



Total costs of ownership:
Comparison Incineration Plant-Landfill
Technical Co-Operation Project Bavaria-Sao Paulo



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1 INTRODUCTION

Brazil is booming. The International Monetary Fund IMF draws a positive prognosis for the Brazilian economy and estimates the growth of the gross domestic product (GDP) at 4 % for the current year. With 14 bn. US\$ in 2005 Brazil is listed on a top position in a ranking of recipients of foreign portfolio investments in Latin America. To hold up the aspired trend of the economic growth, substantial investments in infrastructure are provided.

Already 1.200 German enterprises are settled in the metropolitan area of Sao Paulo. It can be expected, that especially in this area investments for the waste management of the more than proportional increase of waste are discussed primarily.

With high respect towards the results of the numerous pre-operating studies in this region (e.g. MBT pilot plant in São Sebastião with the collaboration of GTZ) as well as the efforts of the informal sector in reduction and recycling a waste master plan has to push the reliability of high quality waste management in the region of Sao Paulo.



Therefore the following systems are competing:

- Landfill
- Incineration and energy recovery of waste

This study offers a decision support for executives, who compare in a draft both systems according to the method of Total Costs of Ownership (TCO), regarding the total life time and including the aftercare of landfill.

Relevant variables of the comparison (costs of Personnel, real estate, construction building, energy) can be varied to include basic local conditions and their trends in the future.



2 BASIC DATA

2.1 Time Schedule

The estimated project start for the landfill as well as the incineration plant scenario is the 1st of January 2006. Planning activities lasting one year will start then.

Start of construction will be the 1st of January 2007.

Both facilities will go into service on 1st of January 2008 and the runtime will be 20 years.

Renaturalisation respectively replacement will last one year and will be realised for the incineration plant in 2028 respectively in the last year of the landfill aftercare in 2067.

| | 2006 | 2007 | 2008 | | 2027 | 2028 | | 2067 |
|---------------------------|------|------|------|-------|------|------|-------|------|
| Planning | ■ | | | | | | | |
| Construction | | ■ | | | | | | |
| Operation | | | ■ | ■ | ■ | ■ | ■ | ■ |
| Replacement incineration | | | | | | ■ | | |
| Aftercare landfill | | | | | | ■ | ■ | ■ |
| Renaturalisation landfill | | | | | | | | ■ |

Figure 1: Timetable

Total costs of ownership: landfill - incineration plant; 2006



2.2 Waste Quantity and Composition

Both facilities are designed to dispose respectively incinerate 500.000 tons of domestic waste per year.

The estimated composition of the waste corresponds to waste analysis accomplished in the region of São Sebastião, because no current and verified data of waste composition and heat value in the region of Sao Paulo were available for the report.

To optimise the compacting of the disposed waste it is assumed that plastic hollowware is presorted out of the delivered waste. Therefore the proportion of plastics in the waste is reduced at about 4 % to 12 %. The other fractions have been increased accordingly. The assumed composition of the waste is displayed in subsequent figure 2.

Subject to the composition of the waste the lower heat value was estimated for the design of the incineration plant. The lower heat value estimation is shown in figure 2 as well.

| | Proportion of waste [%] | Specific heat value [kJ/kg] | Heat value of proportion [kJ/kg] |
|-------------------|-------------------------|-----------------------------|----------------------------------|
| Organics | 48 | 5.706 | 2.739 |
| Ferrous Metal | 3 | 0 | 0 |
| Non-ferrous metal | 2 | 0 | 0 |
| Paper | 16 | 13.941 | 2.231 |
| Cardboard | 6 | 13.702 | 822 |
| Plastics | 12 | 30.478 | 3.657 |
| Glas | 2 | 0 | 0 |
| Miscellaneous | 11 | 6.643 | 731 |
| Sum | 100 | | 10.180 |

Figure 2: Waste composition and heating value
 Total costs of ownership: landfill - incineration plant; 2006

3 LANDFILL

3.1 Landfill Data

The proposed concept is based upon the assumption that an inclination landfill can be constructed. The design of an inclination landfill gives the chance to collect the leachate safely with reasonable expenses and allows furthermore a cost effective operation of the landfill.

Both landfill base and inclination have a continuous base seal (→ 3.2.2) with a 3-layer clay body plus one layer with gravel.

| | |
|--|------------|
| Inclination landfill body | 1:3 |
| Width landfill base [m] | 150 |
| Inclination base seal [%] | 5 |
| Landfill volume [m ³] | 10.000.000 |
| Landfill profile [m ²] | 11.500 |
| Length Landfill [m] | 870 |
| Width base seal [m] | 390 |
| Area base seal [m ²] | 339.300 |
| Width surface sealing [m] | 397 |
| Area surface sealing [m ²] | 345.390 |

