapor
0
gasification + PC comb.
gypsum
0
saleable energy
0
6.944
to mat. recycling
Fe-, NonFe-metals
3.513
43.042
treatment of residues
39.529
0
gaseous emissions
0
waste water
gaseous emissions
122.137
waste water
285
landfill
36.098
analysed system
mass flow in t/a
saleable energy in MWh/a

Model Region 1 FP1 - PC

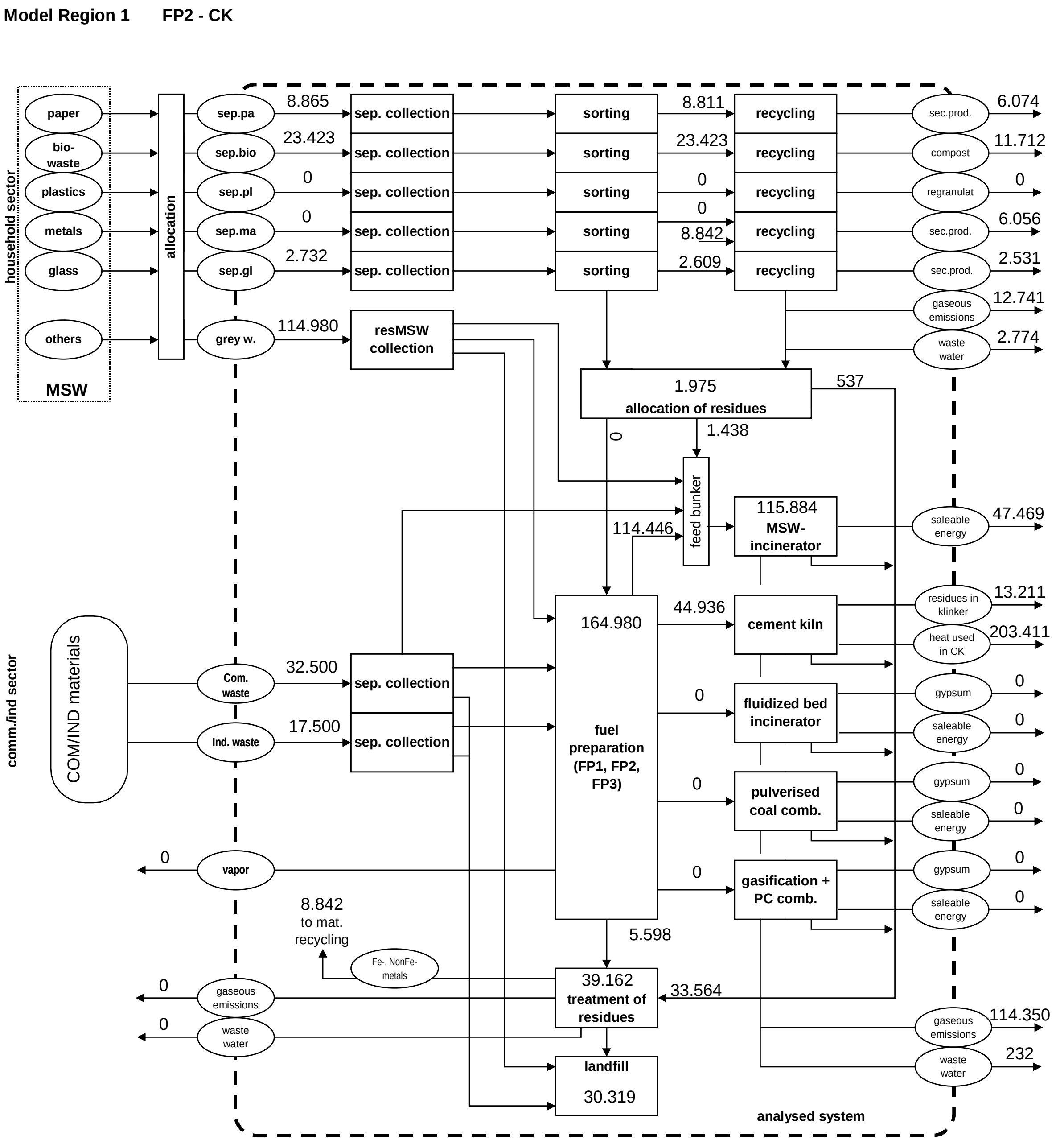


mass flow in t/a
saleable energy in MWh/a

Model Region 1 FP1 - gasPC

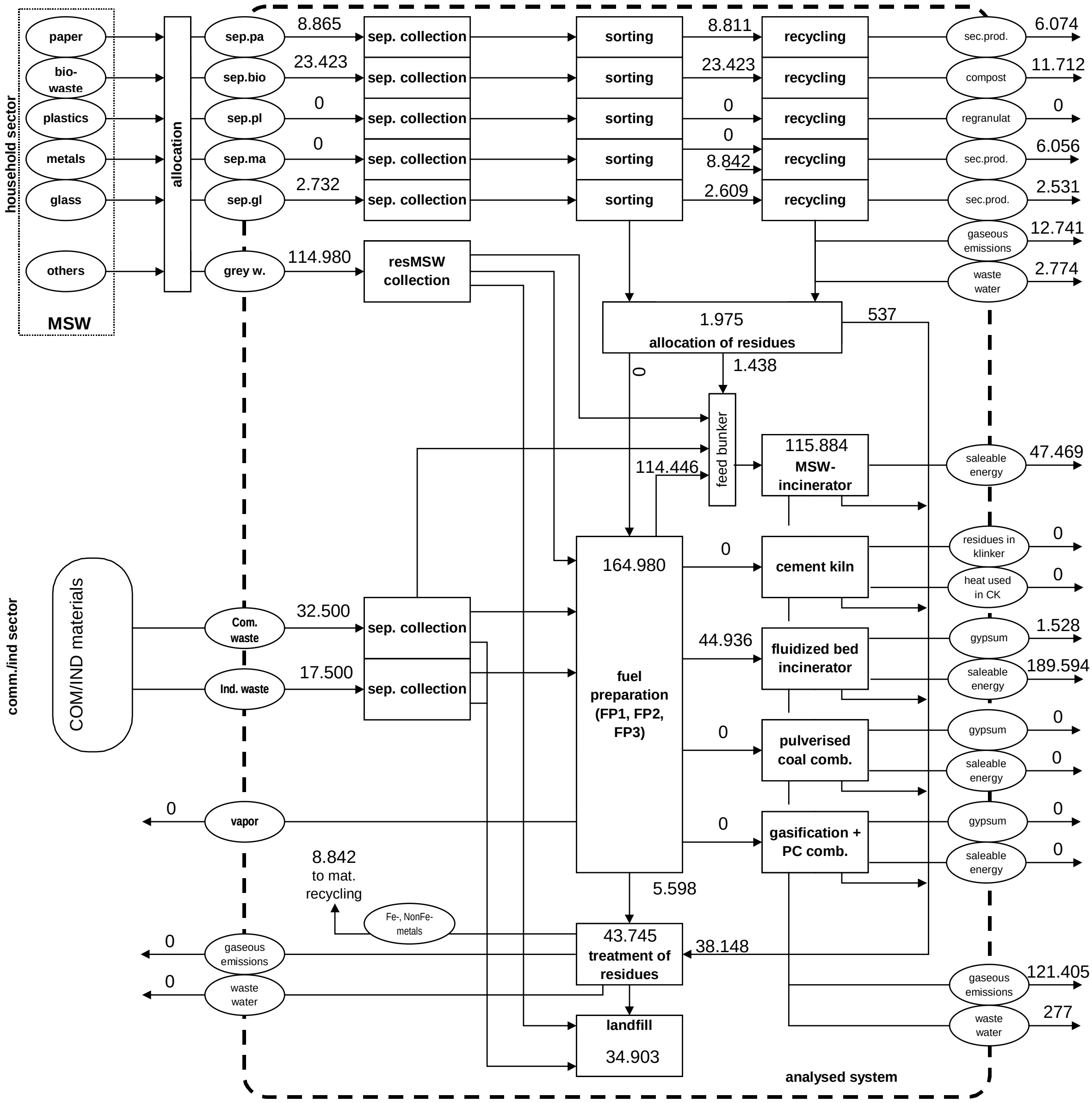


mass flow in t/a
saleable energy in MWh/a



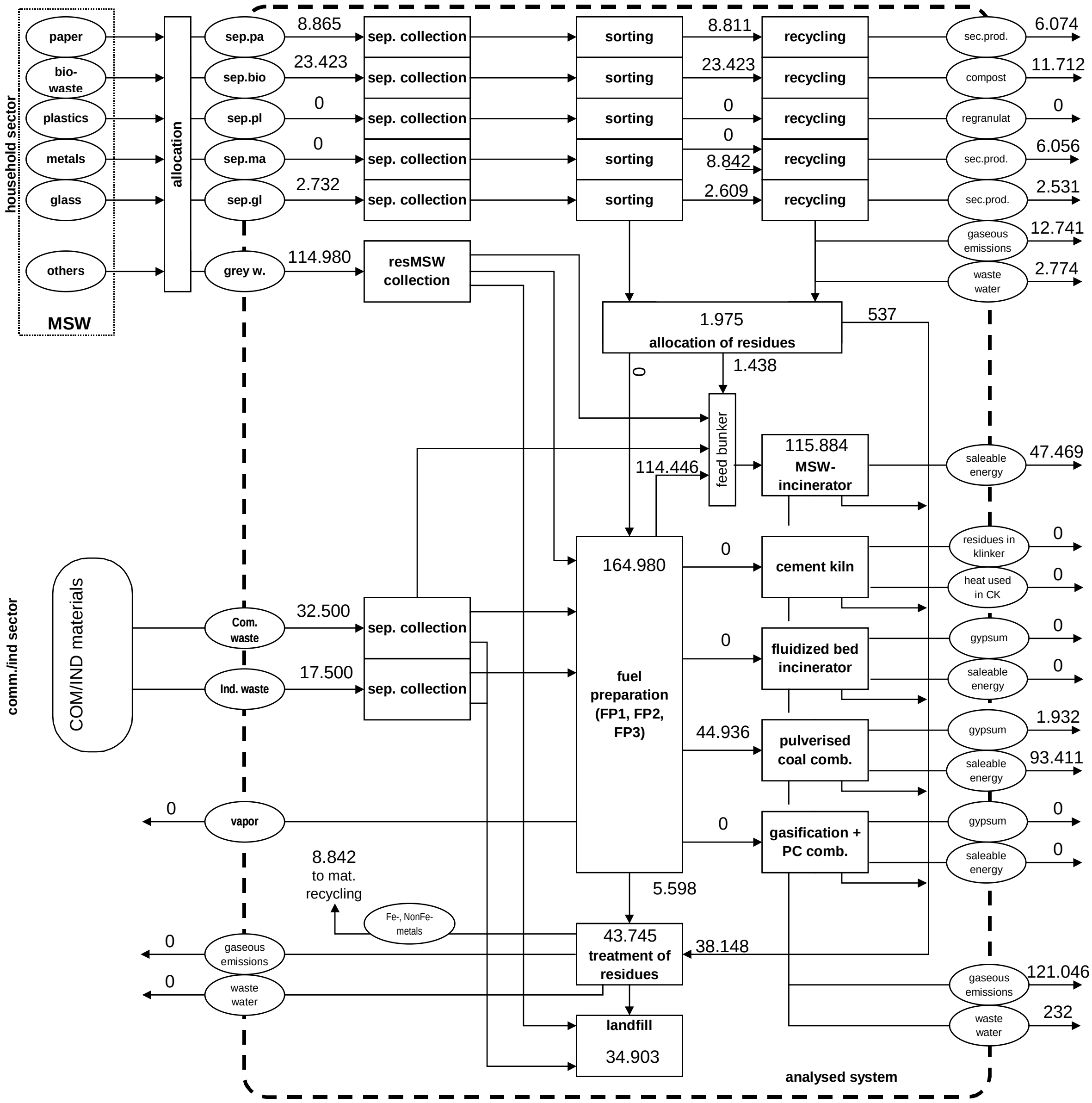
mass flow in t/a
saleable energy in MWh/a

Model Region 1 FP2 - CFB

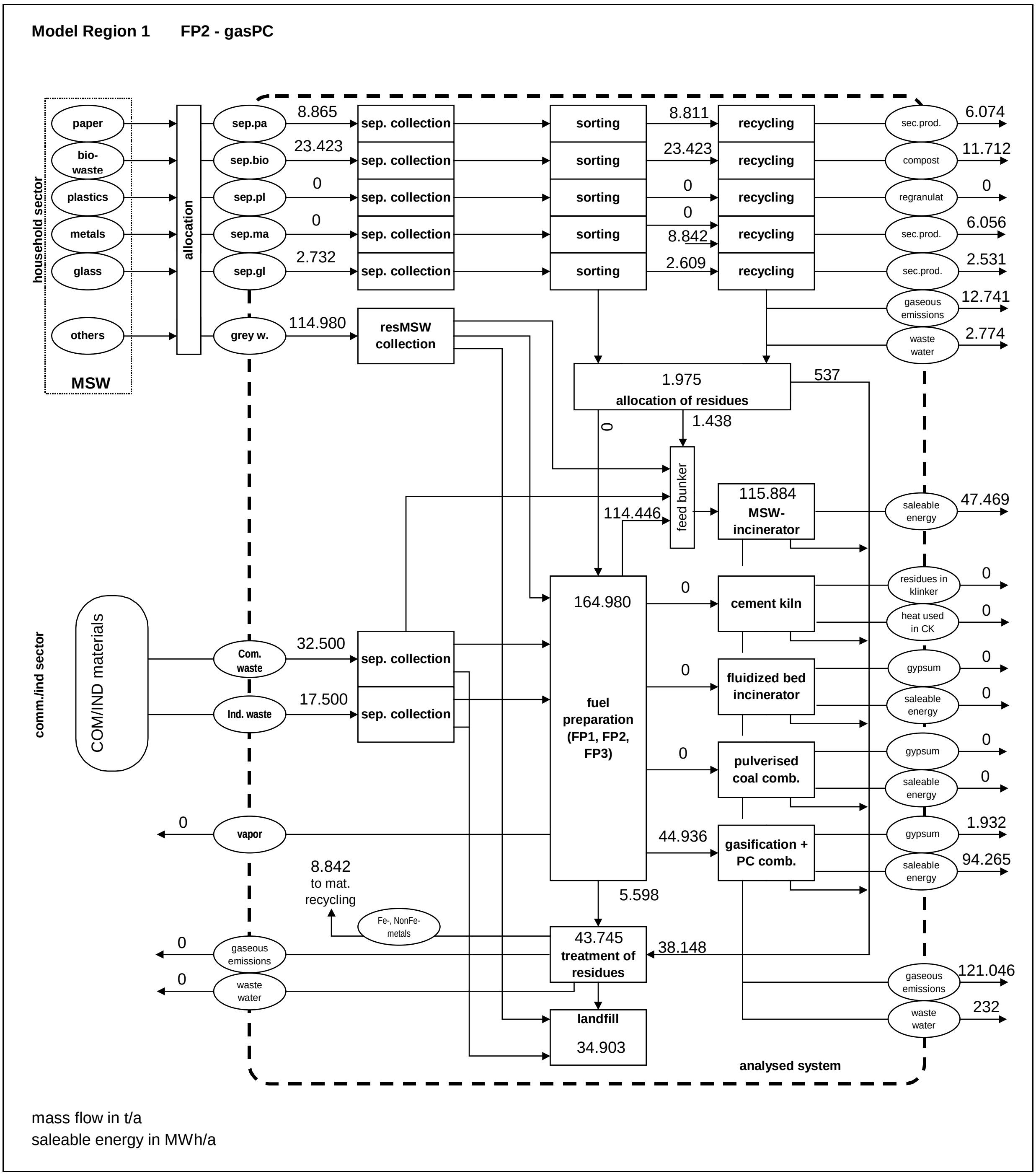


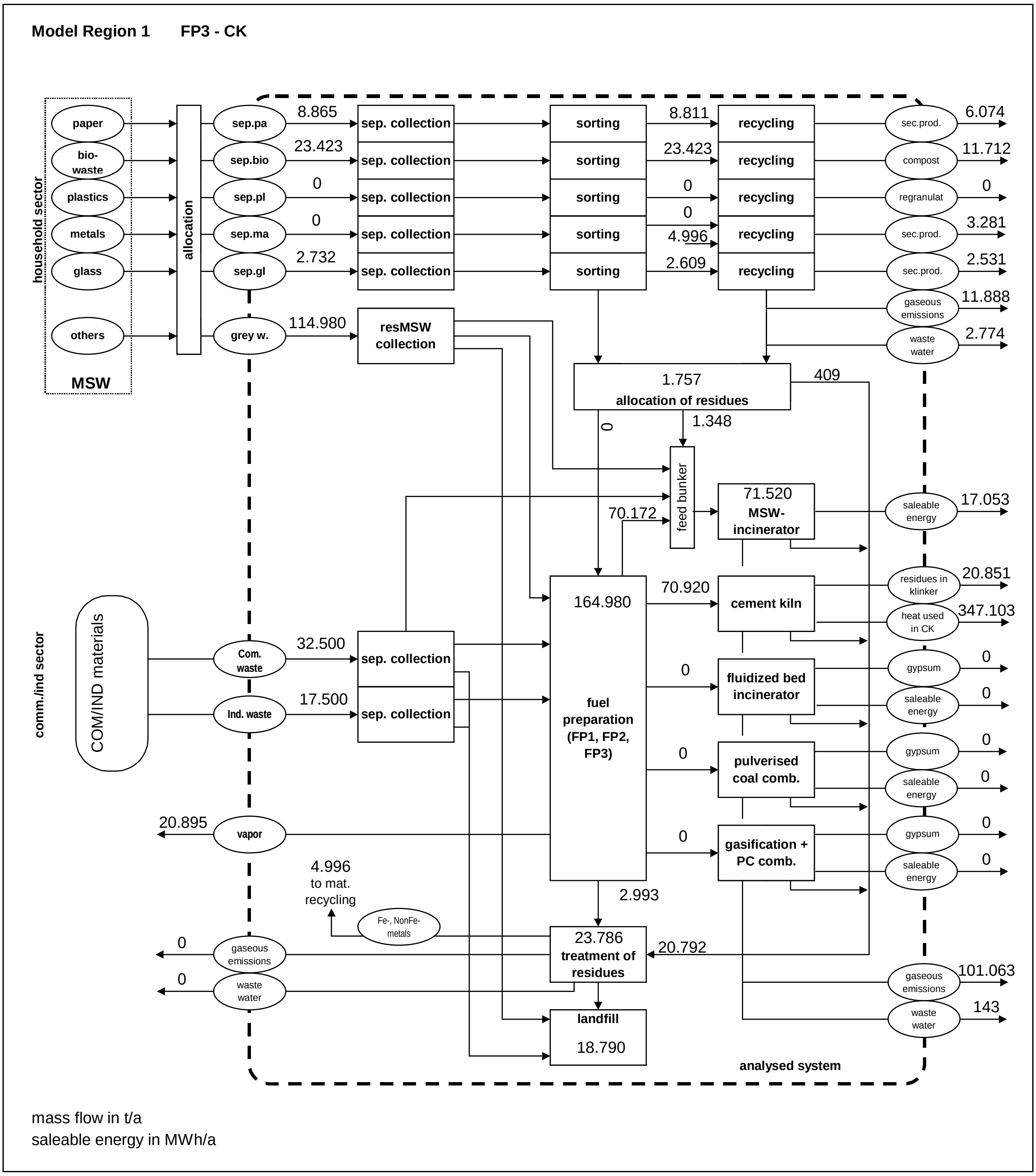
mass flow in t/a
saleable energy in MWh/a

Model Region 1 FP2 - PC



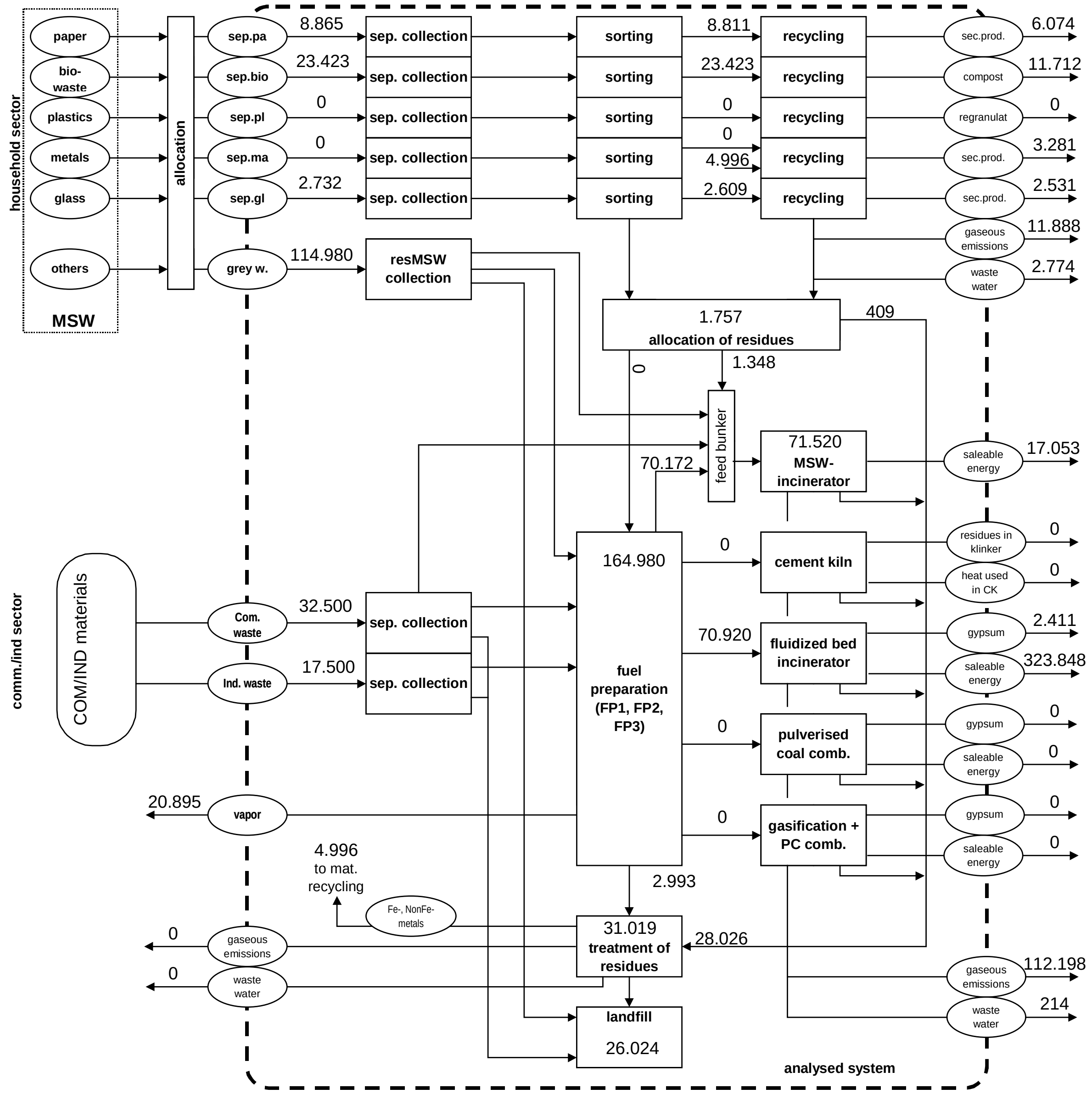
mass flow in t/a
saleable energy in MWh/a


Model Region 1 FP2 - gasPC
household sector
paper
bio-waste
plastics
metals
glass
others
MSW
allocation
sep.pa
sep.bio
sep.pl
sep.ma
sep.gl
grey w.
8.865
23.423
0
0
2.732
114.980
sep. collection
resMSW collection
sorting
8.811
23.423
0
0
8.842
2.609
recycling
sec.prod.
compost
regranulat
sec.prod.
sec.prod.
gaseous emissions
waste water
6.074
11.712
0
6.056
2.531
12.741
2.774
1.975
allocation of residues
537
0
1.438
feed bunker
114.446
115.884
MSW-incinerator
saleable energy
47.469
164.980
fuel preparation (FP1, FP2, FP3)
0
cement kiln
residues in klinker
0
heat used in CK
0
comm./ind sector
COM/IND materials
Com. waste
32.500
Ind. waste
17.500
fluidized bed incinerator
0
gypsum
0
saleable energy
0
pulverised coal comb.
0
gypsum
0
saleable energy
0
vapor
0
44.936
gasification + PC comb.
gypsum
1.932
saleable energy
94.265
8.842
to mat. recycling
Fe-, NonFe-metals
5.598
43.745
treatment of residues
38.148
gaseous emissions
0
waste water
0
gaseous emissions
121.046
waste water
232
landfill
34.903
analysed system
mass flow in t/a
saleable energy in MWh/a

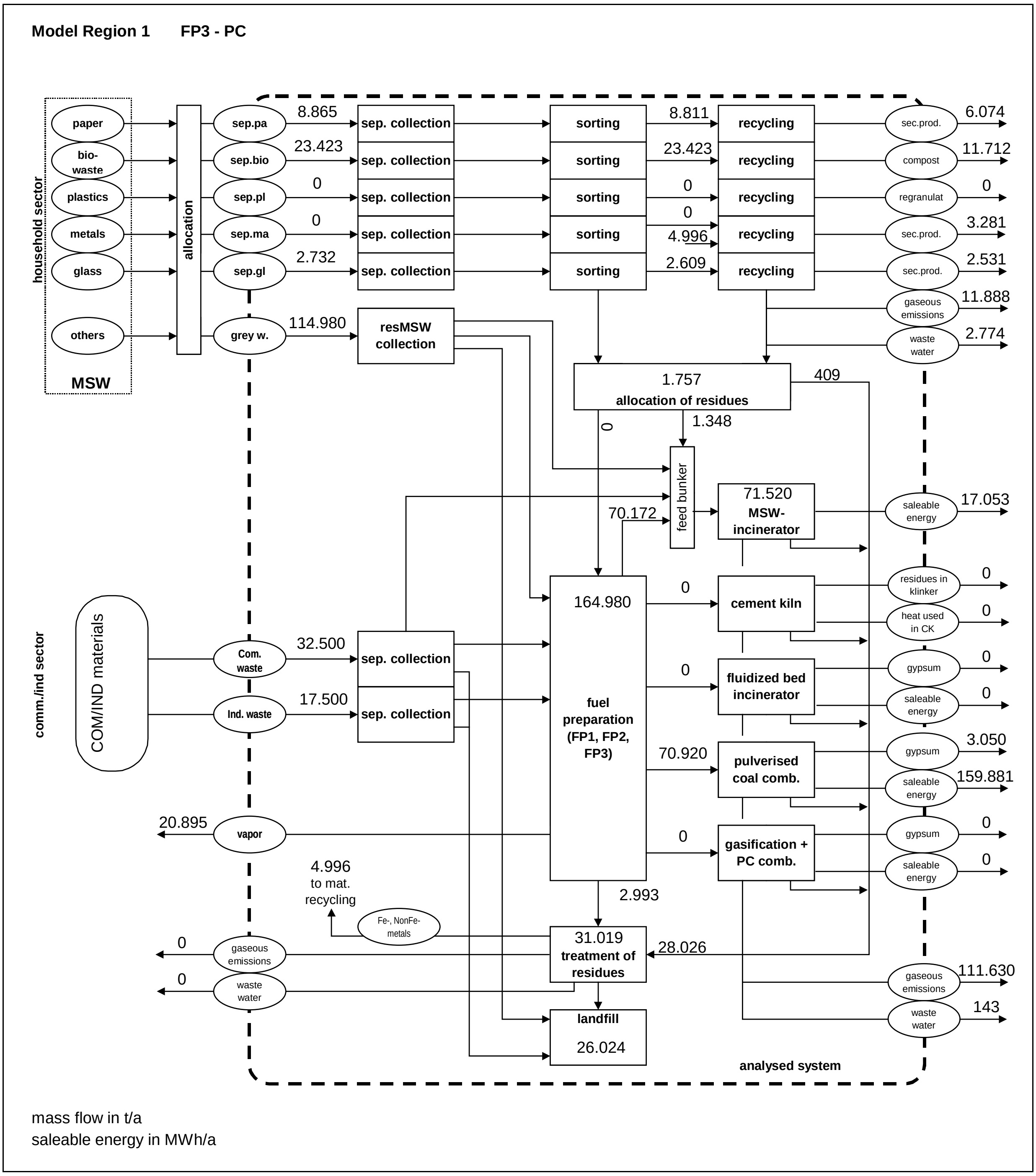


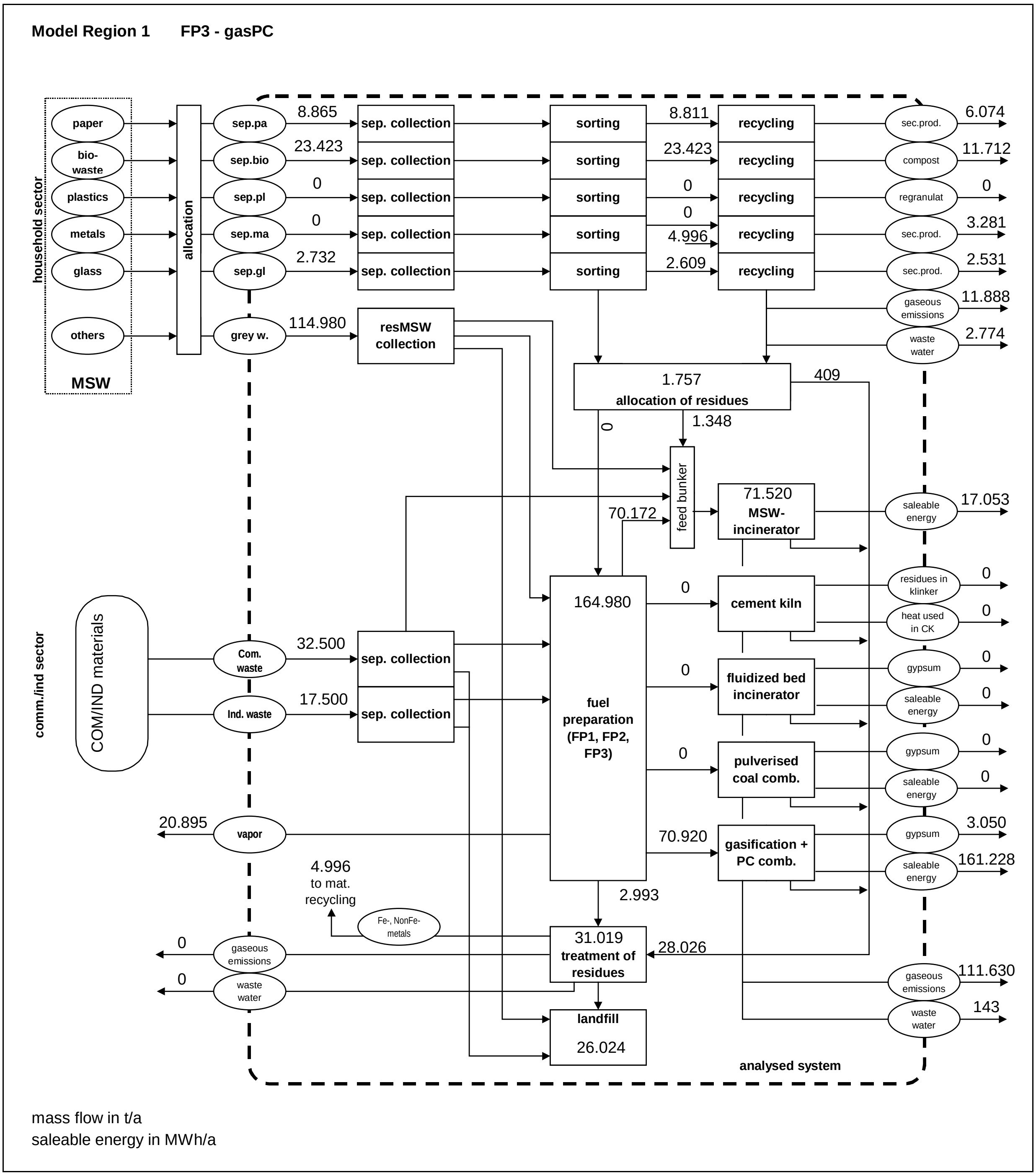
Model Region 1 FP3 - CK
household sector
paper
bio-waste
plastics
metals
glass
others
MSW
allocation
sep.pa
sep.bio
sep.pl
sep.ma
sep.gl
grey w.
8.865
23.423
0
0
2.732
114.980
sep. collection
resMSW collection
sorting
8.811
23.423
0
0
4.996
2.609
recycling
sec.prod.
compost
regranulat
sec.prod.
sec.prod.
gaseous emissions
waste water
6.074
11.712
0
3.281
2.531
11.888
2.774
1.757
allocation of residues
409
0
1.348
feed bunker
70.172
71.520
MSW-incinerator
saleable energy
17.053
164.980
70.920
cement kiln
residues in klinker
20.851
heat used in CK
347.103
fluidized bed incinerator
gypsum
saleable energy
pulverised coal comb.
gasification + PC comb.
comm./ind sector
COM/IND materials
Com. waste
Ind. waste
32.500
17.500
fuel preparation (FP1, FP2, FP3)
20.895
vapor
4.996
to mat. recycling
Fe-, NonFe-metals
2.993
23.786
treatment of residues
20.792
gaseous emissions
waste water
101.063
143
landfill
18.790
analysed system
mass flow in t/a
saleable energy in MWh/a

Model Region 1 FP3 - CFB



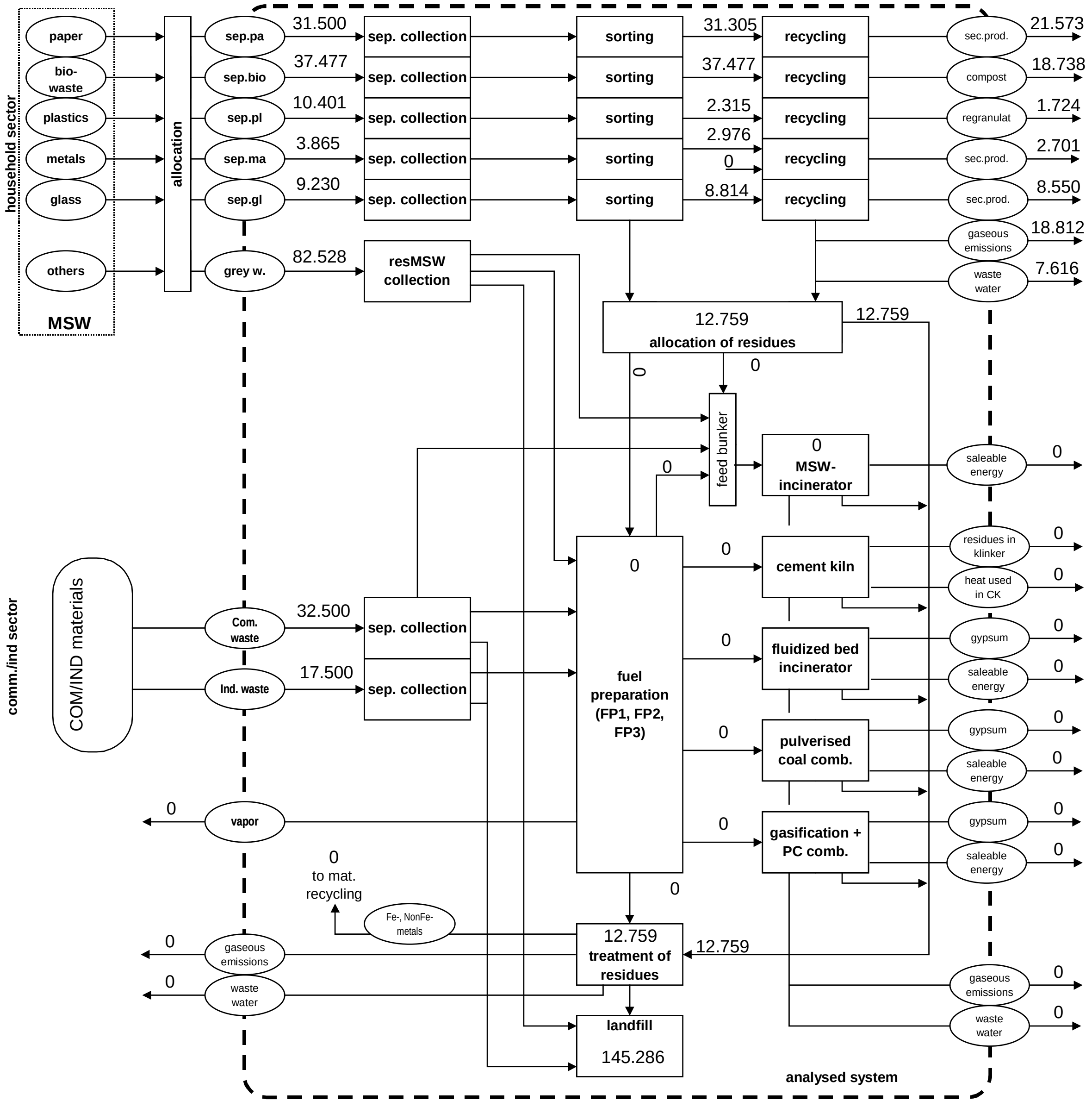
mass flow in t/a
saleable energy in MWh/a


Model Region 1 FP3 - PC
household sector
paper
bio-waste
plastics
metals
glass
others
MSW
allocation
sep.pa
sep.bio
sep.pl
sep.ma
sep.gl
grey w.
8.865
23.423
0
0
2.732
114.980
sep. collection
resMSW collection
sorting
8.811
23.423
0
0
4.996
2.609
recycling
sec.prod.
compost
regranulat
sec.prod.
sec.prod.
gaseous emissions
waste water
6.074
11.712
0
3.281
2.531
11.888
2.774
1.757
allocation of residues
409
0
1.348
feed bunker
70.172
71.520
MSW-incinerator
saleable energy
17.053
164.980
0
cement kiln
residues in klinker
heat used in CK
0
0
comm./ind sector
COM/IND materials
Com. waste
Ind. waste
32.500
17.500
fuel preparation (FP1, FP2, FP3)
0
fluidized bed incinerator
gypsum
0
saleable energy
0
70.920
pulverised coal comb.
gypsum
3.050
saleable energy
159.881
0
gasification + PC comb.
gypsum
0
saleable energy
0
20.895
vapor
4.996
to mat. recycling
Fe-, NonFe-metals
2.993
31.019
treatment of residues
28.026
0
gaseous emissions
0
waste water
gaseous emissions
111.630
waste water
143
landfill
26.024
analysed system
mass flow in t/a
saleable energy in MWh/a

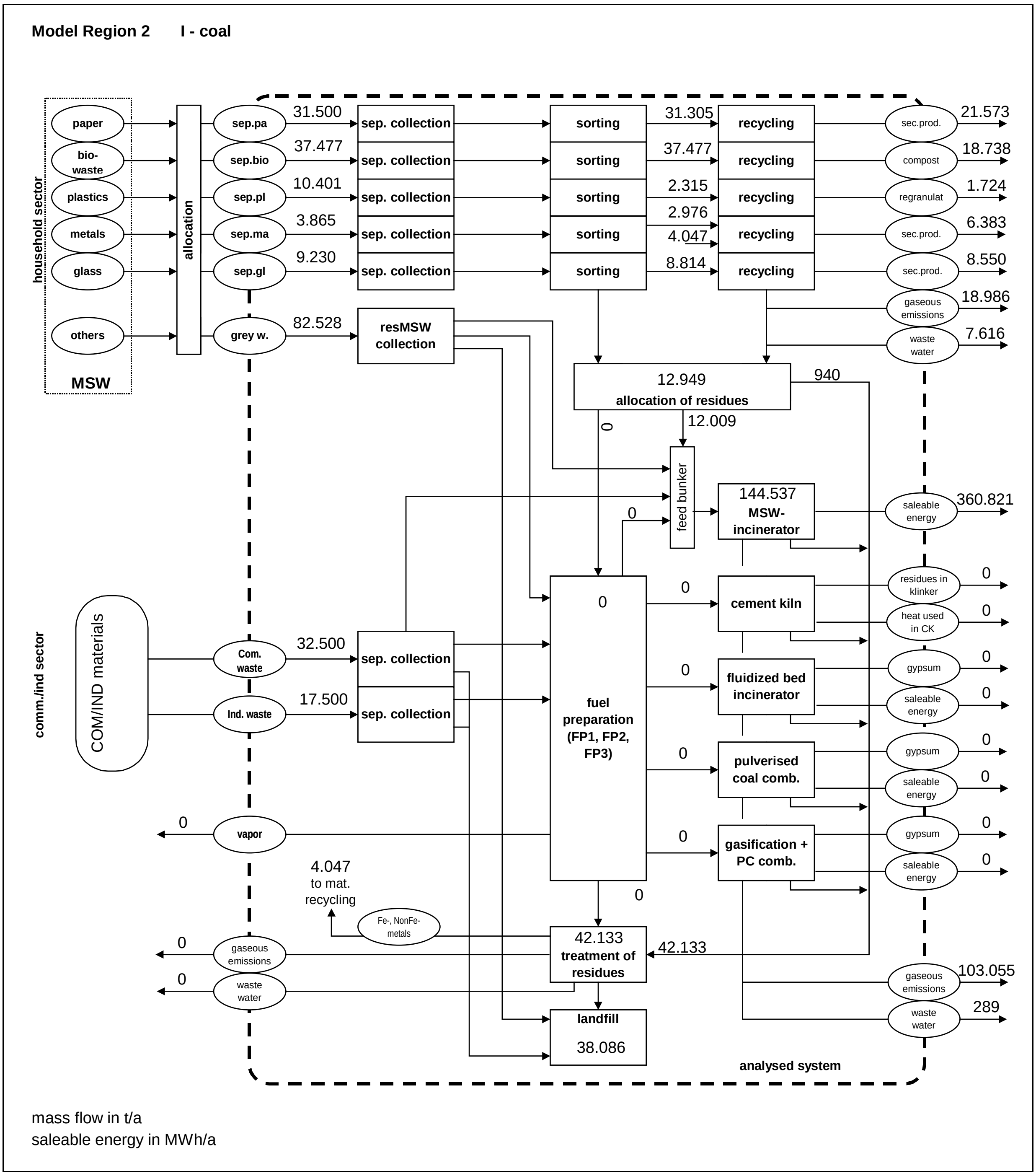

Model Region 1 FP3 - gasPC
household sector
paper
bio-waste
plastics
metals
glass
others
MSW
allocation
sep.pa
sep.bio
sep.pl
sep.ma
sep.gl
grey w.
8.865
23.423
0
0
2.732
114.980
sep. collection
resMSW collection
sorting
8.811
23.423
0
0
4.996
2.609
recycling
sec.prod.
compost
regranulat
sec.prod.
sec.prod.
gaseous emissions
waste water
6.074
11.712
0
3.281
2.531
11.888
2.774
1.757
allocation of residues
409
0
1.348
feed bunker
70.172
71.520
MSW-incinerator
saleable energy
17.053
residues in klinker
0
heat used in CK
0
164.980
cement kiln
fuel preparation (FP1, FP2, FP3)
fluidized bed incinerator
gypsum
saleable energy
pulverised coal comb.
gasification + PC comb.
70.920
3.050
161.228
comm./ind sector
COM/IND materials
Com. waste
Ind. waste
32.500
17.500
20.895
vapor
4.996
to mat. recycling
Fe-, NonFe-metals
2.993
31.019
treatment of residues
28.026
0
gaseous emissions
0
waste water
111.630
143
landfill
26.024
analysed system
mass flow in t/a
saleable energy in MWh/a

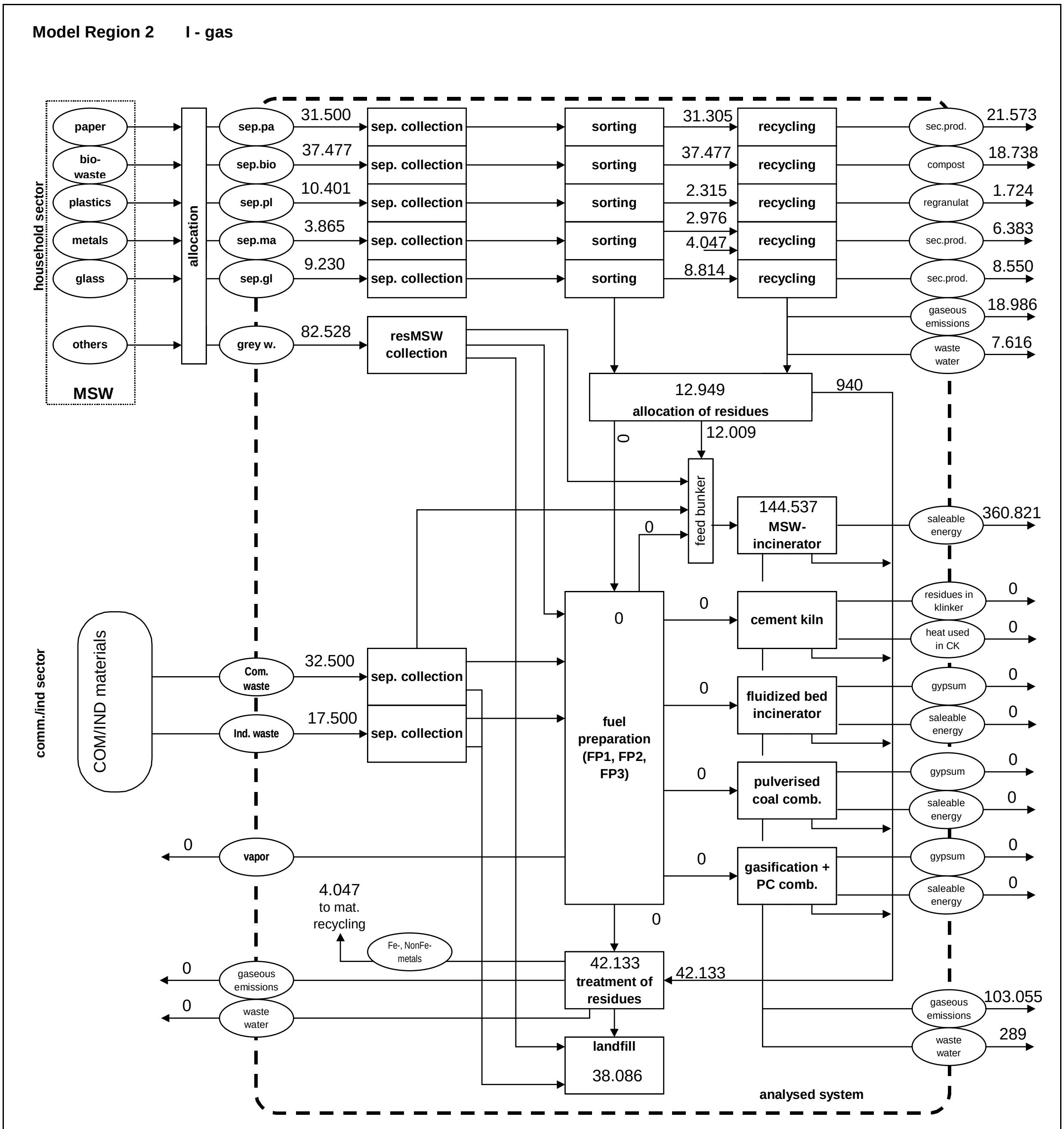
11.3.2 Model Region 2

Model Region 2 BS (baseline)



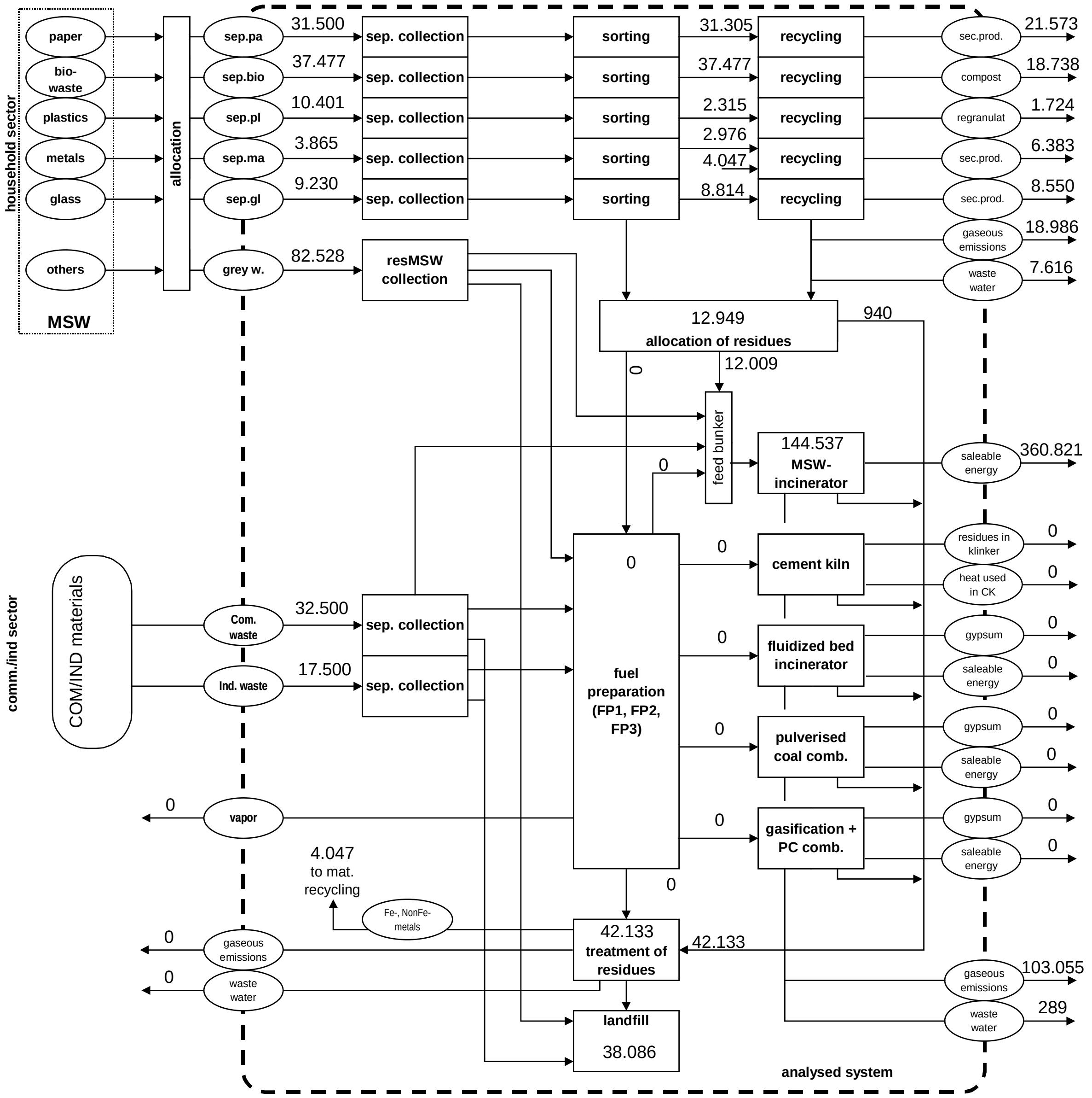
mass flow in t/a
saleable energy in MWh/a


Model Region 2 I - coal
household sector
paper
bio-waste
plastics
metals
glass
others
MSW
allocation
sep.pa
sep.bio
sep.pl
sep.ma
sep.gl
grey w.
31.500
37.477
10.401
3.865
9.230
82.528
sep. collection
resMSW collection
sorting
31.305
37.477
2.315
2.976
4.047
8.814
recycling
sec.prod. 21.573
compost 18.738
regranulat 1.724
sec.prod. 6.383
sec.prod. 8.550
gaseous emissions 18.986
waste water 7.616
12.949
allocation of residues
940
0
12.009
feed bunker
0
144.537
MSW-incinerator
saleable energy 360.821
residues in klinker 0
heat used in CK 0
cement kiln
fluidized bed incinerator
gypsum 0
saleable energy 0
pulverised coal comb.
gypsum 0
saleable energy 0
gasification + PC comb.
gypsum 0
saleable energy 0
fuel preparation (FP1, FP2, FP3)
comm./ind sector
COM/IND materials
Com. waste
Ind. waste
32.500
17.500
vapor
4.047 to mat. recycling
Fe-, NonFe-metals
42.133 treatment of residues
42.133
gaseous emissions
waste water
gaseous emissions 103.055
waste water 289
landfill 38.086
analysed system
mass flow in t/a
saleable energy in MWh/a

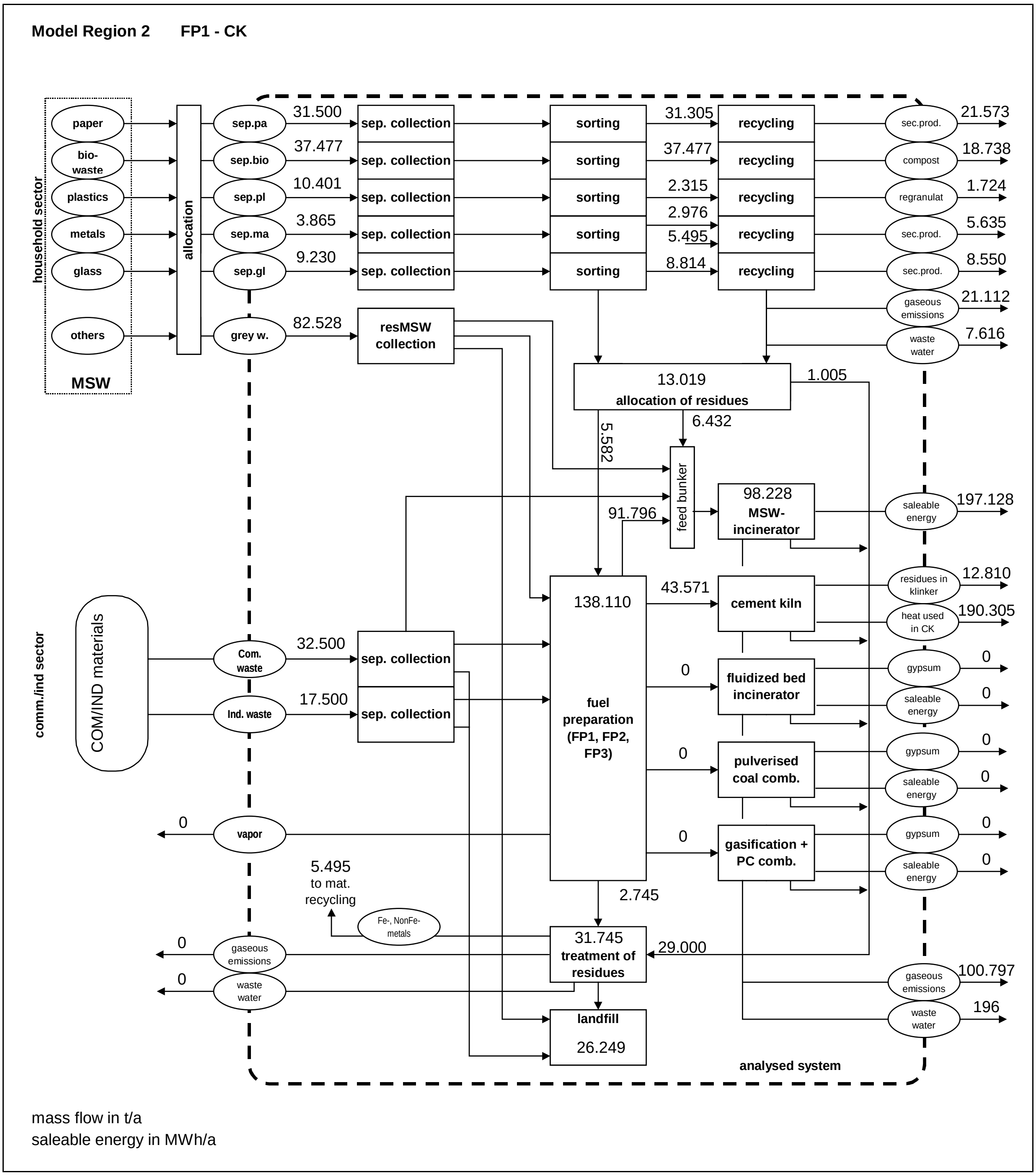


mass flow in t/a
saleable energy in MWh/a

Model Region 2 I - mix

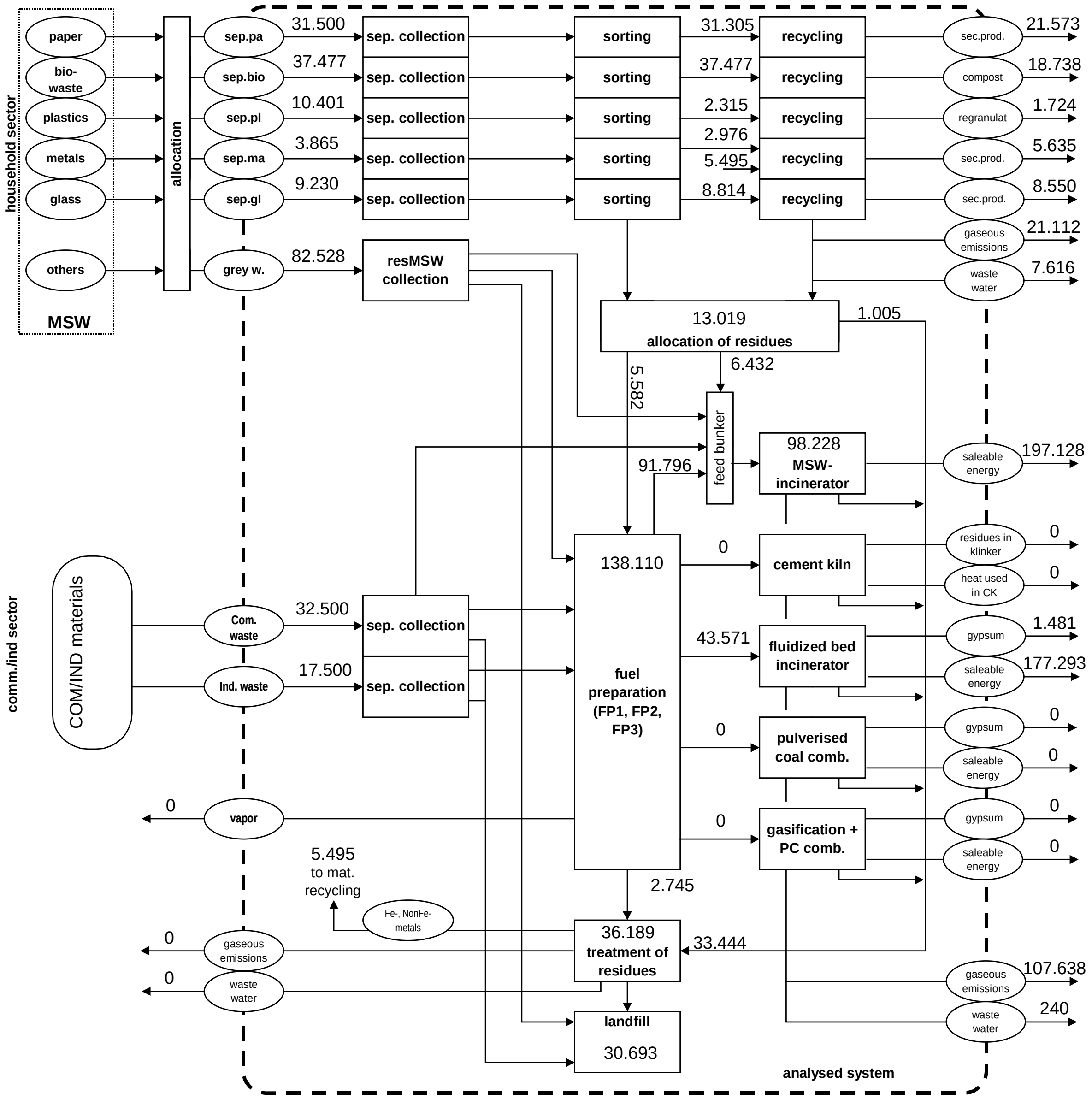


mass flow in t/a
saleable energy in MWh/a

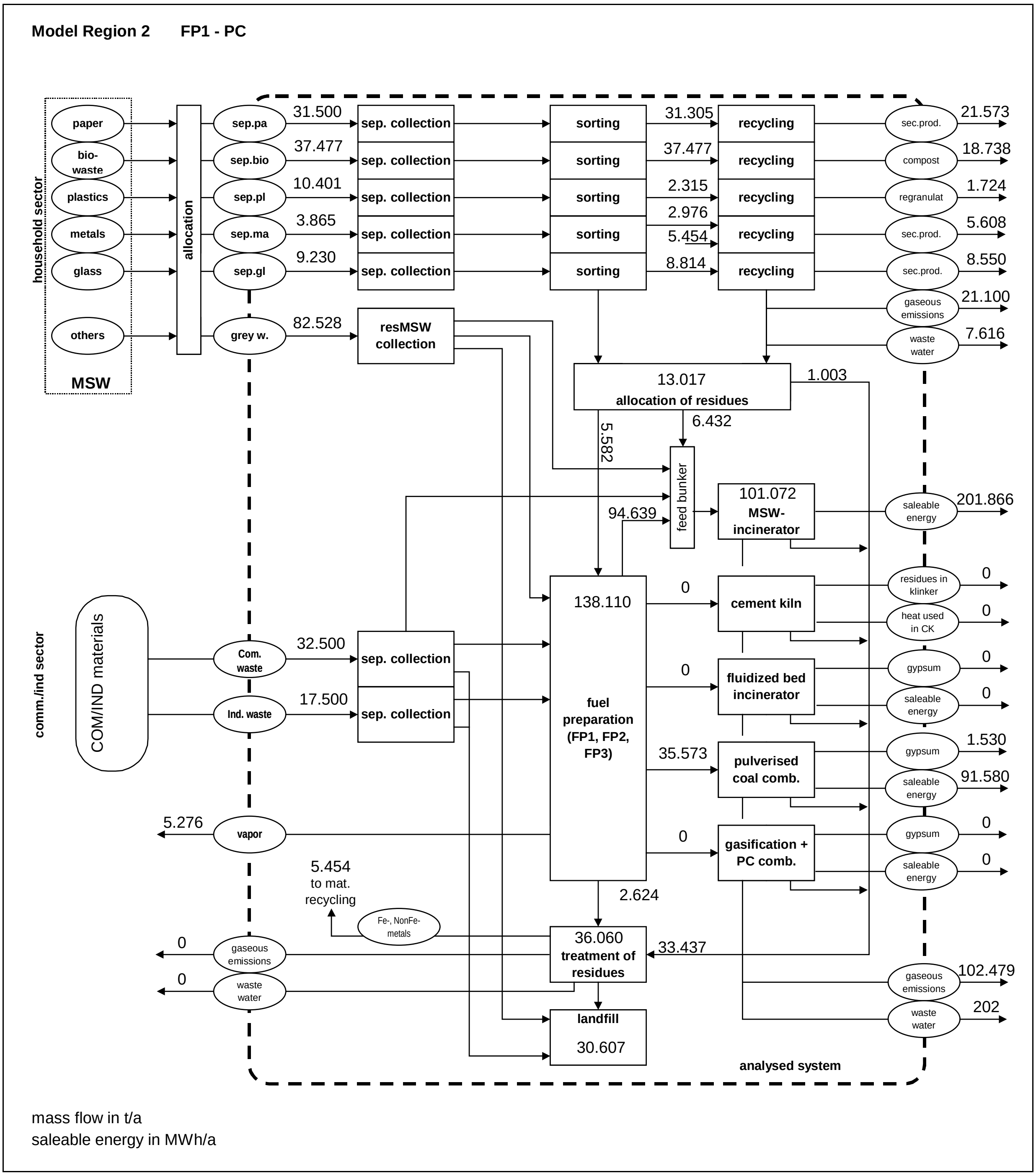


Model Region 2 FP1 - CK
household sector
paper
bio-waste
plastics
metals
glass
others
MSW
allocation
sep.pa
sep.bio
sep.pl
sep.ma
sep.gl
grey w.
31.500
37.477
10.401
3.865
9.230
82.528
sep. collection
resMSW collection
sorting
31.305
37.477
2.315
2.976
5.495
8.814
recycling
sec.prod.
compost
regranulat
gaseous emissions
waste water
21.573
18.738
1.724
5.635
8.550
21.112
7.616
13.019
allocation of residues
1.005
6.432
5.582
feed bunker
91.796
98.228
MSW-incinerator
saleable energy
197.128
comm./ind sector
COM/IND materials
Com. waste
Ind. waste
32.500
17.500
138.110
fuel preparation (FP1, FP2, FP3)
43.571
cement kiln
residues in klinker
12.810
heat used in CK
190.305
fluidized bed incinerator
gypsum
pulverised coal comb.
gasification + PC comb.
0
vapor
5.495
to mat. recycling
Fe-, NonFe-metals
2.745
31.745
treatment of residues
29.000
landfill
26.249
100.797
196
analysed system
mass flow in t/a
saleable energy in MWh/a

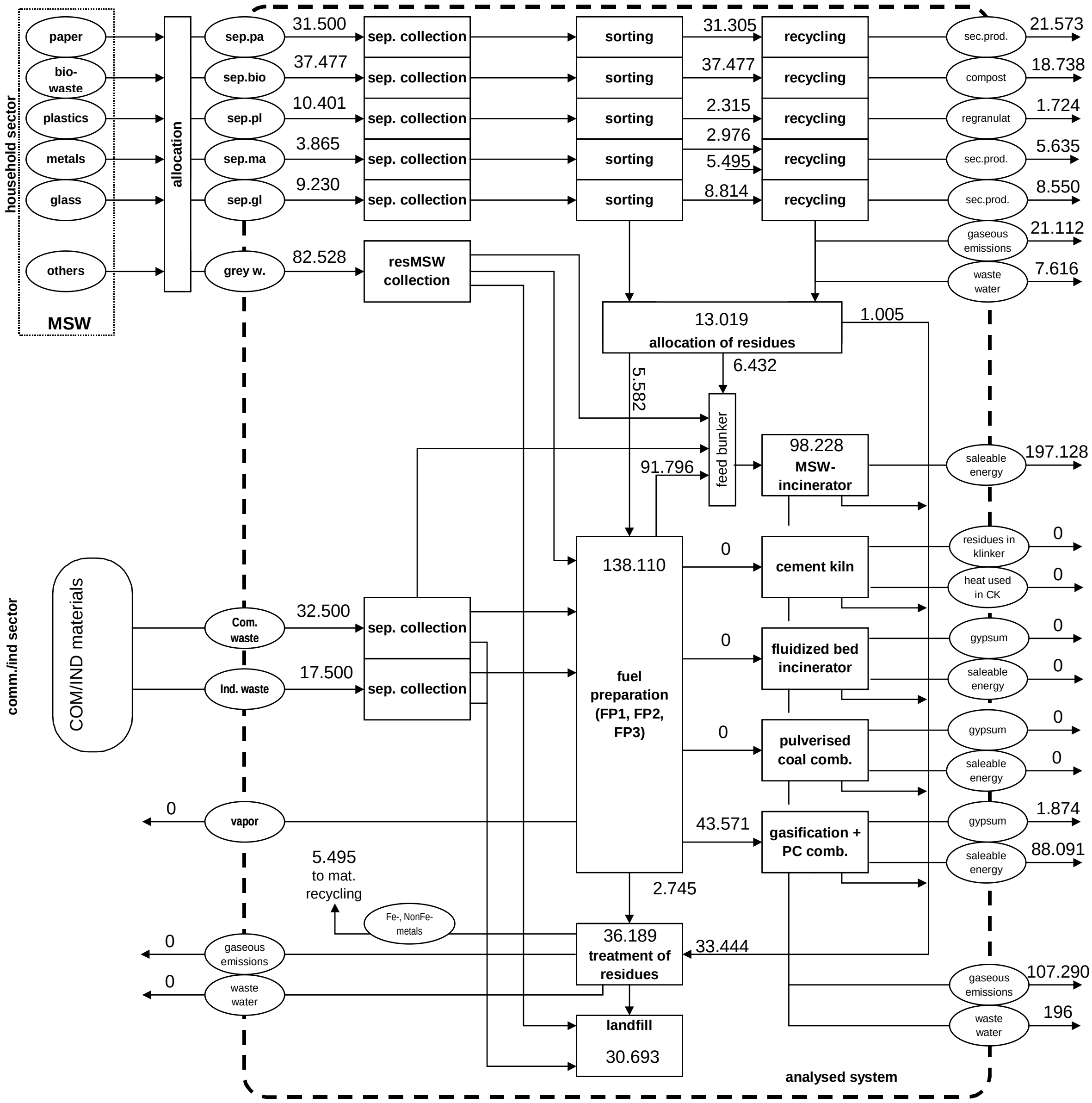
Model Region 2 FP1 - CFB



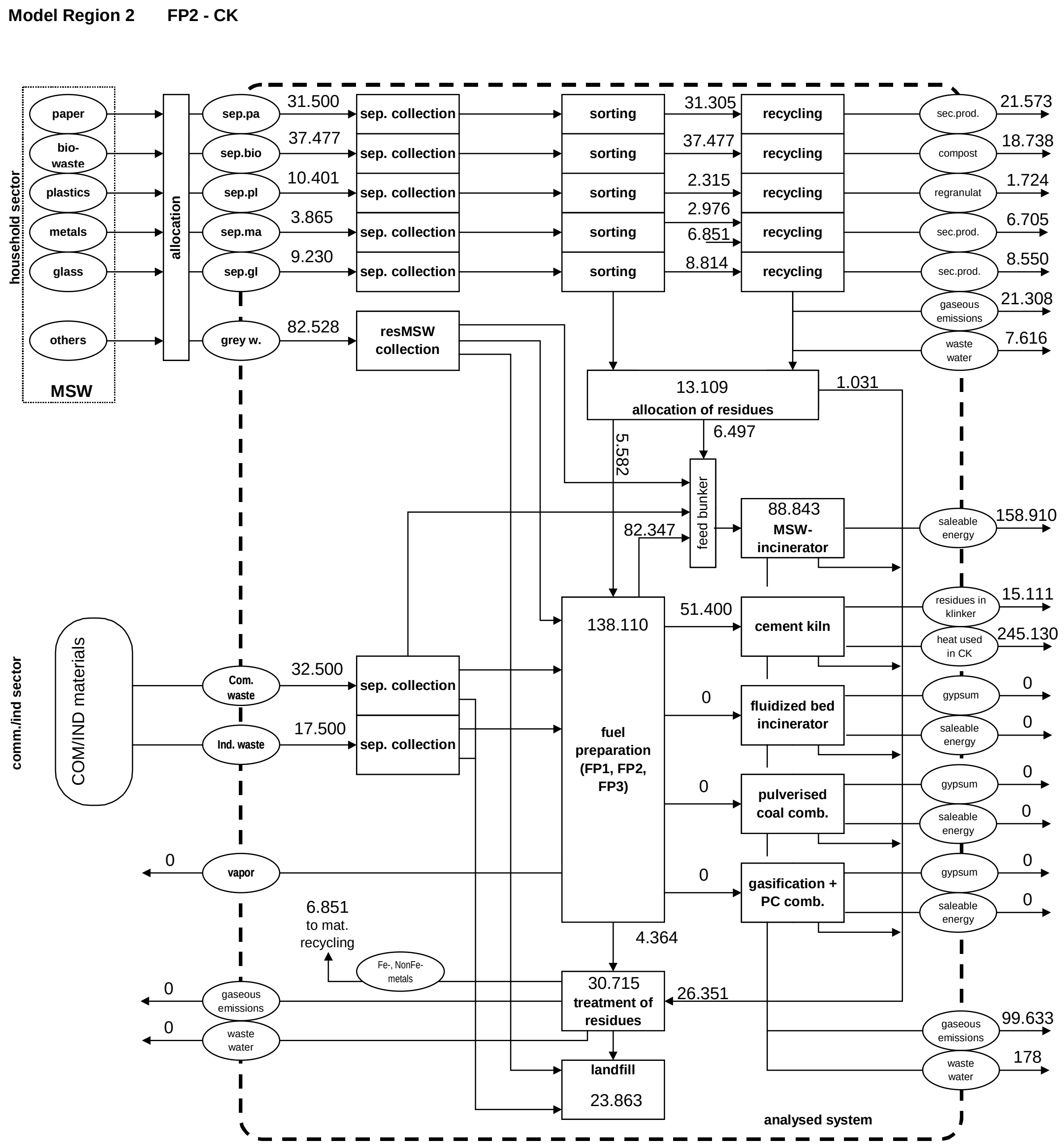
mass flow in t/a
saleable energy in MWh/a


Model Region 2 FP1 - PC
household sector
paper
bio-waste
plastics
metals
glass
others
MSW
allocation
sep.pa
sep.bio
sep.pl
sep.ma
sep.gl
grey w.
31.500
37.477
10.401
3.865
9.230
82.528
sep. collection
resMSW collection
sorting
31.305
37.477
2.315
2.976
5.454
8.814
recycling
sec.prod.
compost
regranulat
sec.prod.
sec.prod.
gaseous emissions
waste water
21.573
18.738
1.724
5.608
8.550
21.100
7.616
13.017
allocation of residues
1.003
6.432
5.582
feed bunker
94.639
101.072
MSW-incinerator
saleable energy
201.866
comm./ind sector
COM/IND materials
Com. waste
Ind. waste
32.500
17.500
138.110
fuel preparation (FP1, FP2, FP3)
0
cement kiln
residues in klinker
heat used in CK
0
0
0
fluidized bed incinerator
gypsum
saleable energy
0
0
35.573
pulverised coal comb.
gypsum
saleable energy
1.530
91.580
0
gasification + PC comb.
gypsum
saleable energy
0
0
5.276
vapor
5.454
to mat. recycling
Fe-, NonFe-metals
2.624
36.060
treatment of residues
33.437
0
gaseous emissions
0
waste water
landfill
30.607
gaseous emissions
waste water
102.479
202
analysed system
mass flow in t/a
saleable energy in MWh/a

Model Region 2 FP1 - gasPC

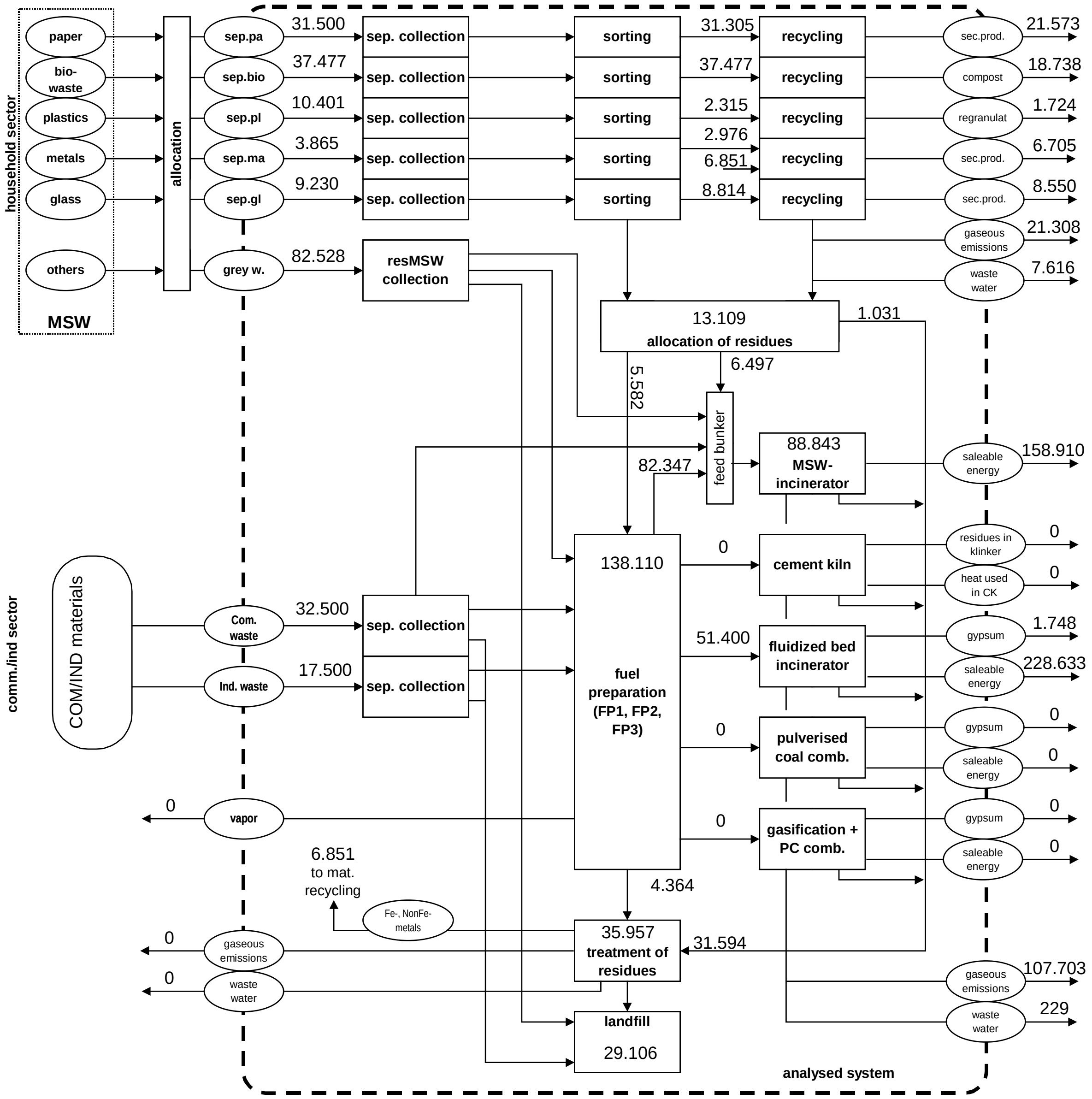


mass flow in t/a
saleable energy in MWh/a



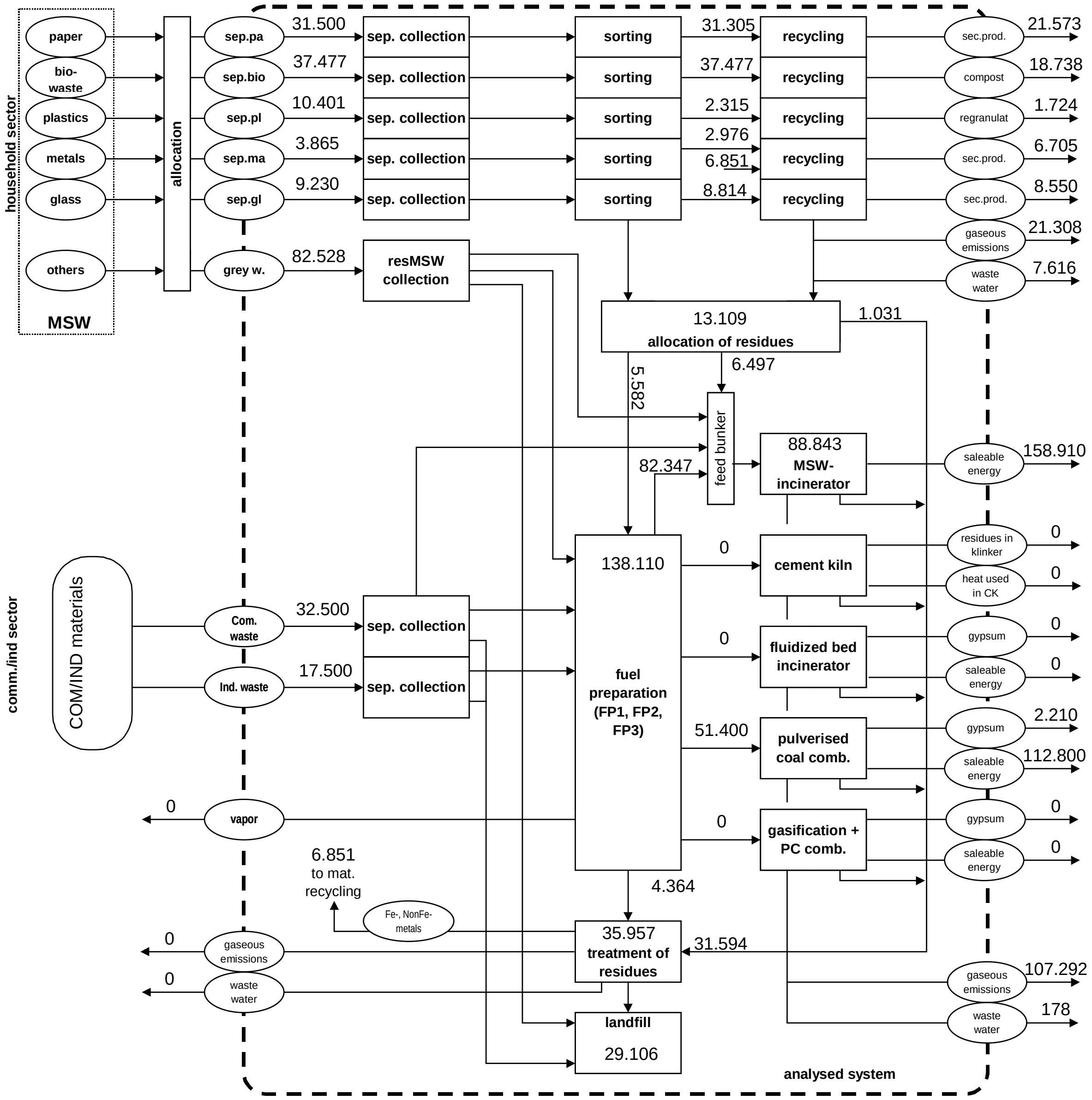
mass flow in t/a
saleable energy in MWh/a

Model Region 2 FP2 - CFB

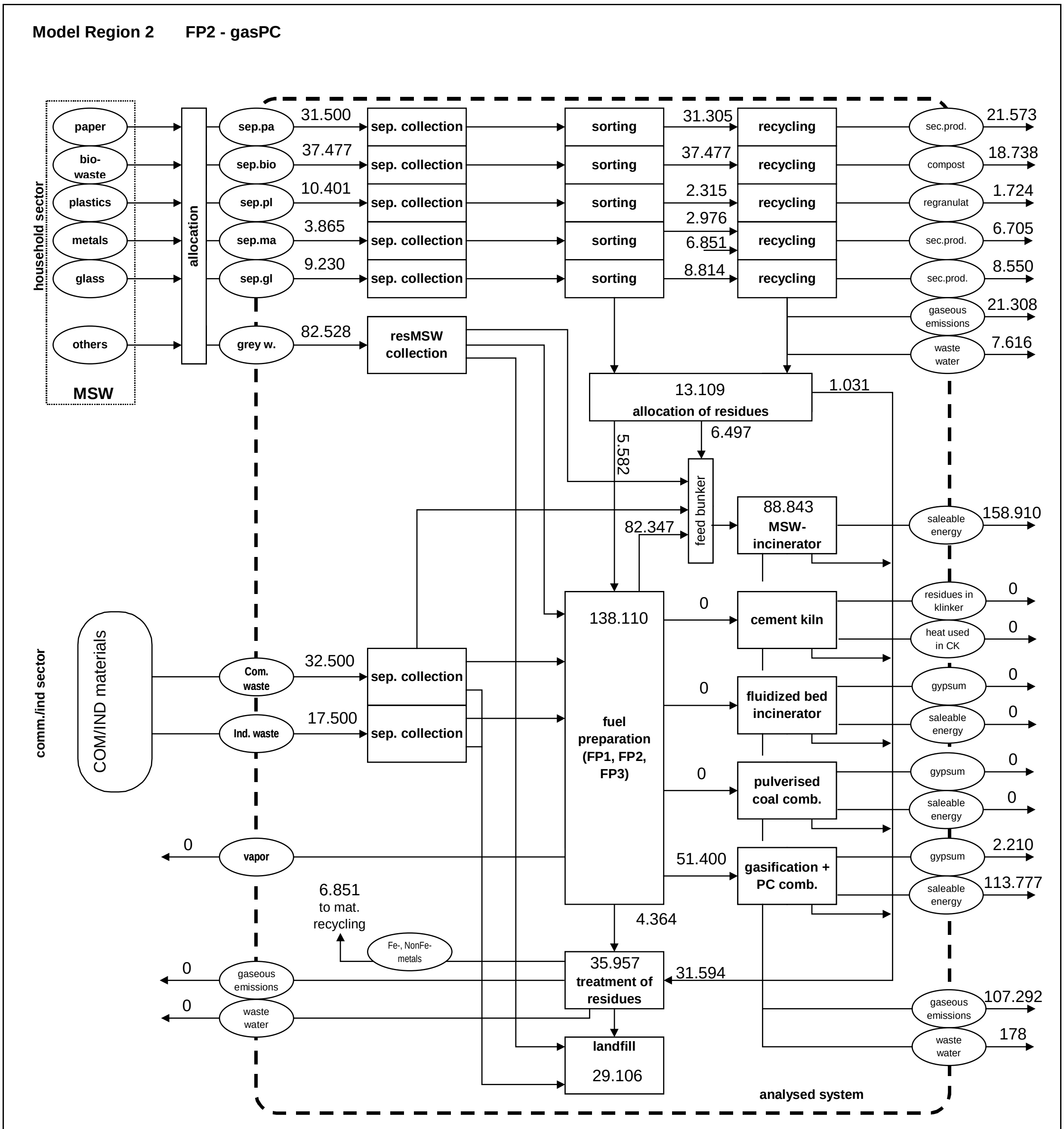


mass flow in t/a
saleable energy in MWh/a

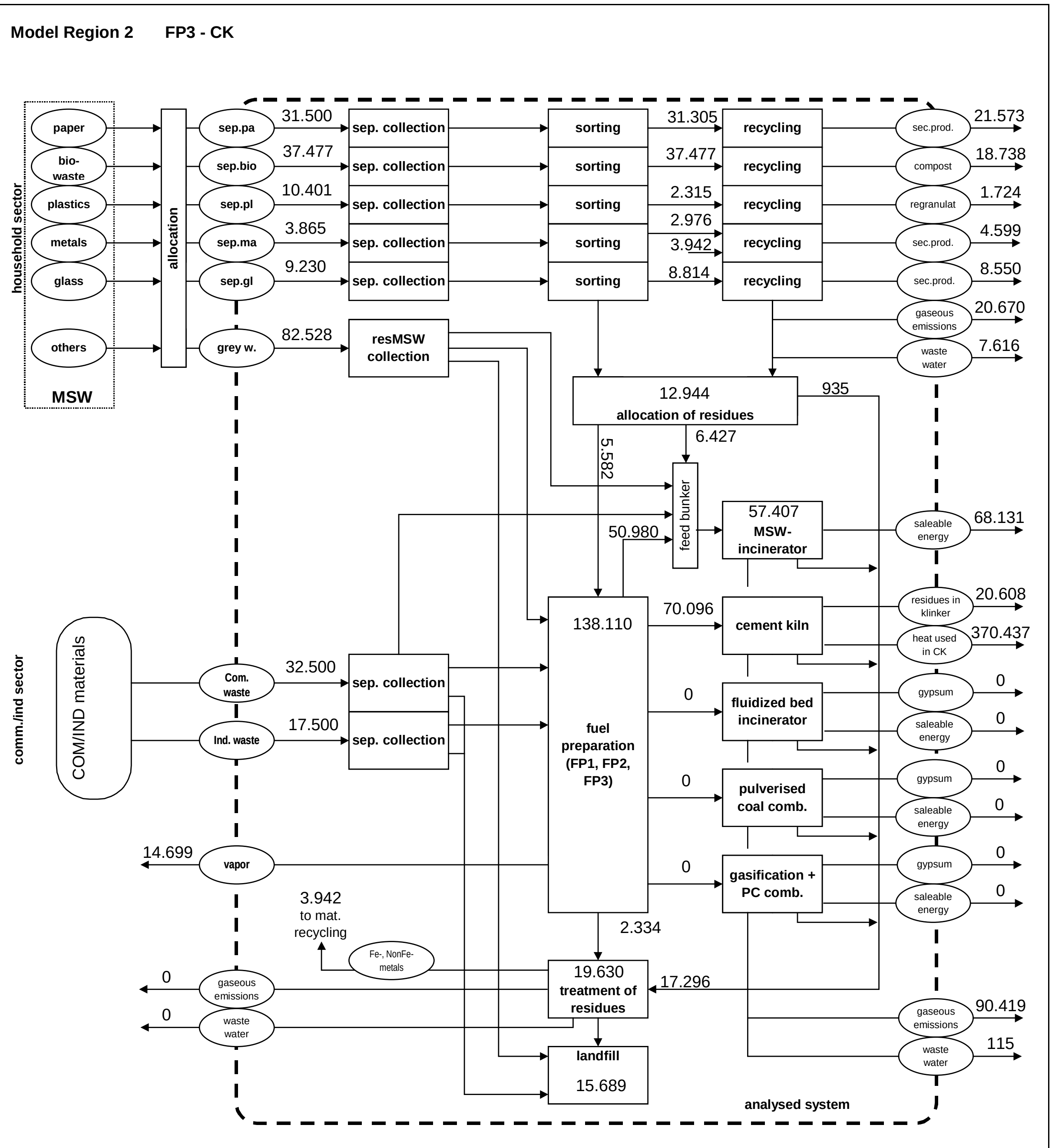
Model Region 2 FP2 - PC



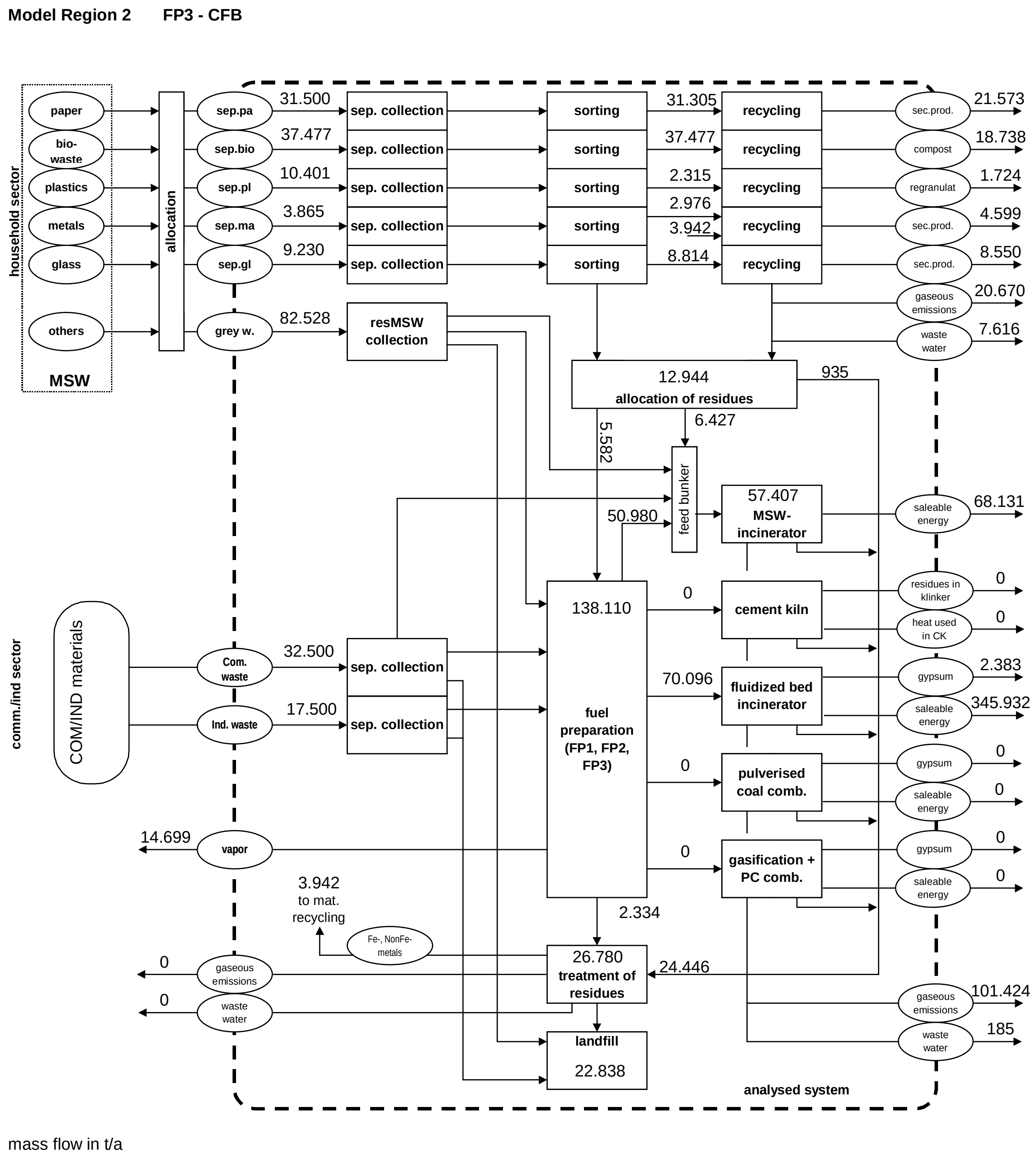
mass flow in t/a
saleable energy in MWh/a



mass flow in t/a
saleable energy in MWh/a

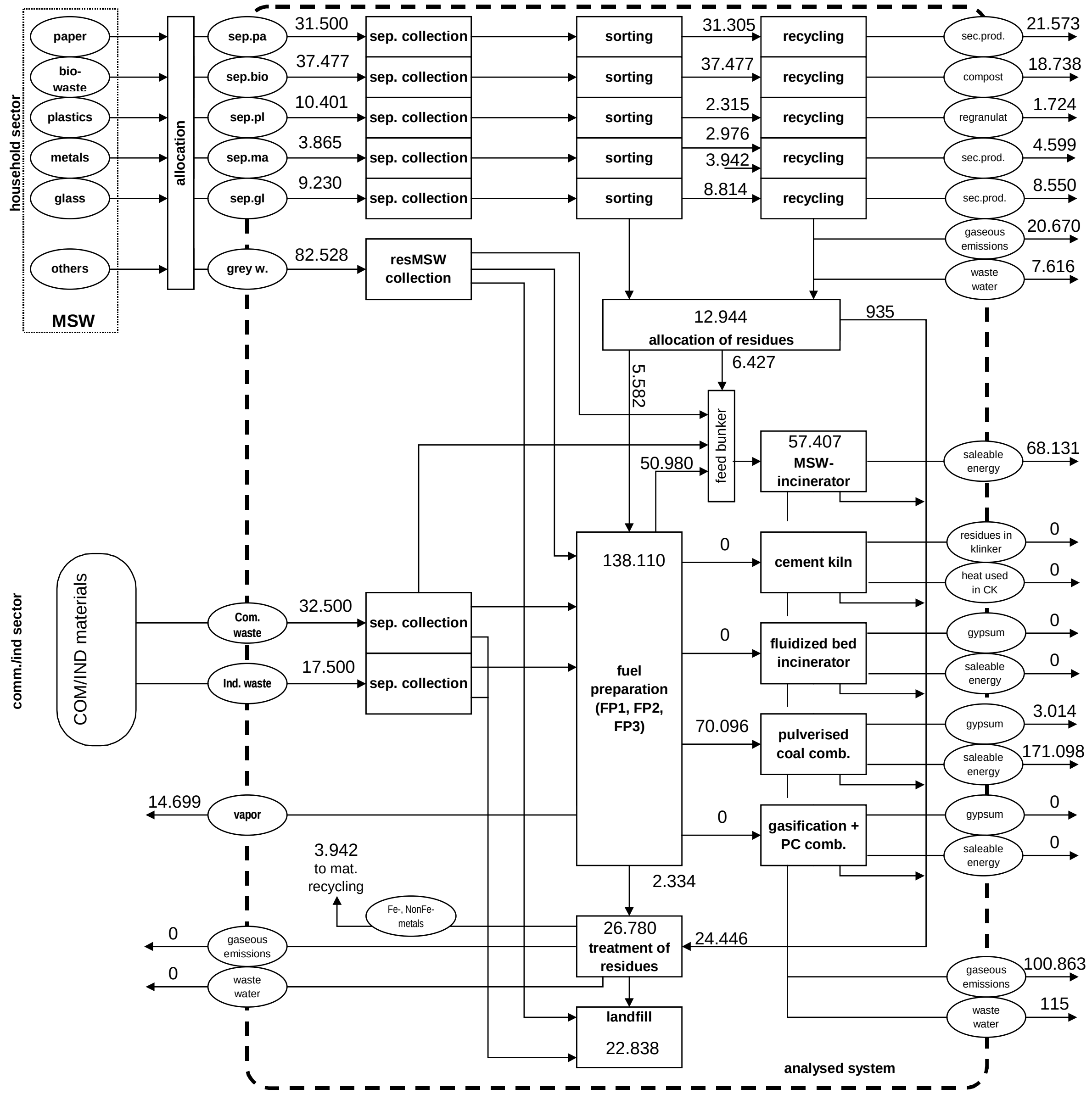


mass flow in t/a
saleable energy in MWh/a

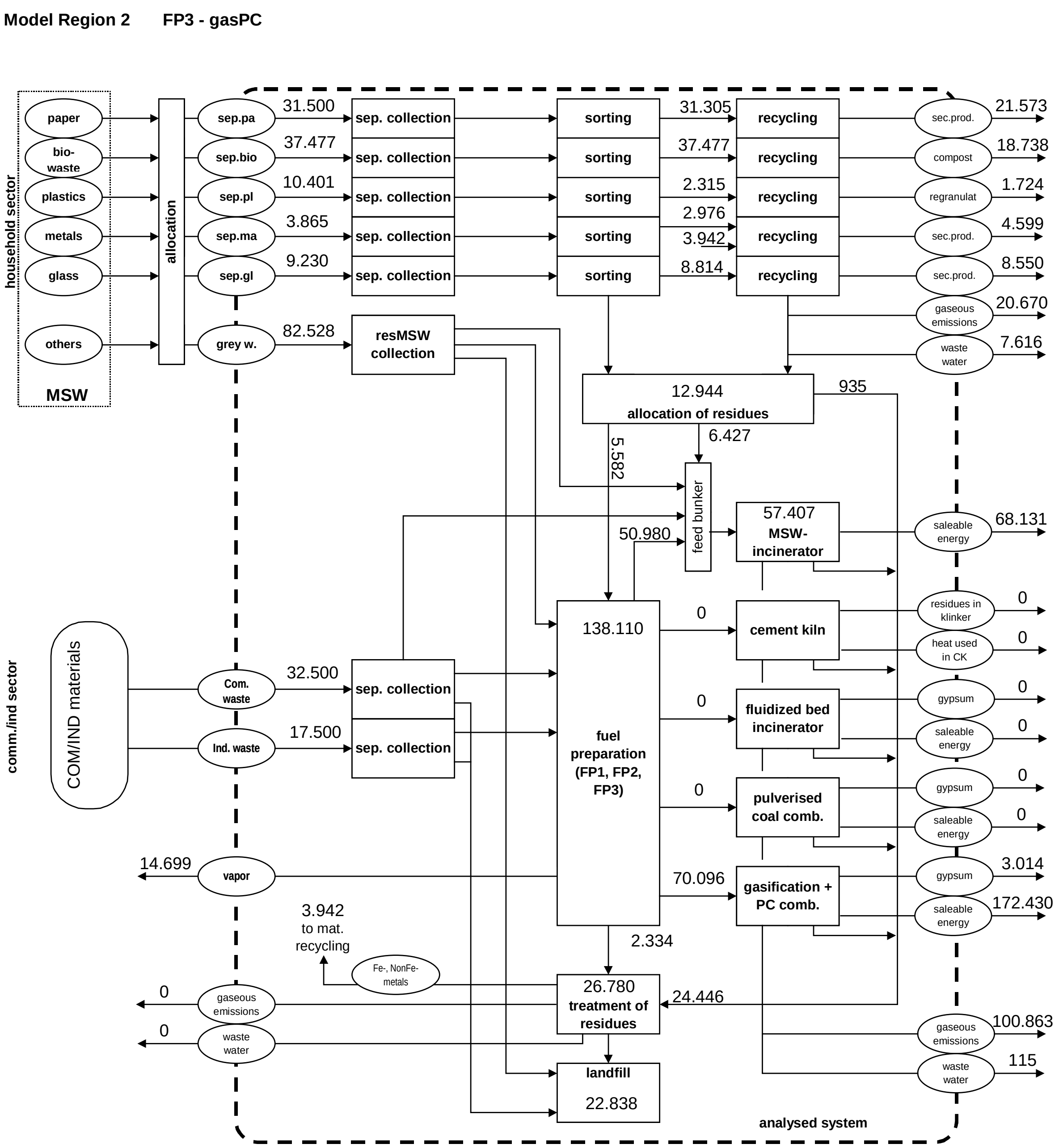


mass flow in t/a
saleable energy in MWh/a

Model Region 2 FP3 - PC



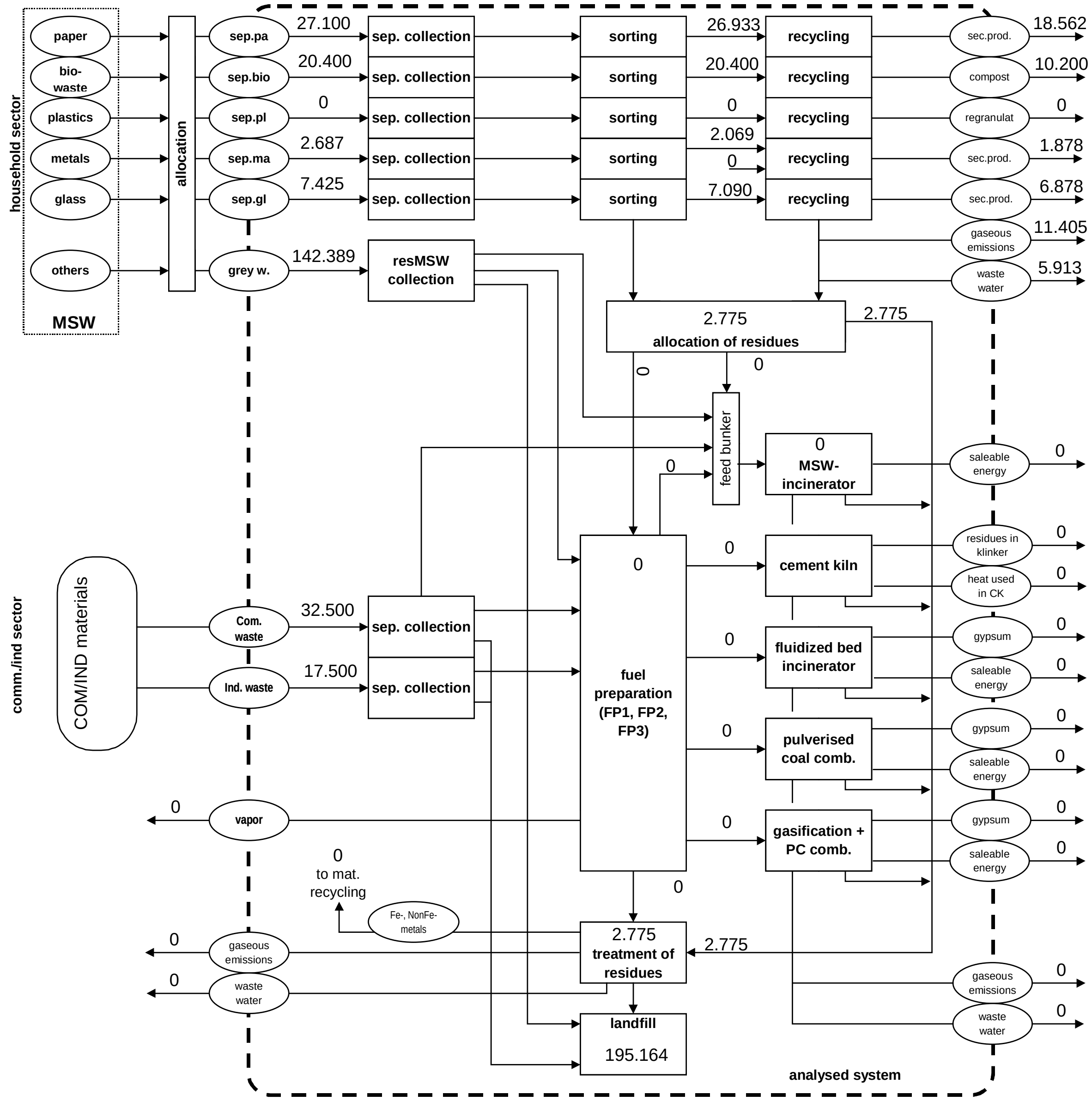
mass flow in t/a
saleable energy in MWh/a



mass flow in t/a
saleable energy in MWh/a

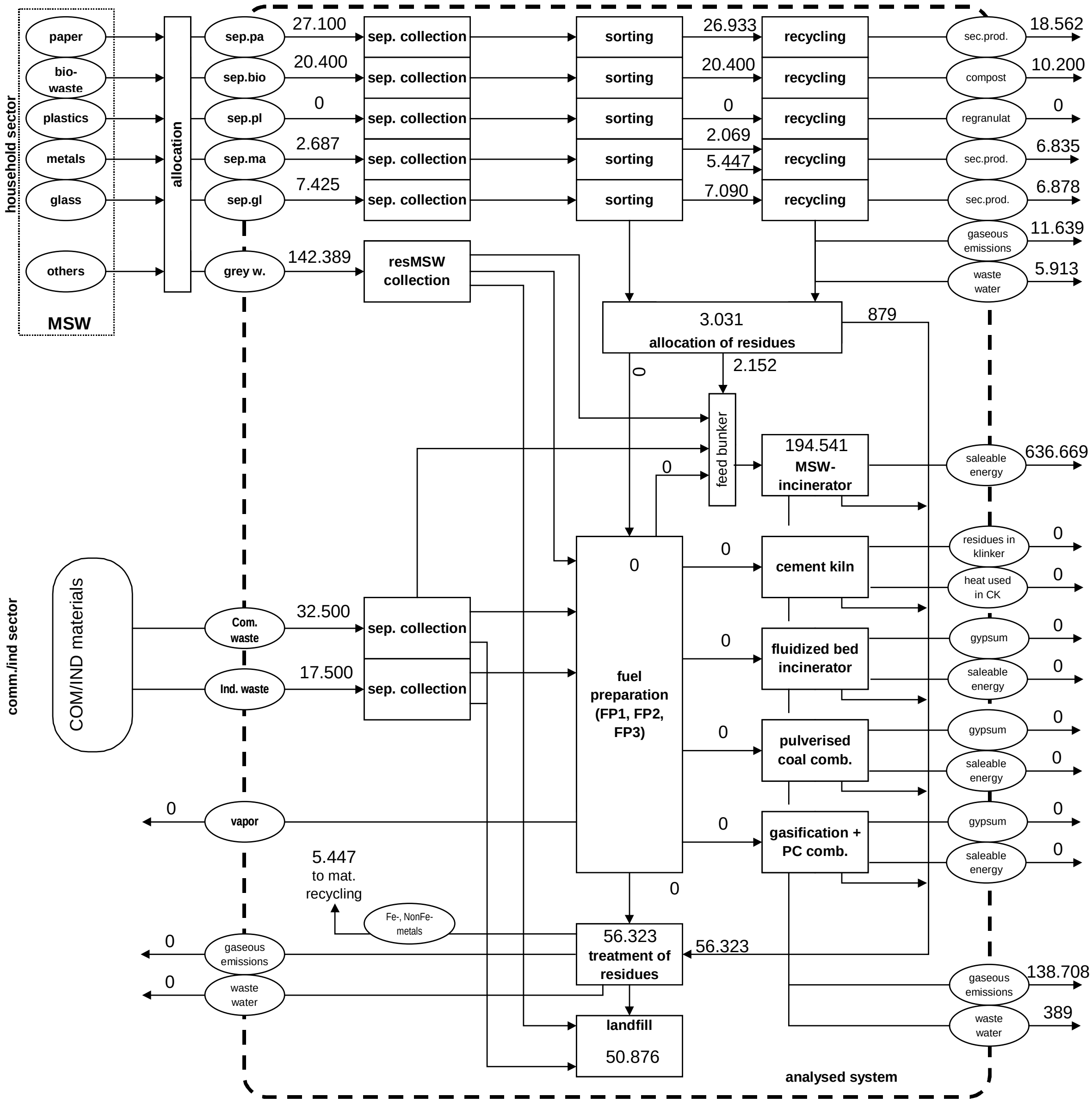
11.3.3 Model Region 3

Model Region 3 BS (baseline)



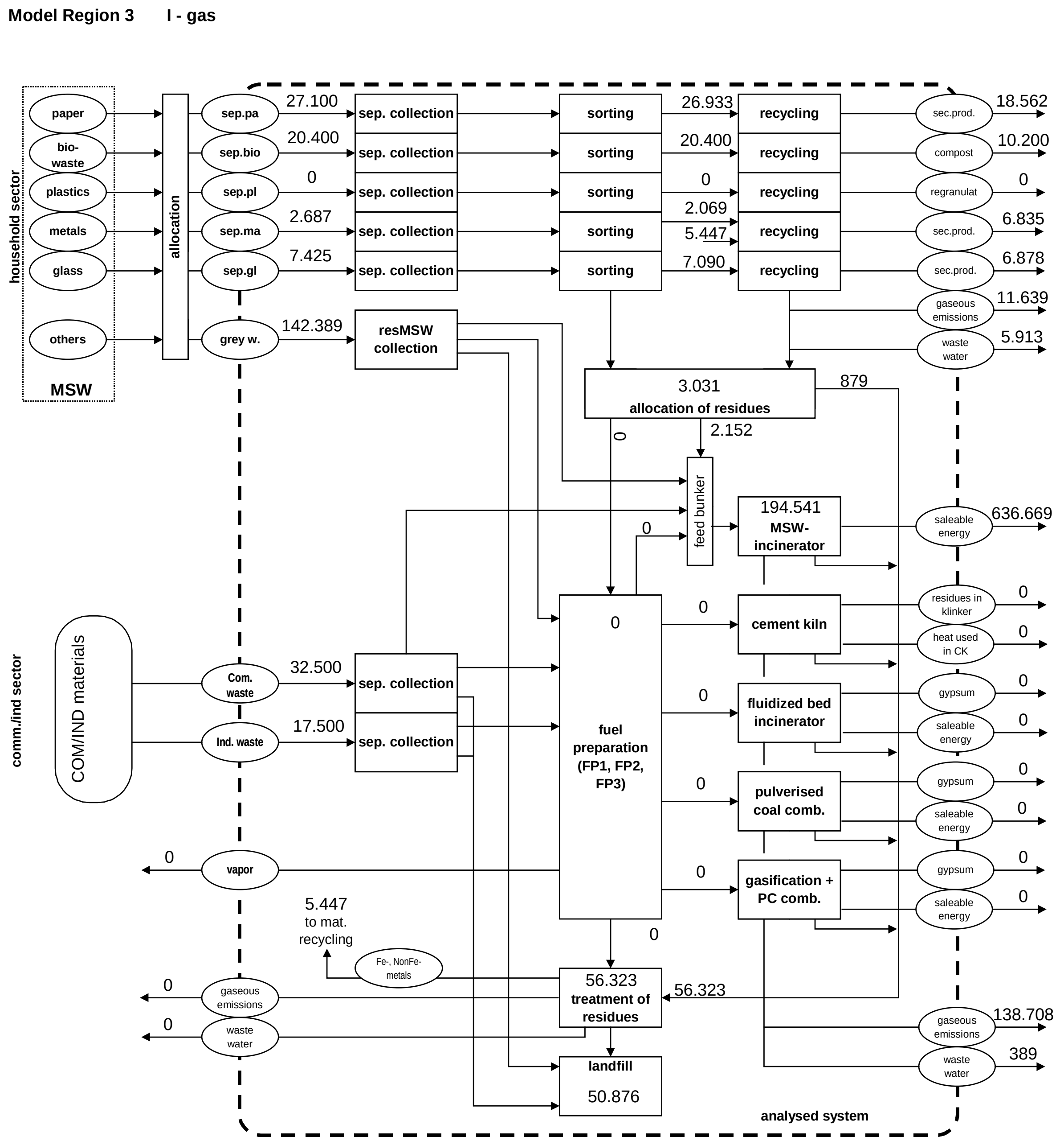
mass flow in t/a
saleable energy in MWh/a

Model Region 3 I - coal



mass flow in t/a

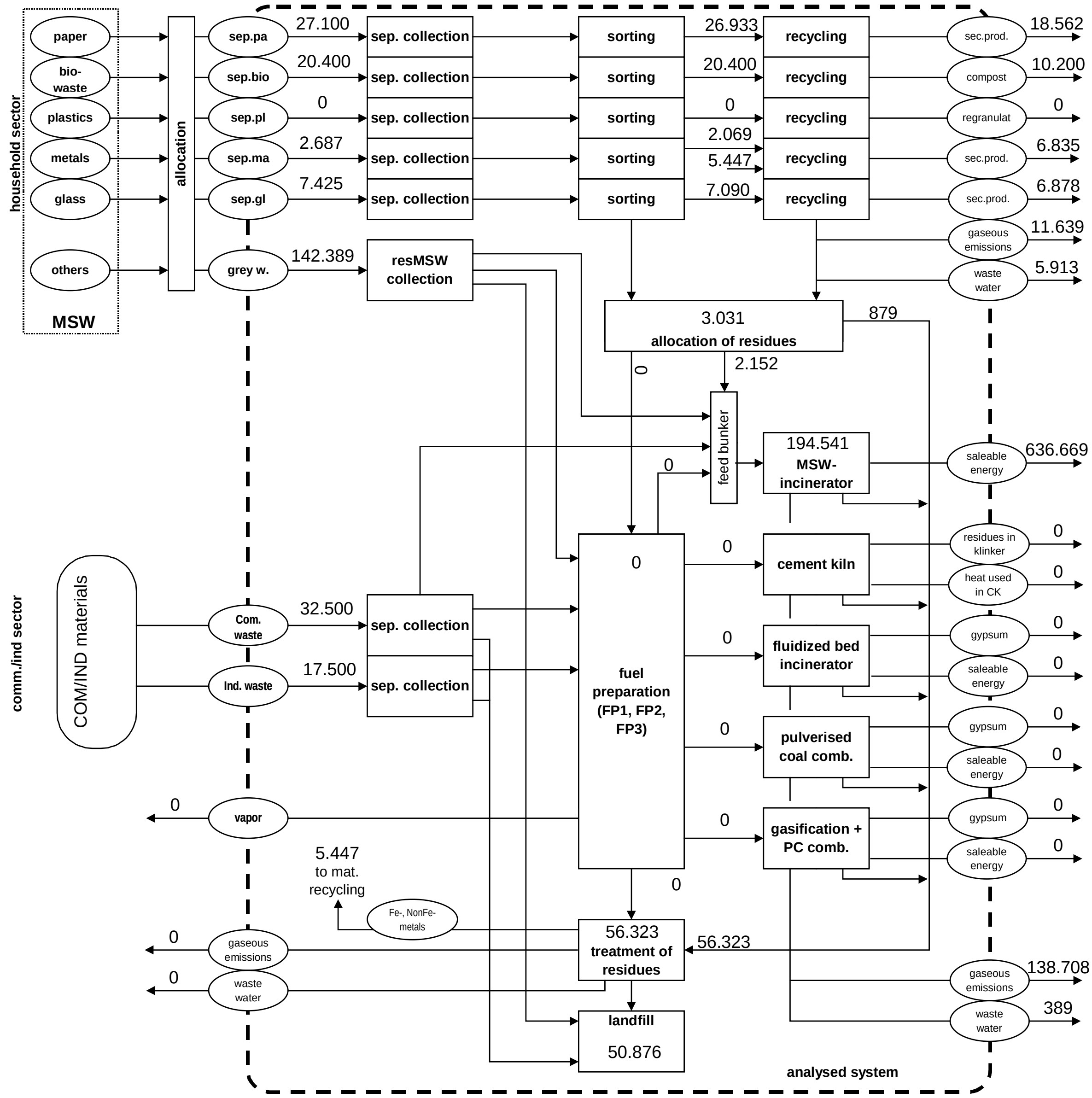
saleable energy in MWh/a



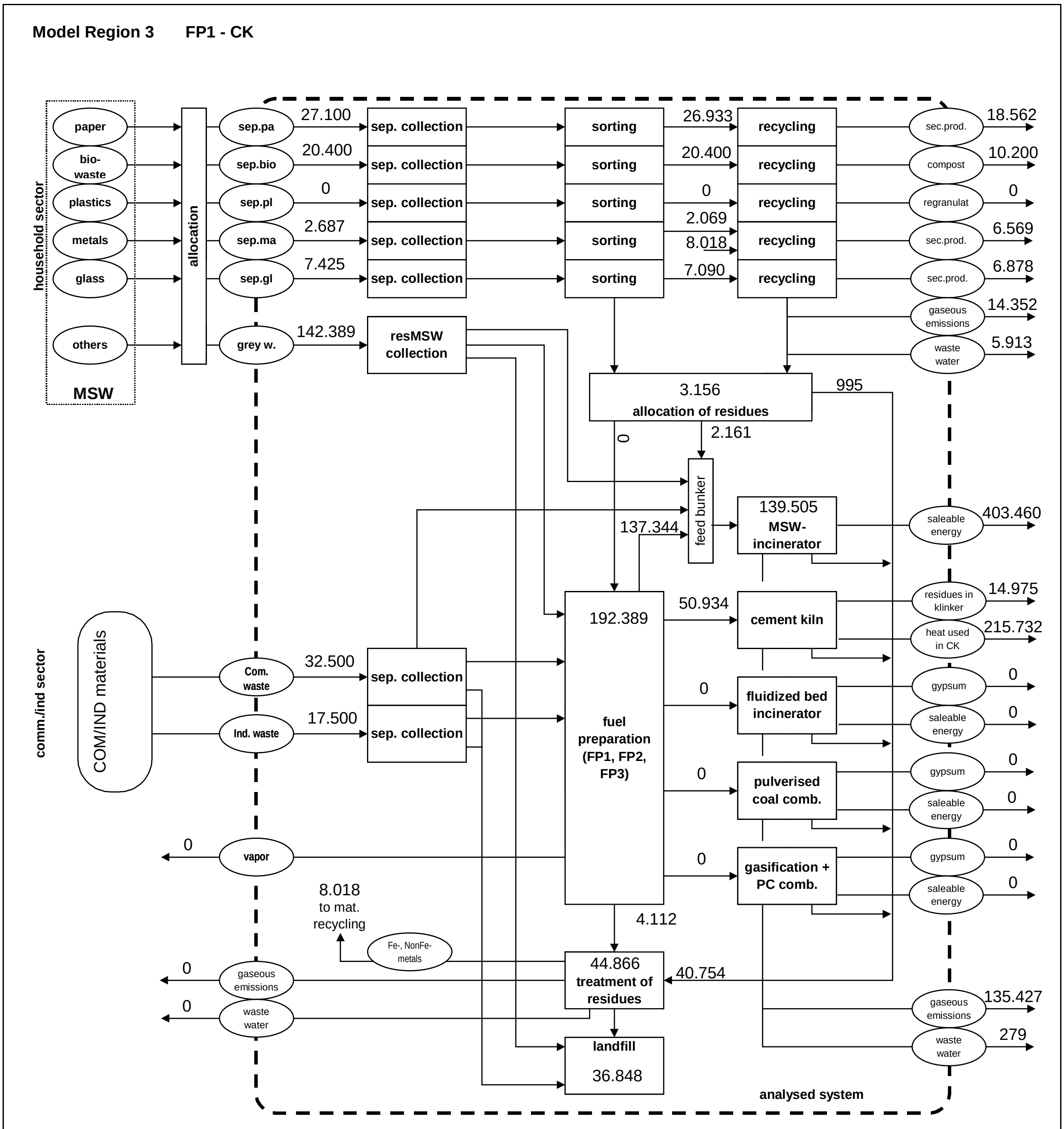
mass flow in t/a

saleable energy in MWh/a

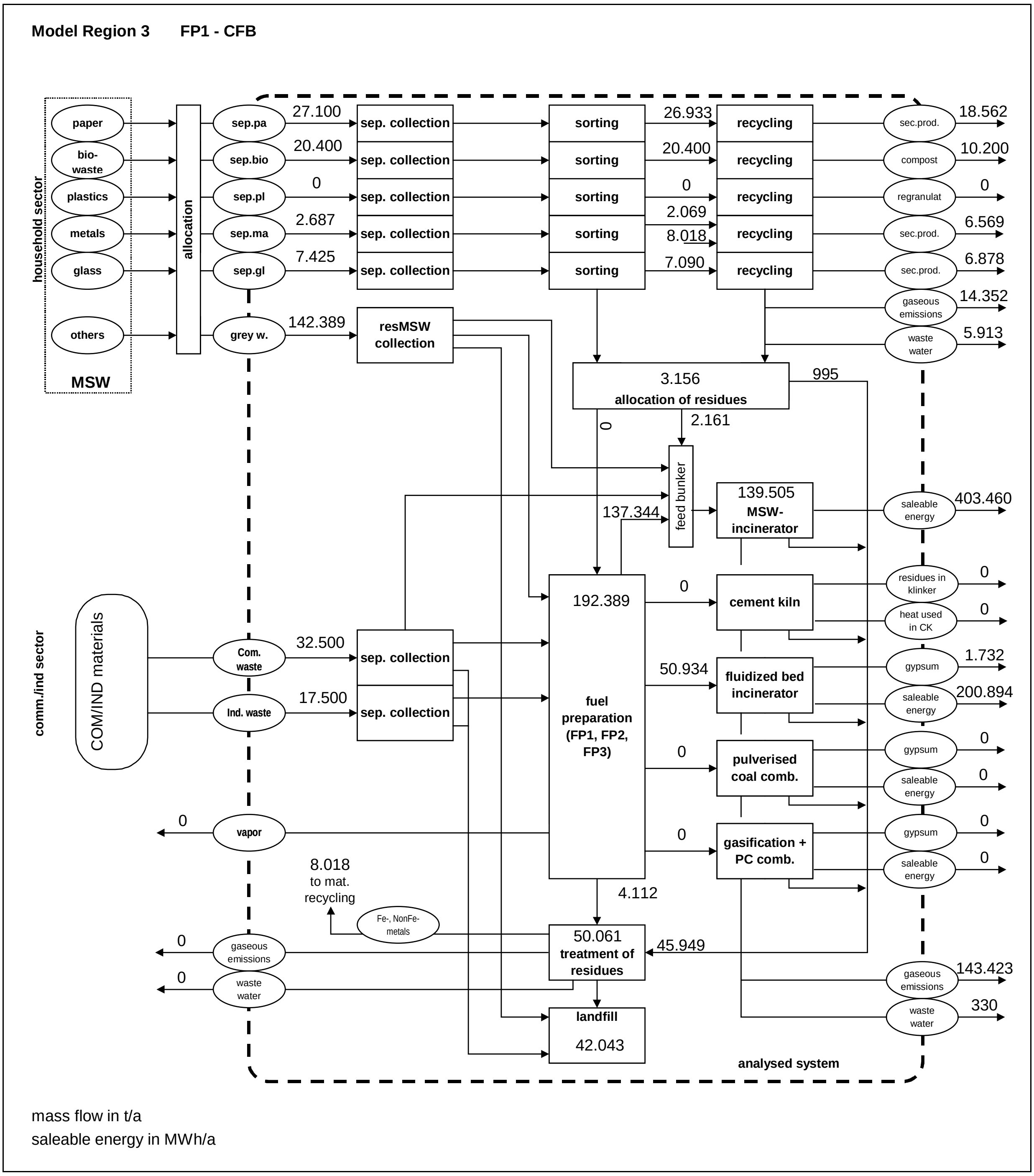
Model Region 3 I - mix

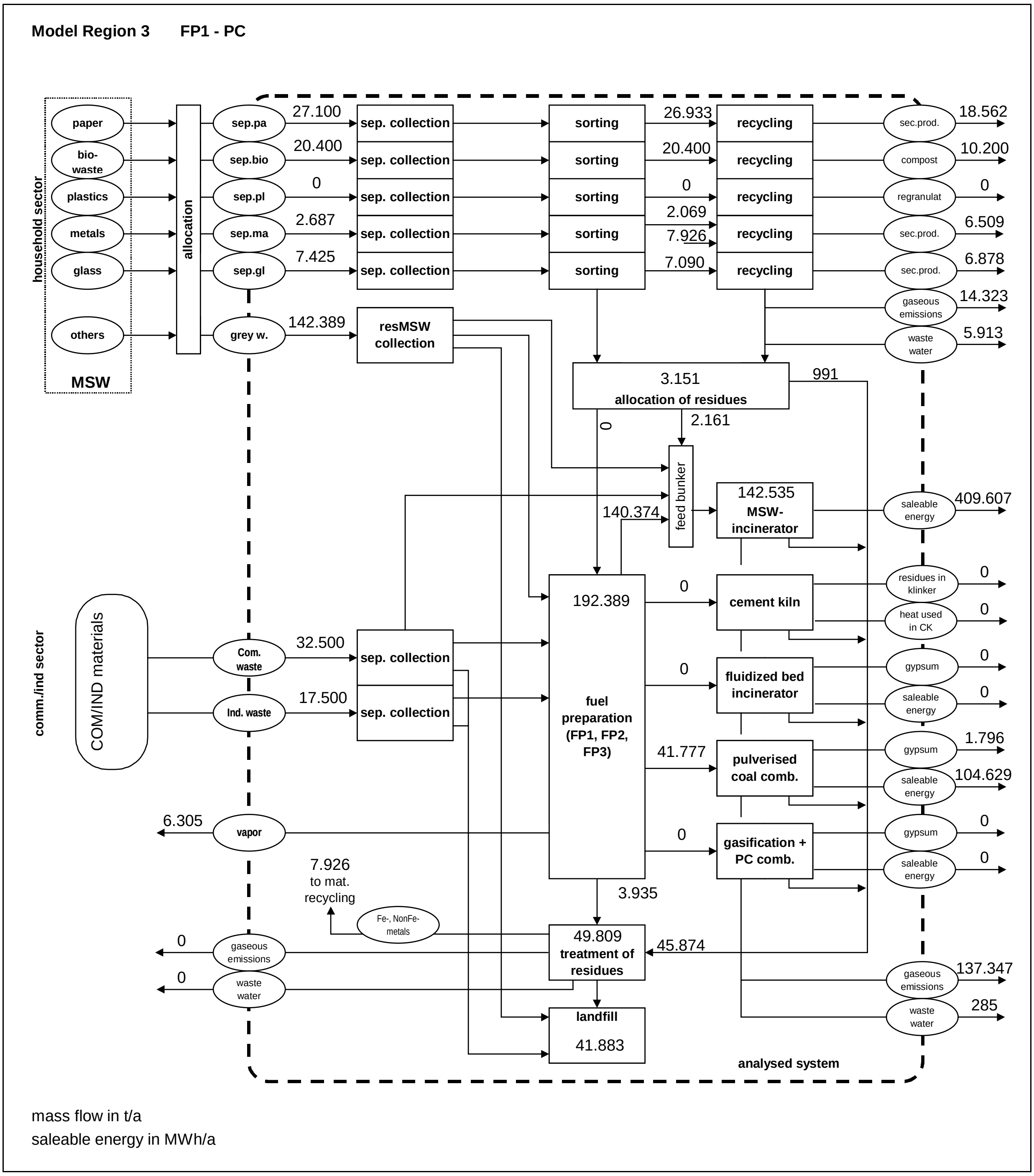


mass flow in t/a
saleable energy in MWh/a

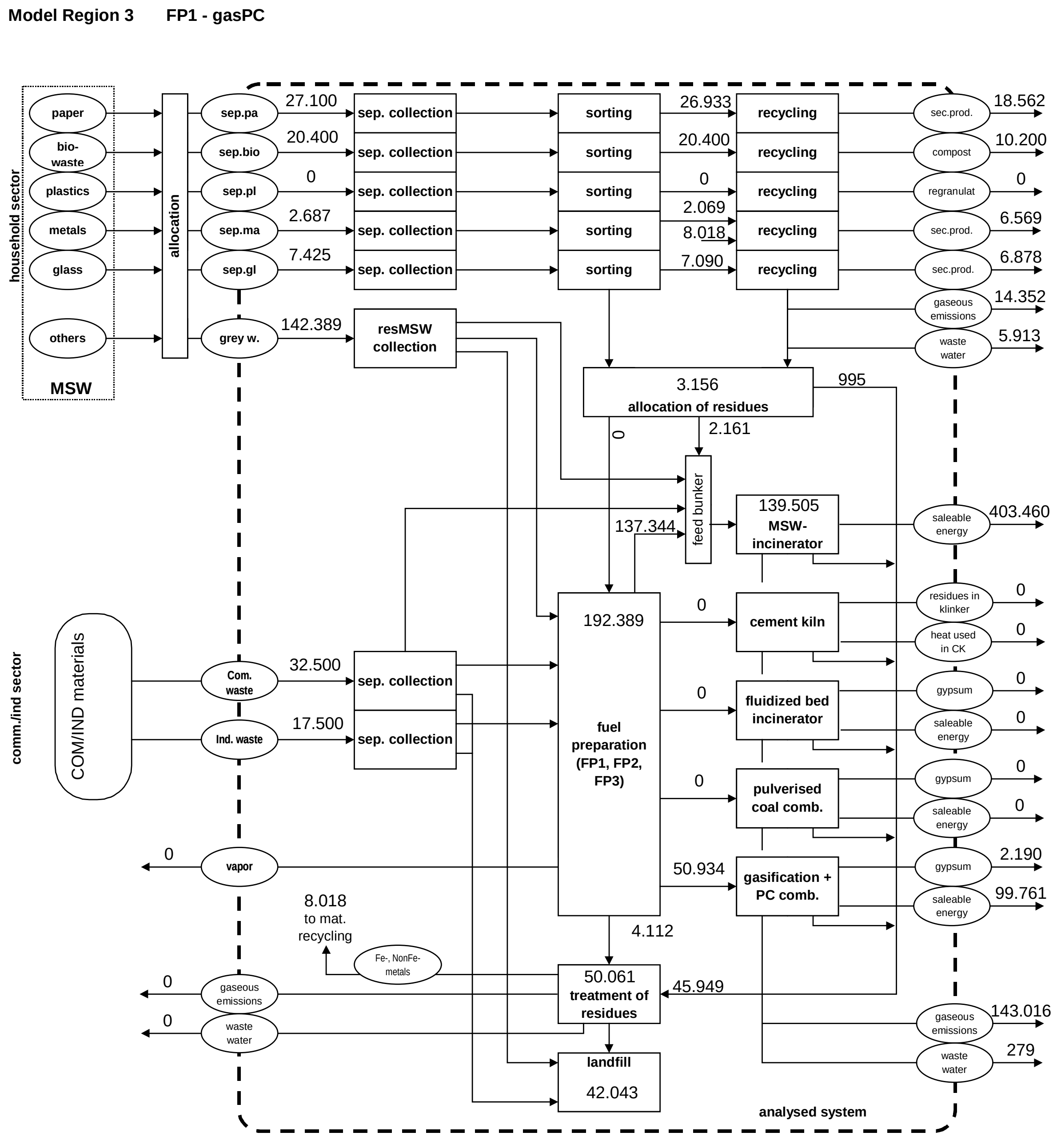


mass flow in t/a
saleable energy in MWh/a

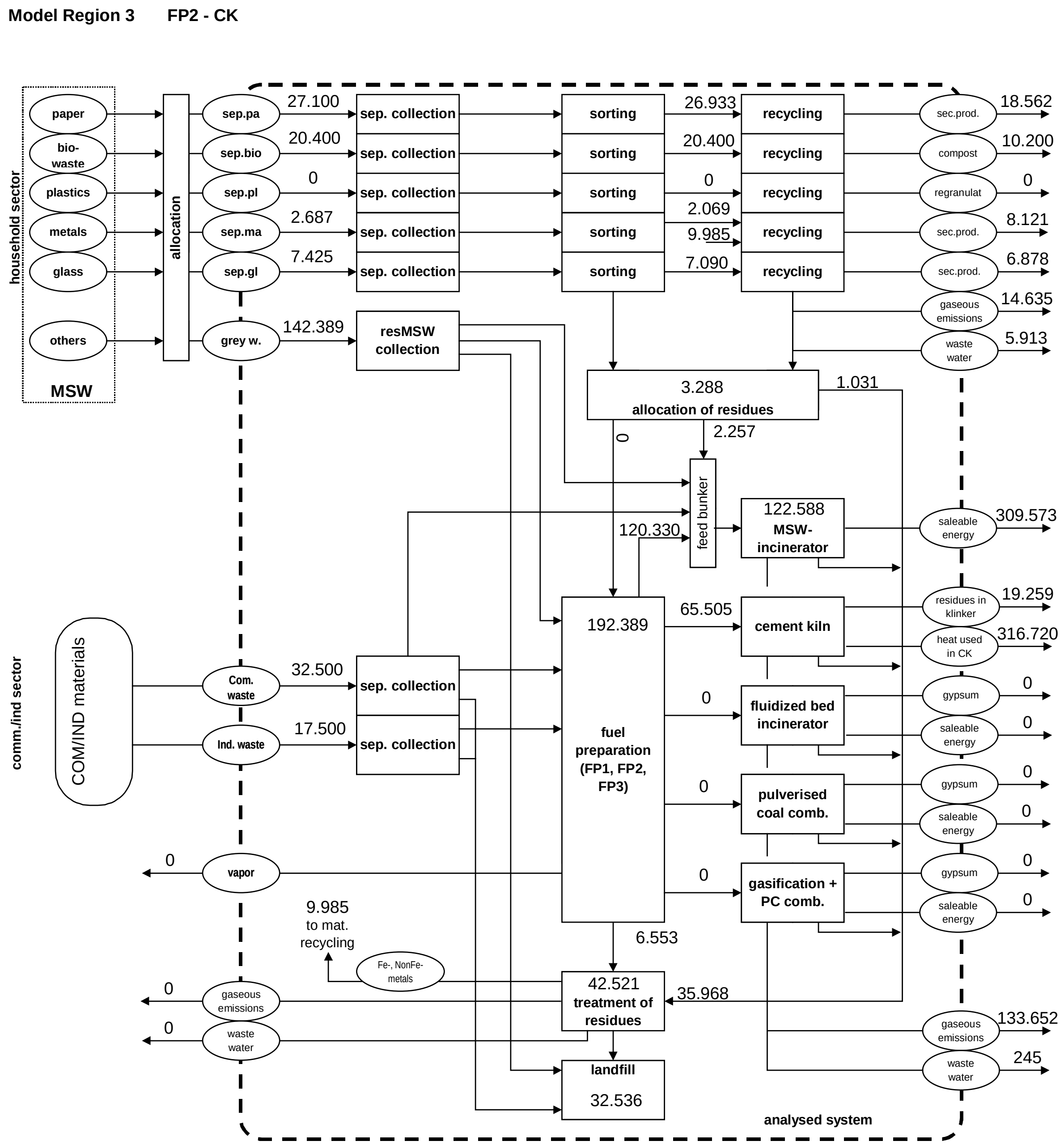

Model Region 3 FP1 - CFB
household sector
paper
bio-waste
plastics
metals
glass
others
MSW
allocation
sep.pa
sep.bio
sep.pl
sep.ma
sep.gl
grey w.
27.100
20.400
0
2.687
7.425
142.389
sep. collection
resMSW collection
sorting
26.933
20.400
0
2.069
8.018
7.090
recycling
sec.prod.
compost
regranulat
sec.prod.
sec.prod.
gaseous emissions
waste water
18.562
10.200
0
6.569
6.878
14.352
5.913
3.156
allocation of residues
995
0
2.161
feed bunker
137.344
139.505
MSW-incinerator
saleable energy
403.460
comm./ind sector
COM/IND materials
Com. waste
Ind. waste
32.500
17.500
192.389
fuel preparation (FP1, FP2, FP3)
0
cement kiln
residues in klinker
heat used in CK
0
0
50.934
fluidized bed incinerator
gypsum
1.732
saleable energy
200.894
0
pulverised coal comb.
gypsum
0
saleable energy
0
0
gasification + PC comb.
gypsum
0
saleable energy
0
0
vapor
8.018
to mat. recycling
Fe-, NonFe-metals
4.112
50.061
treatment of residues
45.949
0
gaseous emissions
0
waste water
landfill
42.043
gaseous emissions
143.423
waste water
330
analysed system
mass flow in t/a
saleable energy in MWh/a



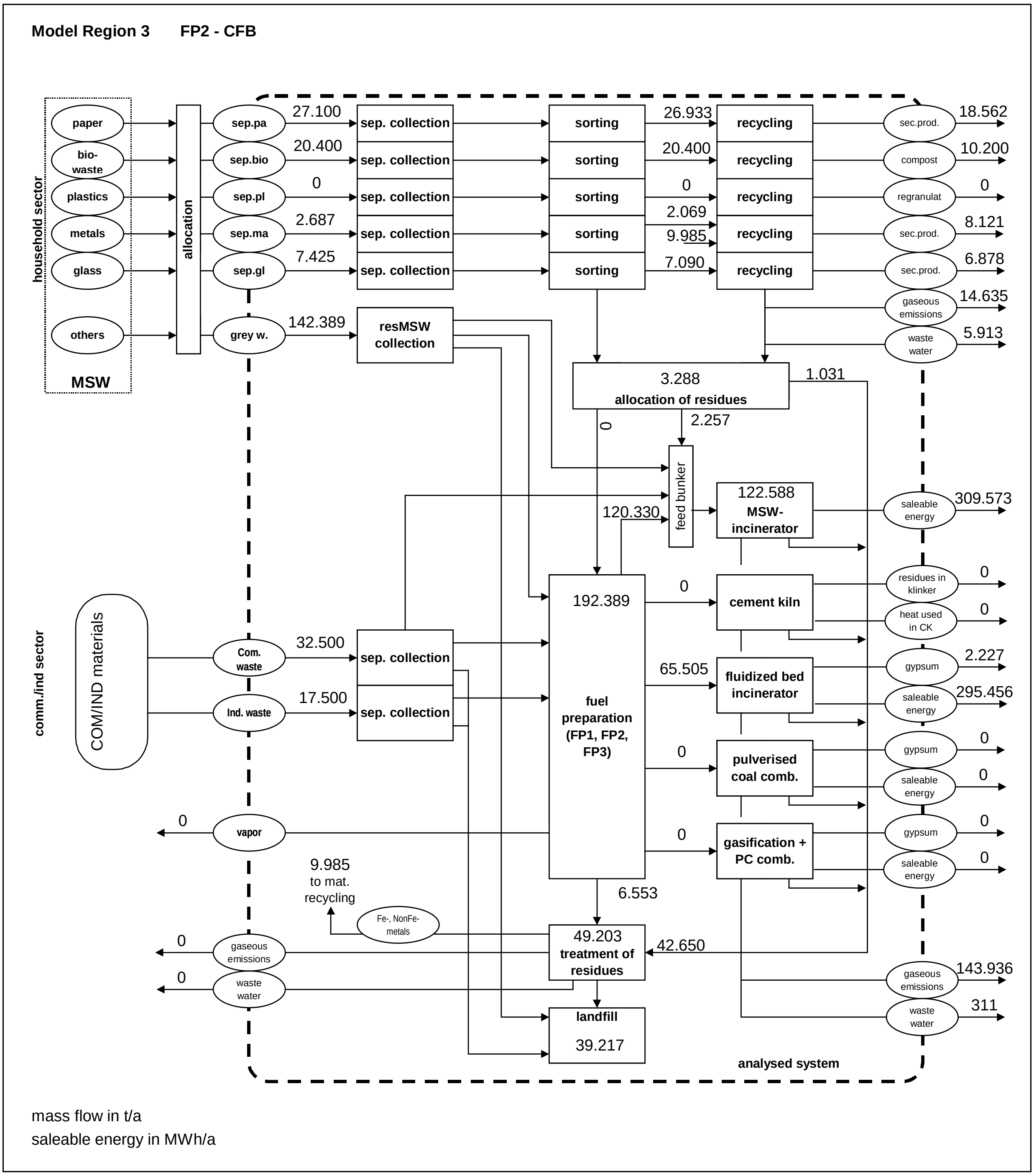
Model Region 3 FP1 - PC
household sector
paper
bio-waste
plastics
metals
glass
others
MSW
allocation
sep.pa
sep.bio
sep.pl
sep.ma
sep.gl
grey w.
27.100
20.400
0
2.687
7.425
142.389
sep. collection
resMSW collection
sorting
26.933
20.400
0
2.069
7.926
7.090
recycling
sec.prod.
compost
regranulat
gaseous emissions
waste water
18.562
10.200
0
6.509
6.878
14.323
5.913
3.151
allocation of residues
991
0
2.161
feed bunker
140.374
142.535
MSW-incinerator
saleable energy
409.607
comm./ind sector
COM/IND materials
Com. waste
Ind. waste
32.500
17.500
192.389
fuel preparation (FP1, FP2, FP3)
cement kiln
residues in klinker
heat used in CK
fluidized bed incinerator
gypsum
41.777
pulverised coal comb.
1.796
104.629
gasification + PC comb.
vapor
6.305
7.926
to mat. recycling
Fe-, NonFe-metals
3.935
49.809
treatment of residues
45.874
gaseous emissions
waste water
137.347
285
landfill
41.883
analysed system
mass flow in t/a
saleable energy in MWh/a



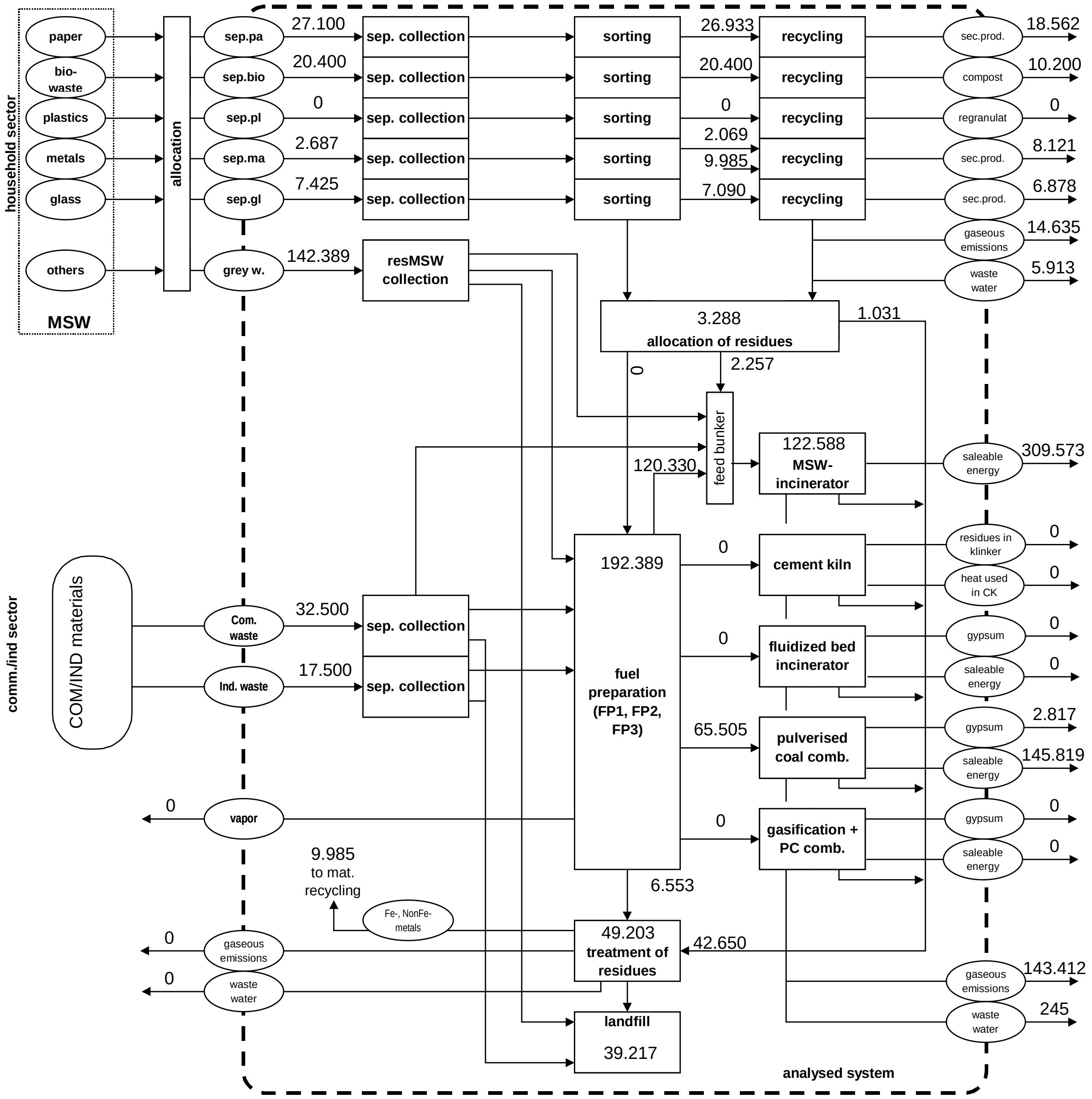
mass flow in t/a
saleable energy in MWh/a



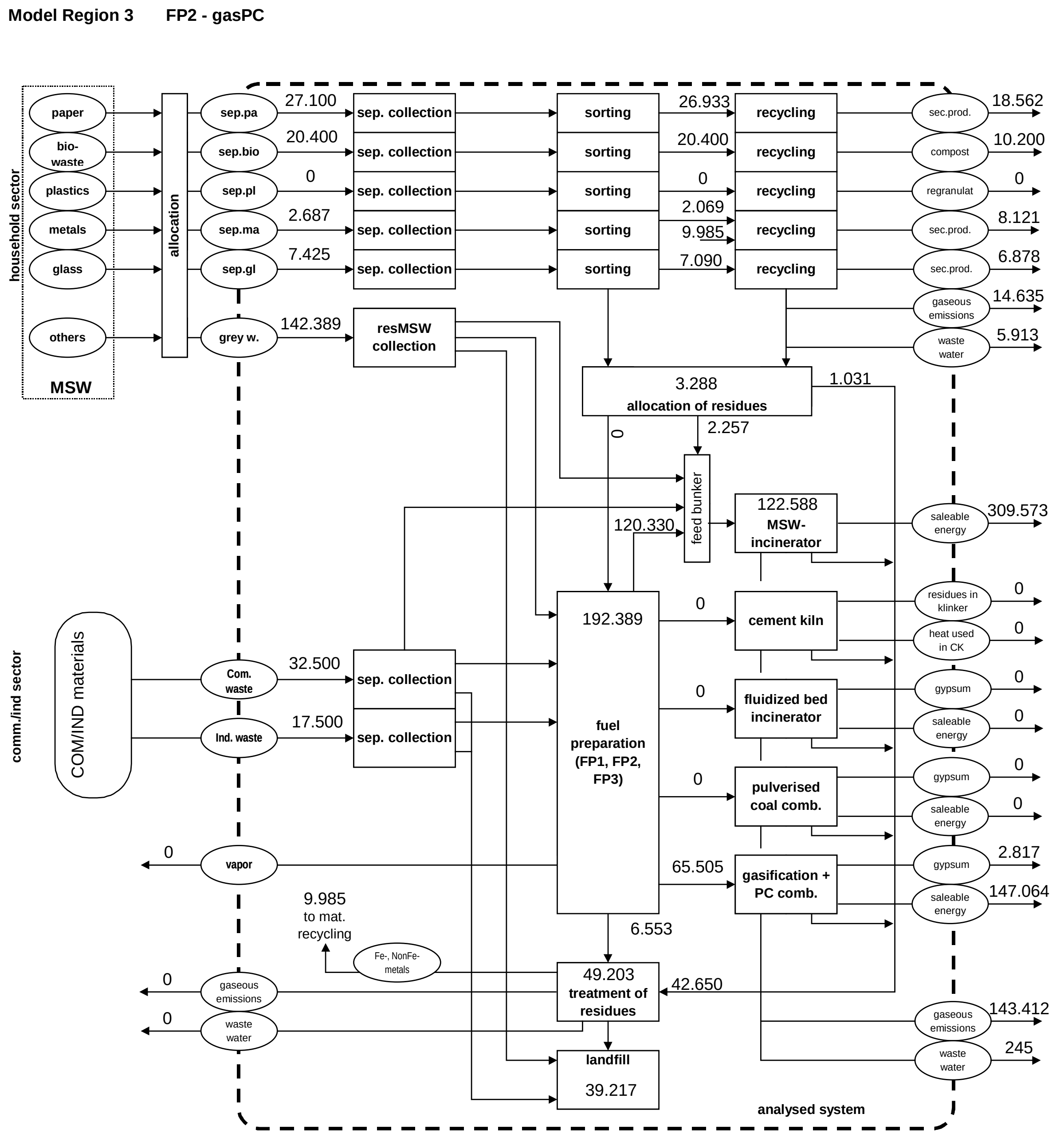
mass flow in t/a
saleable energy in MWh/a


Model Region 3 FP2 - CFB
household sector
paper
bio-waste
plastics
metals
glass
others
MSW
allocation
sep.pa
sep.bio
sep.pl
sep.ma
sep.gl
grey w.
27.100
20.400
0
2.687
7.425
142.389
sep. collection
resMSW collection
sorting
26.933
20.400
0
2.069
9.985
7.090
recycling
sec.prod.
compost
regranulat
gaseous emissions
waste water
18.562
10.200
0
8.121
6.878
14.635
5.913
3.288
allocation of residues
1.031
2.257
0
feed bunker
120.330
122.588
MSW-incinerator
saleable energy
309.573
comm./ind sector
COM/IND materials
Com. waste
Ind. waste
32.500
17.500
192.389
fuel preparation (FP1, FP2, FP3)
cement kiln
residues in klinker
heat used in CK
65.505
fluidized bed incinerator
gypsum
2.227
295.456
pulverised coal comb.
gasification + PC comb.
vapor
9.985 to mat. recycling
Fe-, NonFe-metals
6.553
49.203
treatment of residues
42.650
143.936
311
landfill
39.217
analysed system
mass flow in t/a
saleable energy in MWh/a

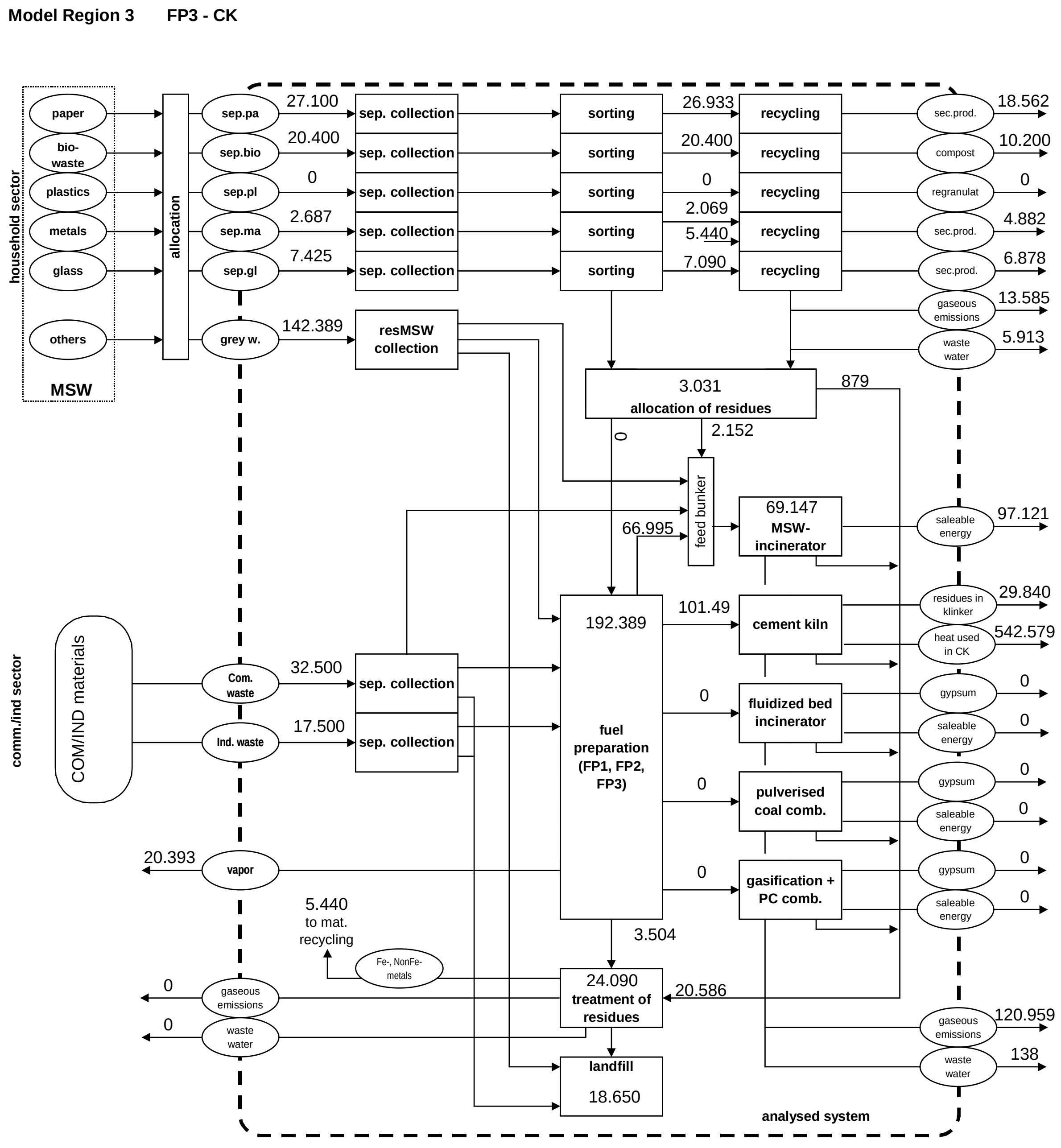
Model Region 3 FP2 - PC



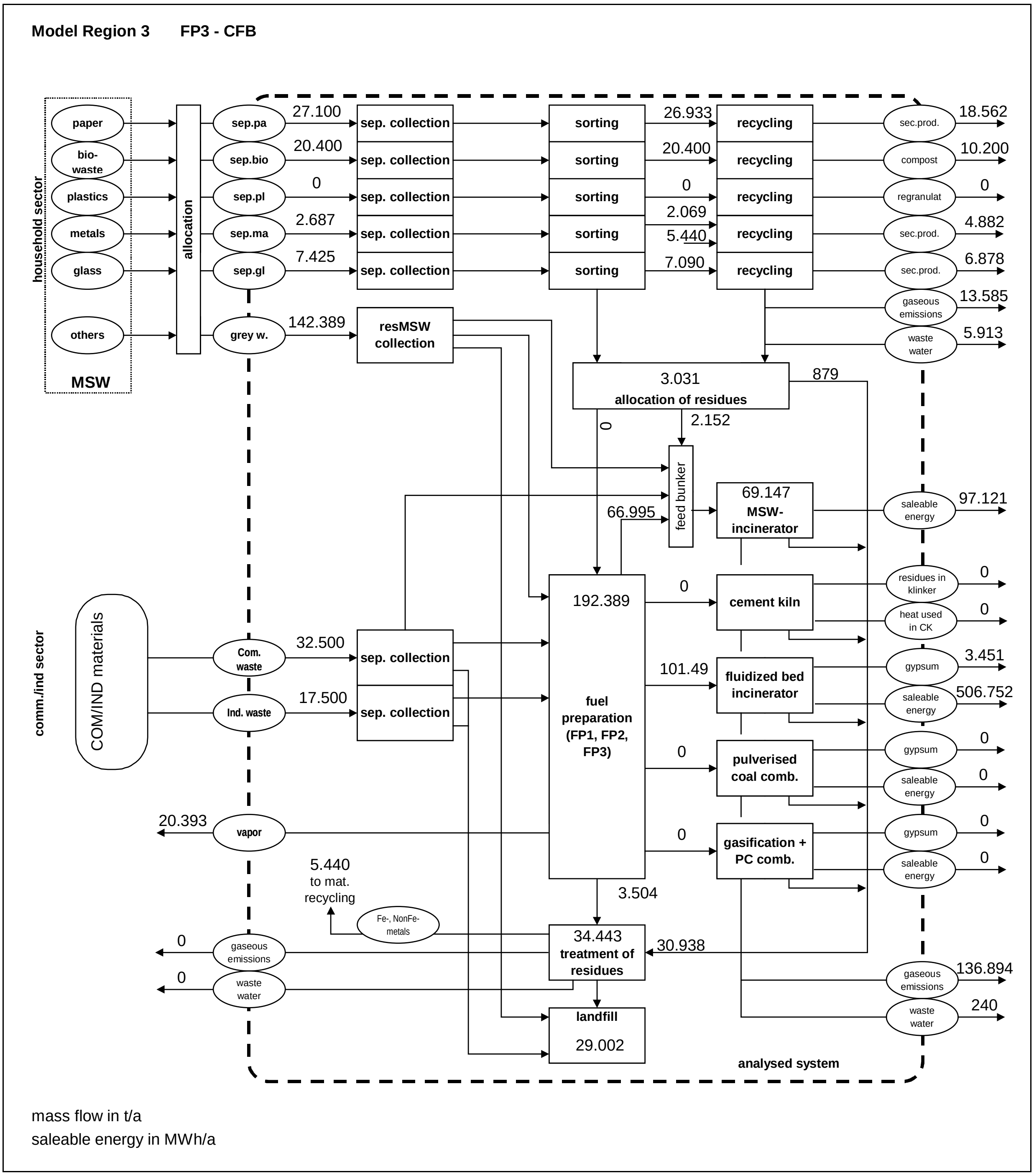
mass flow in t/a
saleable energy in MWh/a



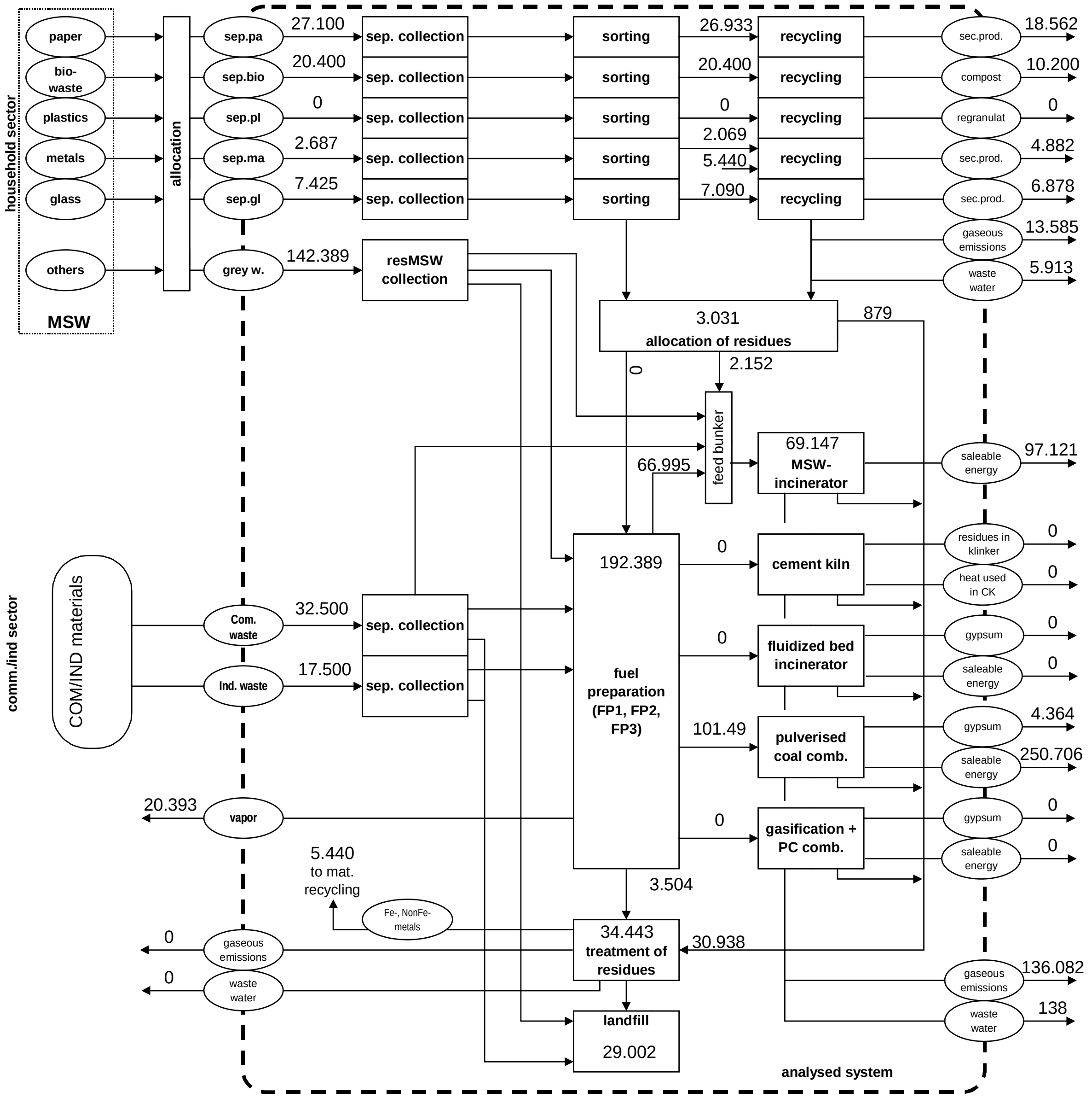
mass flow in t/a
saleable energy in MWh/a



mass flow in t/a
saleable energy in MWh/a

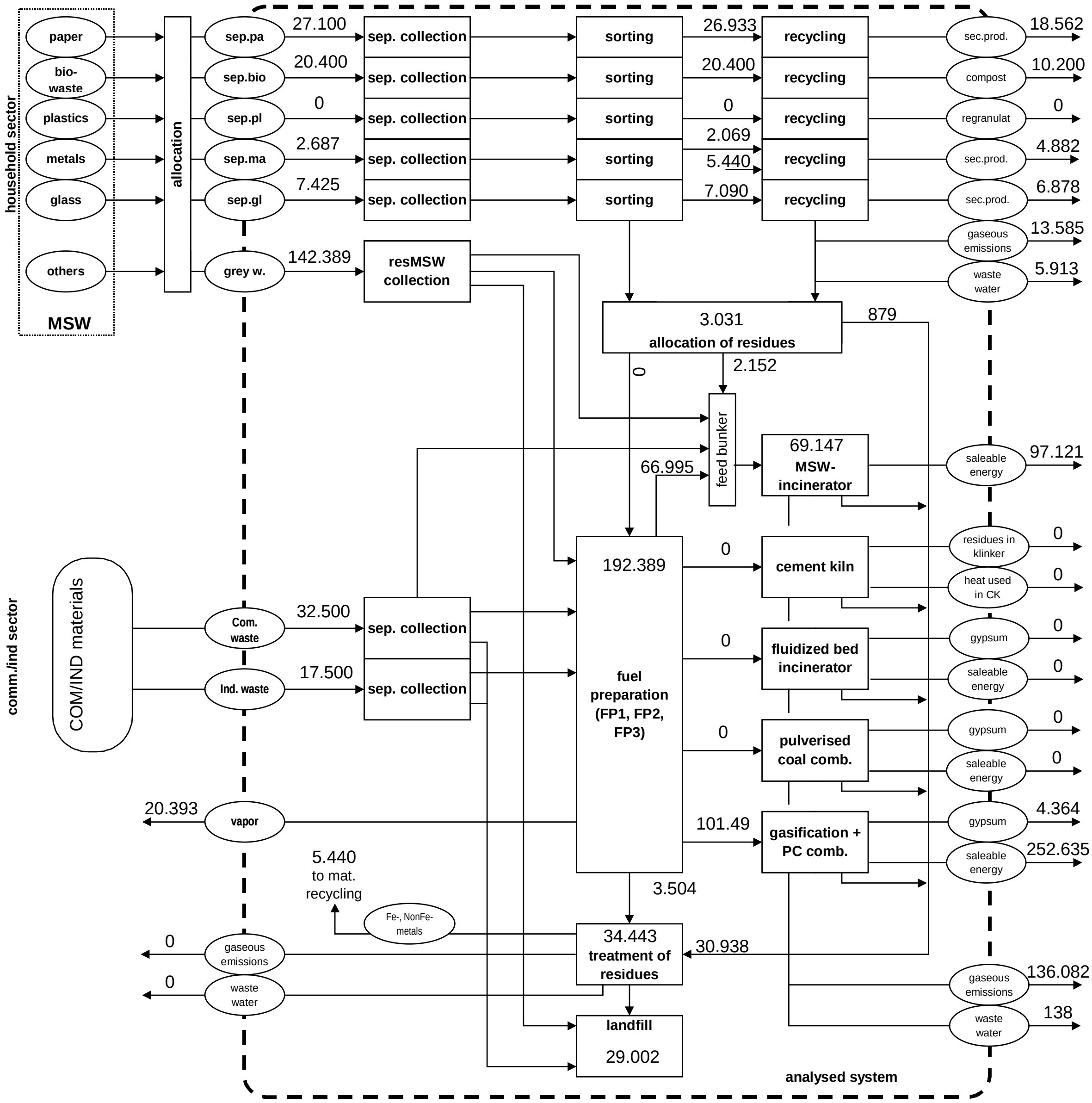

Model Region 3 FP3 - CFB
household sector
paper
bio-waste
plastics
metals
glass
others
MSW
allocation
sep.pa
sep.bio
sep.pl
sep.ma
sep.gl
grey w.
27.100
20.400
0
2.687
7.425
142.389
sep. collection
resMSW collection
sorting
26.933
20.400
0
2.069
5.440
7.090
recycling
sec.prod.
compost
regranulat
sec.prod.
sec.prod.
gaseous emissions
waste water
18.562
10.200
0
4.882
6.878
13.585
5.913
3.031
allocation of residues
879
0
2.152
feed bunker
66.995
69.147
MSW-incinerator
saleable energy
97.121
192.389
fuel preparation (FP1, FP2, FP3)
0
cement kiln
residues in klinker
heat used in CK
0
0
101.49
fluidized bed incinerator
gypsum
3.451
saleable energy
506.752
0
pulverised coal comb.
gypsum
0
saleable energy
0
0
gasification + PC comb.
gypsum
0
saleable energy
0
comm./ind sector
COM/IND materials
Com. waste
Ind. waste
32.500
17.500
20.393
vapor
5.440
to mat. recycling
Fe-, NonFe-metals
3.504
34.443
treatment of residues
30.938
0
gaseous emissions
0
waste water
gaseous emissions
136.894
waste water
240
landfill
29.002
analysed system
mass flow in t/a
saleable energy in MWh/a

Model Region 3 FP3 - PC



mass flow in t/a
saleable energy in MWh/a

Model Region 3 FP3 - gasPC



mass flow in t/a

saleable energy in MWh/a

11.4 Transfercoefficients

Cement Kiln		
element	**clinker**	**gaseous emission**
C	1,00%	99,00%
N	1,00%	99,00%
S	90,00%	10,00%
Cl	99,81%	0,19%
Cd	99,98%	0,02%
Hg	59,76%	40,24%
Pb	99,96%	0,04%
Zn	99,99%	0,01%

Source: FEHRINGER et al. (1999)

Circulated Fludized Bed Combustion					
element	**gypsum**	**ash**	**filter-residues**	**sewage**	**gaseous emission**
C	0,00%	0,40%	0,20%	0,10%	99,30%
N	0,50%	0,50%	0,10%	0,01%	98,89%
S	40,35%	45,00%	6,00%	8,00%	0,65%
Cl	0,00%	45,00%	0,50%	54,27%	0,23%
Cd	0,00%	99,00%	0,50%	0,45%	0,05%
Hg	0,00%	3,00%	95,63%	0,10%	1,27%
Pb	0,39%	99,00%	0,50%	0,10%	0,01%
Zn	0,50%	99,00%	0,37%	0,10%	0,03%

Source: FEHRINGER et al. (1997); ECOLING AG (1997)

Pulverised Coal Power Plant					
element	**gypsum**	**fly ash**	**bottom ash**	**sewage**	**gaseous emission**
C	0,20%	0,00%	0,40%	0,10%	99,30%
N					
S					
Cl			99,65%		0,35%
Cd	1,00%	94,00%	3,00%	0,00%	2,00%
Hg	22,00%	49,00%	0,00%	0,00%	29,00%
Pb	1,00%	93,00%	5,00%	0,00%	1,00%
Zn					

Source: ELSAM (not published); MUNLV (2000)

MSW - Waste Incineration Plant					
element	**fe-metals**	**ash&slag**	**filter residues**	**sewage**	**gaseous emission**
C	0,01%	1,45%	0,20%	0,34%	98,00%
N	0,01%	1,45%	0,20%	0,34%	98,00%
S	0,00%	86,00%	6,00%	8,00%	0,00%
Cl	0,00%	46,00%	0,00%	54,00%	0,00%
Cd	0,00%	99,50%	0,40%	0,02%	0,08%
Hg	0,00%	46,00%	50,00%	0,00%	4,00%
Pb	0,00%	99,90%	0,10%	0,00%	0,00%
Zn	0,00%	99,88%	0,10%	0,00%	0,02%

Source: SCHACHERMAYER et al. (1994), ECOLING (1997)

Landfill - organic type ("MSW-landfill") examination period: 100 a			
element	**stable residue**	**leakage water**	**gaseous emission**
C	53,70%	0,30%	46,00%
N	62,00%	37,44%	0,56%
S	81,00%	17,80%	1,20%
Cl	62,00%	37,90%	0,10%
Cd	100,00%	0,00%	0,00%
Hg	99,90%	0,09%	0,01%
Pb	100,00%	0,00%	0,00%
Zn	100,00%	0,00%	0,00%

Source: GUA, AWS, IFIP (2000)

Landfill - organic type ("MSW-landfill") examination period: 10.000 a			
element	**stable residue**	**leakage water**	**gaseous emission**
C	5,00%	3,00%	92,00%
N	5,00%	94,40%	0,60%
S	1,00%	97,80%	1,20%
Cl	1,00%	98,90%	0,10%
Cd	58,00%	42,00%	0,00%
Hg	0,00%	99,99%	0,01%
Pb	93,00%	7,00%	0,00%
Zn	0,00%	100,00%	0,00%

Source: GUA, AWS, IFIP (2000)

Landfill - organic type ("rotting-residues-landfill") examination period: 100 a			
element	**stable residue**	**leakage water**	**gaseous emission**
C	69,00%	0,00%	31,00%
N	46,00%	53,44%	0,56%
S	87,00%	12,10%	0,90%
Cl	71,00%	28,91%	0,09%
Cd	100,00%	0,00%	0,00%
Hg	99,90%	0,09%	0,01%
Pb	100,00%	0,00%	0,00%
Zn	100,00%	0,00%	0,00%

Source: GUA, AWS, IFIP (2000)

Landfill - organic type ("rotting-residues-landfill") examination period: 10.000 a			
element	**stable residue**	**leakage water**	**gaseous emission**
C	4,00%	3,00%	93,00%
N	4,00%	95,20%	0,80%
S	5,00%	94,10%	0,90%
Cl	4,00%	95,91%	0,09%
Cd	43,00%	57,00%	0,00%
Hg	0,00%	99,99%	0,01%
Pb	83,00%	17,00%	0,00%
Zn	30,00%	70,00%	0,00%

Source: GUA, AWS, IFIP (2000)

Landfill - inorganic type ("ash/slag-landfill") examination period: 100 a			
element	**stable residue**	**leakage water**	**gaseous emission**
C	100,00%	0,00%	0,00%
N	85,00%	15,00%	0,00%
S	98,00%	2,00%	0,00%
Cl	64,00%	36,00%	0,00%
Cd	100,00%	0,00%	0,00%
Hg	97,00%	3,00%	0,00%
Pb	100,00%	0,00%	0,00%
Zn	100,00%	0,00%	0,00%

Source: GUA, AWS, IFIP (2000)

Landfill - inorganic type ("ash/slag-landfill") examination period: 10.000 a			
element	**stable residue**	**leakage water**	**gaseous emission**
C	98,00%	2,00%	0,00%
N	3,00%	97,00%	0,00%
S	7,00%	93,00%	0,00%
Cl	0,00%	100,00%	0,00%
Cd	66,00%	34,00%	0,00%
Hg	0,00%	100,00%	0,00%
Pb	99,00%	1,00%	0,00%
Zn	97,00%	3,00%	0,00%

Source: GUA, AWS, IFIP (2000)

11.5 Emissions of Energy Consumption

11.5.1 Primary Processes (Fossil Energy Carriers, Generation of Electricity)

Primary Processes

Energy Carrier		**air [g/unit]**						
	unit	CO2	CH4	CO	SO2	NOx	NMVOC	dust
el. energy (1)	kWhel	8,73E+02	1,91E+00	1,44E-01	3,62E+00	1,75E+00	1,88E-01	1,12E+00
diesel	l	4,24E+02	3,70E+00	5,88E-01	2,32E+00	2,23E+00	7,38E+00	3,19E-01
fuel oil (heavy)	l	6,34E+02	4,62E+00	7,00E-01	3,59E+00	2,91E+00	9,06E+00	4,80E-01
fuel oil (light)	l	4,22E+02	3,72E+00	5,27E-01	2,32E+00	2,23E+00	7,37E+00	2,14E-01
hard coal	kg	1,24E+02	8,09E+00	2,50E-01	1,45E+00	9,83E-01	2,75E-01	n.v.
lignite	kg	6,73E+02	1,86E-01	3,30E-01	4,87E+00	9,53E-01	4,44E-02	n.v.
natural gas	m3	2,19E+02	5,45E+00	4,62E-01	8,61E-01	7,63E-01	9,59E-01	1,16E-01
wood	kg	n.v.	n.v.	n.v.	n.v.	n.v.	n.v.	n.v.

Energy Carrier		**air [g/unit]**						
	unit	PCDD/F	HCl	CFC	Cd	Hg	Pb	Zn
el. energy (1)	kWhel	n.v.	1,55E-01	1,02E-07	1,03E-05	2,86E-05	1,02E-04	2,23E-04
diesel	l	n.v.	1,11E-02	1,03E-08	1,75E-05	6,16E-06	4,93E-05	5,75E-04
fuel oil (heavy)	l	n.v.	1,93E-02	4,86E-08	6,00E-05	1,05E-05	1,50E-04	1,05E-03
fuel oil (light)	l	n.v.	1,11E-02	5,75E-08	1,18E-05	6,13E-06	8,88E-05	3,06E-02
hard coal	kg	n.v.	1,43E-02	3,12E-08	n.v.	3,91E-06	8,79E-05	1,76E-04
lignite	kg	n.v.	1,78E-01	3,12E-08	n.v.	2,30E-05	1,62E-03	n.v.
natural gas	m3	n.v.	1,70E-03	2,52E-08	8,60E-07	1,02E-05	1,56E-05	1,72E-05
wood	kg	n.v.	n.v.	n.v.	n.v.	n.v.	n.v.	n.v.

Energy Carrier		**water [g/Input]**						
	unit	COD	NH4	Cd	Hg	Pb	Zn	Cl-
el. energy (1)	kWhel	2,14E-03	1,95E-03	1,90E-05	6,39E-07	1,79E-03	3,47E-03	2,67E+00
diesel	l	6,76E-02	7,69E-02	3,04E-05	2,70E-07	7,40E-05	1,60E-03	2,58E+01
fuel oil (heavy)	l	2,43E-02	4,77E-02	3,22E-05	3,20E-07	2,29E-04	1,82E-03	3,18E+01
fuel oil (light)	l	4,87E-02	7,68E-02	2,41E-05	1,94E-07	8,55E-05	1,60E-03	2,58E+01
hard coal	kg	1,38E-03	3,29E-03	6,70E-05	4,44E-08	6,65E-03	2,60E-02	1,35E+01
lignite	kg	1,38E-03	1,00E-04	6,70E-05	4,44E-08	6,65E-03	4,89E-05	5,44E-02
natural gas	m3	7,50E-04	1,23E-03	1,15E-06	1,84E-06	1,02E-04	4,87E-04	8,90E-01
wood	kg	n.v.	n.v.	n.v.	n.v.	n.v.	n.v.	n.v.

n.v. no value available

source: (dark grey) HABERSATTER et al. (1999)

(light blue) SUTER et al. (1996)

(white) resume of HABERSATTER and SUTER

(1) emissions according to the European electricity mix applied

11.5.2 Use in Processes within the Analysed System

Use in Processes within the Analysed System

Energy Carrier	unit	air [g/unit] CO2	CH4	CO	SO2	NOx	NMVOC	dust
el. energy	kWhel	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
diesel	l	2,63E+03	n.v.	1,60E+01	3,19E+00	5,21E+01	8,40E+00	9,24E-01
fuel oil (heavy)	l	3,12E+03	1,20E-01	6,00E-01	4,80E+01	6,40E+00	2,40E-01	2,00E+00
fuel oil (light)	l	2,65E+03	3,59E-02	4,30E-01	2,33E+00	2,15E+00	1,08E-01	3,59E-03
hard coal	kg	2,64E+03	2,89E-01	2,89E+00	1,45E+01	5,78E+00	4,97E-02	2,10E+00
lignite	kg	1,78E+03	5,85E+00	2,81E+00	1,95E+00	1,95E+00	3,39E-01	2,10E+00
natural gas	m3	2,15E+03	7,26E-02	5,08E-01	1,82E-02	1,71E+00	1,00E-01	7,26E-03
wood	kg	1,81E+03	1,03E+00	1,27E+01	3,84E-01	1,62E+00	1,70E+00	1,44E+00

Energy Carrier	unit	air [g/unit] PCDD/F	HCl	CFC	Cd	Hg	Pb	Zn
el. energy	kWhel	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
diesel	l	n.v.	n.v.	1,03E-08	1,75E-05	n.v.	1,43E-04	5,75E-04
fuel oil (heavy)	l	1,80E-11	5,76E-02	4,86E-08	1,32E-03	6,00E-06	2,28E-03	1,60E-03
fuel oil (light)	l	1,61E-11	3,37E-03	5,75E-08	1,18E-05	1,79E-05	1,49E-06	2,51E-05
hard coal	kg	5,78E-10	1,45E+00	3,12E-08	2,89E-04	8,67E-04	2,31E-03	1,73E-03
lignite	kg	3,90E-11	1,36E-01	3,12E-08	5,85E-05	2,92E-05	7,80E-04	3,90E-03
natural gas	m3	1,09E-12	1,26E-02	2,52E-08	8,60E-07	2,00E-06	9,80E-07	1,72E-05
wood	kg	n.v.	2,04E-02	1,24E-07	9,60E-07	2,95E-08	3,60E-04	3,60E-03

Energy Carrier	unit	water [g/Input] COD	NH4	Cd	Hg	Pb	Zn	Cl-
el. energy	kWhel	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
diesel	l	6,76E-02	4,31E-02	3,04E-05	2,70E-07	7,40E-05	n.v.	3,41E+00
fuel oil (heavy)	l	2,43E-02	1,01E-02	3,22E-05	3,20E-07	2,29E-04	n.v.	n.v.
fuel oil (light)	l	4,87E-02	1,21E-02	2,41E-05	1,94E-07	8,55E-05	n.v.	2,61E+00
hard coal	kg	1,38E-03	9,19E-04	6,70E-05	4,44E-08	6,65E-03	5,52E-04	4,36E-01
lignite	kg	1,38E-03	4,11E-03	6,70E-05	4,44E-08	6,65E-03	2,66E-02	1,38E+01
natural gas	m3	7,50E-04	n.v.	1,15E-06	1,84E-06	1,02E-04	n.v.	n.v.
wood	kg	2,43E-05	2,36E-04	1,49E-07	1,98E-09	2,61E-05	3,48E-06	2,00E-02

n.v. no value available

source:
- (dark grey) HABERSATTER et al. (1999)
- (light blue) SUTER et al. (1996)
- (white) resume of HABERSATTER and SUTER

11.6 Emissions of Processes substituted through Waste Incineration (incl. Emissions of Primary Processes)

incinerator substitutes	power plant		energy mix		
	pulverised coal	gas	el. energy	room heating	industrial heat
	[g/kWh energy content]	[g/kWh energy content]	g/kWhel	g/kWh heat	g/kWh heat
air					
CO2biog	0,00E+00	0,00E+00	0,00E+00	9,90E-02	8,21E-02
CO2foss	3,46E+02	1,99E+02	8,73E+02	3,27E+02	3,09E+02
CH4	6,55E-03	1,51E-02	1,91E+00	7,72E-01	1,01E+00
CO	6,55E-02	3,02E-01	1,44E-01	5,19E-01	5,48E-01
SO2	2,27E-01	1,56E-03	3,62E+00	1,48E+00	1,27E+00
NOx	1,18E-01	3,02E-01	1,75E+00	6,49E-01	6,29E-01
NMVOC	6,55E-03	1,51E-02	1,88E-01	2,91E-01	1,53E-01
dust	8,88E-03	1,51E-03	1,12E+00	2,65E-01	1,96E-01
PCDD/F	n.v.	n.v.	n.v.	n.v.	n.v.
HCl	1,30E-02	2,35E-04	1,55E-01	4,29E-02	8,29E-02
CFC	3,92E-09	5,89E-10	1,02E-07	2,06E-08	1,05E-08
Cd	1,72E-06	8,70E-08	1,03E-05	2,07E-05	9,33E-06
Hg	1,42E-05	5,55E-06	2,86E-05	7,93E-06	8,86E-06
Pb	6,77E-05	1,37E-06	1,02E-04	9,70E-05	1,55E-04
Zn	1,30E-04	2,21E-06	2,23E-04	6,16E-04	3,80E-04
water					
COD	1,61E-03	9,46E-05	2,14E-03	2,49E-03	1,07E-03
NH4	5,25E-04	2,45E-04	1,95E-03	2,25E-03	1,03E-03
Cd	1,88E-05	1,71E-06	1,90E-05	5,74E-06	8,00E-06
Hg	5,14E-07	2,97E-07	6,39E-07	2,31E-07	1,96E-07
Pb	1,81E-03	1,70E-04	1,79E-03	4,20E-04	7,38E-04
Zn	3,63E-03	3,40E-04	3,47E-03	8,29E-04	1,47E-03
Cl-	2,33E+00	2,40E-01	2,67E+00	1,30E+00	1,08E+00

n.v. no value available

source: (grey) FRITSCHE et al. (2000)

(light blue) HABERSATTER et al. (1999)

11.7 Characteristics of Substance Groups and Energy Carriers

11.7.1Substance Groups

	water content	heating value	C	N	S	Cl
substance group	%	MJ/t dm	mg/kg dm	mg/kg dm	mg/kg dm	mg/kg dm
Paper/cardboard (packaging)	29,2%	15.200	4,37E+05	1,89E+03	1,74E+03	2,55E+03
Paper/cardboard (non-packaging)	24,3%	15.200	3,75E+05	1,89E+03	1,74E+03	2,55E+03
Composites (packaging)	26,0%	21.000	4,63E+05	2,10E+03	3,62E+03	3,27E+03
Composites (others)	13,0%	19.000	5,00E+05	2,10E+03	3,62E+03	3,27E+03
Textiles	27,3%	18.700	6,35E+05	2,23E+04	3,11E+03	5,84E+03
Wood, leather, rubber	39,7%	18.600	5,46E+05	9,60E+03	4,26E+03	1,08E+04
Bio-waste (kitchen-type)	71,0%	12.700	3,58E+05	1,89E+04	4,60E+03	4,45E+03
Bio-waste (garden-type)	44,2%	12.200	4,34E+05	1,07E+04	4,44E+03	2,00E+03
Plastics (packaging)	13,7%	35.000	6,96E+05	5,88E+03	1,88E+03	1,12E+04
Plastics (non-packaging)	5,1%	34.000	7,01E+05	5,27E+03	1,24E+03	1,88E+04
Metals (packaging)	33,1%	0	2,31E+04	3,60E+02	6,00E+01	5,45E+02
Metals (others)	17,8%	0	2,31E+04	3,60E+02	6,00E+01	5,45E+02
Glass (packaging)	3,2%	0	3,39E+03	3,05E+02	4,67E+02	2,13E+02
Glass (non-packaging)	2,5%	0	3,39E+03	3,05E+02	4,67E+02	2,13E+02
Mineral materials	5,3%	0	2,72E+04	3,00E+02	0,00E+00	1,00E+02

	Cd	Hg	Pb	Zn
substance group	mg/kg dm	mg/kg dm	mg/kg dm	mg/kg dm
Paper/cardboard (packaging)	2,69E-01	1,42E-01	3,75E+01	2,19E+02
Paper/cardboard (non-packaging)	2,69E-01	1,42E-01	3,75E+01	2,19E+02
Composites (packaging)	9,56E-01	1,82E-01	2,23E+01	1,39E+02
Composites (others)	9,56E-01	1,82E-01	2,23E+01	1,39E+02
Composites (others2)	9,56E-01	1,82E-01	2,60E+02	1,91E+02
Textiles	1,06E-02	7,40E-02	7,67E+01	6,46E+02
Wood (bulky)	8,17E-01	1,13E-01	3,43E+02	4,53E+02
Wood, leather, rubber	3,44E+00	4,01E+00	2,74E+02	2,48E+03
Bio-waste (kitchen-type)	7,70E-01	3,75E-01	6,44E+01	2,88E+02
Bio-waste (garden-type)	4,41E-01	1,81E-01	6,01E+01	6,94E+02
Plastics (packaging)	1,59E+01	1,70E-01	2,34E+02	4,40E+02
Plastics (non-packaging)	2,17E+01	6,02E-01	3,59E+02	3,17E+02
Metals (packaging)	4,65E+00	1,80E+01	1,97E+03	2,89E+03
Metals (bulky)	4,65E+00	1,80E+01	1,97E+03	2,89E+03
Metals (others)	4,65E+00	1,80E+01	1,97E+03	2,89E+03
Glass (packaging)	7,77E-01	4,00E-02	3,17E+02	7,13E+01
Glass (non-packaging)	7,77E-01	4,00E-02	3,17E+02	7,13E+01
Mineral materials	1,67E-01	3,33E-01	5,56E+01	5,00E+01

sources:

(white) resume of ESSENT Milieu (not published); GUA, AWS, IFIP (2000)

(grey) resume of IBA, BZL, CUTEC (1998); ESSENT Milieu (not published); Borealis Polymers (not published)

(light blue) resume of IBA, BZL, CUTEC (1998); MORF, L.S., BRUNNER, P.H. (1999); RIJPKEMA L.P.M., ZEEVALKINK J.A., (1996); KOST et al. (2000a); KOST et al. (2000b), FEHRINGER et al. (1997), RIVM (1999); Witzenhausen-Institut & Umwelttechnik&Ingenieure (2000)

11.7.2 Energy Carriers

energy carrier	water content	heating value	C	N	S	Cl
	%	MJ/t dm	mg/kg dm	mg/kg dm	mg/kg dm	mg/kg dm
hard coal	5,0%	29.200	7,50E+05	1,20E+04	1,00E+04	1,50E+03
lignite	51,0%	23.500	6,00E+05	1,00E+04	6,50E+03	1,00E+03
fuel oil (heavy)		40.000	8,50E+05	3,00E+03	1,50E+04	1,00E+01
natural gas		45.750	7,50E+05			

energy carrier	Cd	Hg	Pb	Zn
	mg/kg dm	mg/kg dm	mg/kg dm	mg/kg dm
hard coal	1,00E+00	5,00E-01	8,00E+01	8,50E+01
lignite	3,00E-01	2,00E-01	5,00E+00	2,50E+01
fuel oil (heavy)	1,00E+00	6,00E-03	1,00E+01	2,00E+01
natural gas				

sources:

NUBER (hard coal: Schlesische-Steinkohle; lignite: Rohbraunkohle Mitteldeutschland)

FEHRINGER et al. (1997)

OPET NETWORK:
ORGANISATIONS FOR THE PROMOTION OF ENERGY TECHNOLOGIES

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NOTICE TO THE READER
A great deal of information on the European Union is available on the Internet. It can be accessed through the Europa server (http://europa.eu.int).

The overall objective of the European Union's energy policy is to help ensuring a sustainable energy system for Europe's citizens and businesses, by supporting and promoting secure energy supplies of high service quality at competitive prices and in an environmentally compatible way. The European Commission's Directorate-General for Energy and Transport initiates, coordinates and manages energy policy actions at transnational level in the fields of solid fuels, oil & gas, electricity, nuclear energy, renewable energy sources and the efficient use of energy. The most important actions concern maintaining and enhancing security of energy supply and international cooperation, strengthening the integrity of energy markets and promoting sustainable development in the energy field.

A central policy instrument is its support and promotion of energy research, technological development and demonstration, principally through the ENERGIE sub-programme (jointly managed with DG Research) within the theme "Energy, Environment & Sustainable Development" under the European Union's Fifth Framework Programme for RTD. This contributes to sustainable development by focusing on key activities crucial for social well-being and economic competitiveness in Europe.

Other programmes managed by DG Energy and Transport such as SAVE, ALTENER and SYNERGY focus on accelerating the market uptake of cleaner and more efficient energy systems through legal, administrative, promotional and structural change measures on a trans-regional basis. As part of the wider Energy Framework Programme, they logically complement and reinforce the impacts of ENERGIE.

The internet address for the Fifth Framework Programme is
http://www.cordis.lu/fp5/home.html

Further information on DG Energy and Transport activities is available at the internet address
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