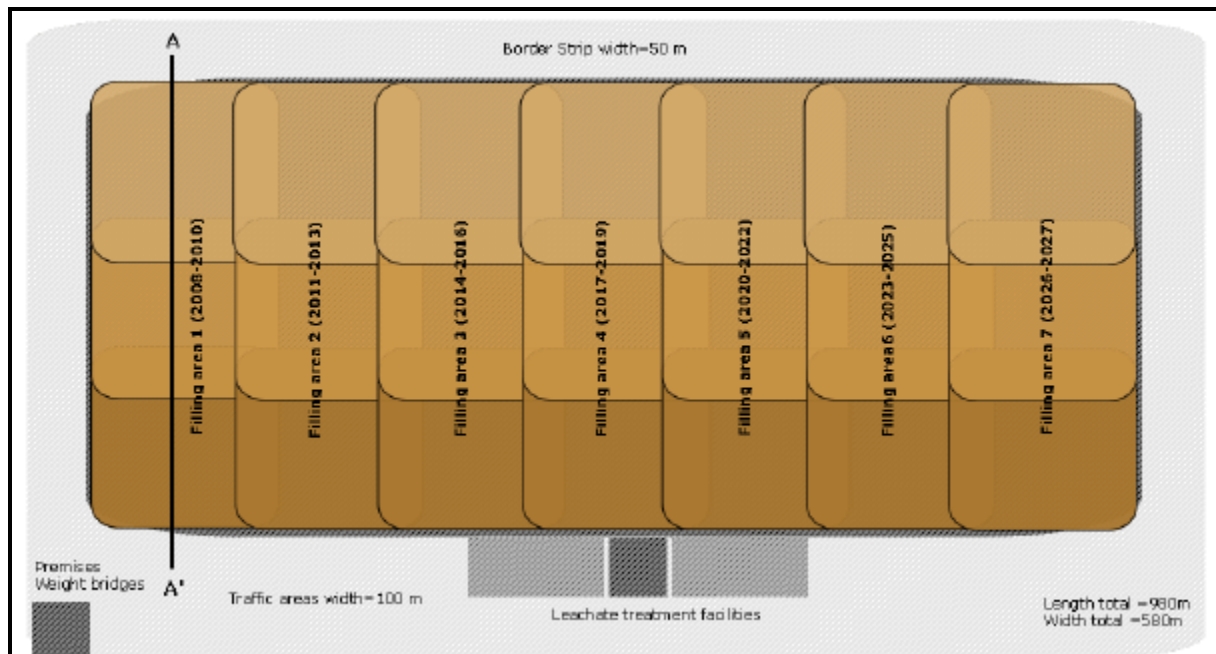
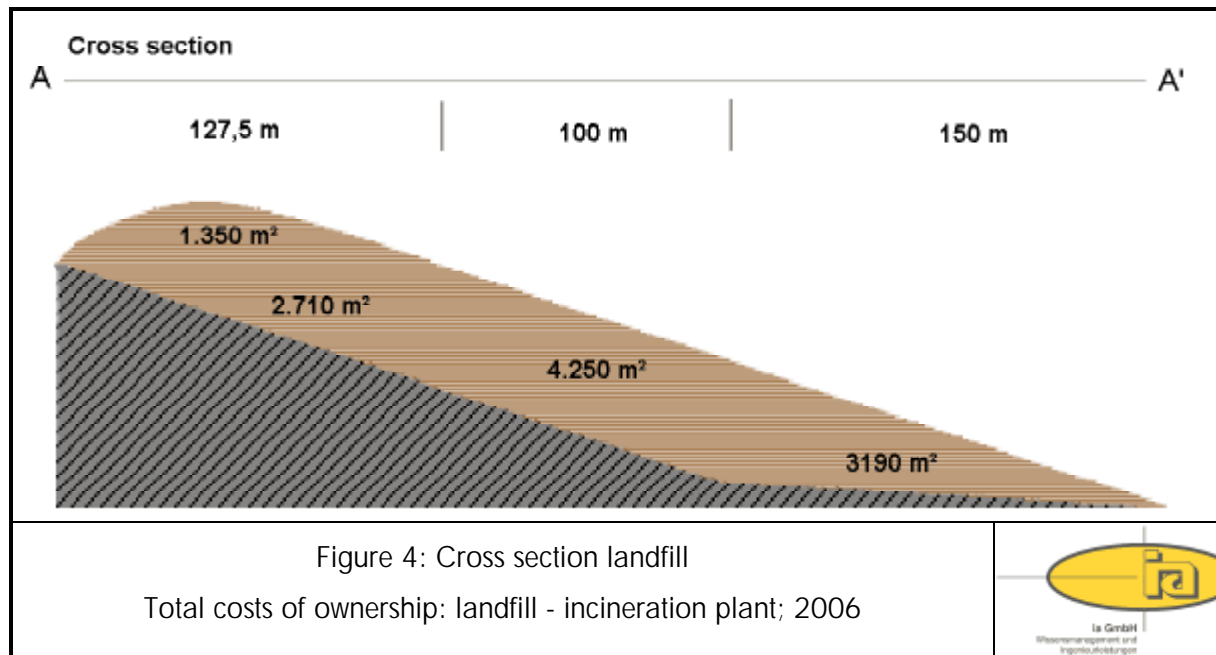


Figure 3: Top view landfill

Total costs of ownership: landfill - incineration plant; 2006



3.2 Costs of Landfill

Provided that the idealised landfill body (→ 3.1) can be implemented, the following costs are expected:

3.2.1 Real Estate

3.2.1.1 Purchase Real Estate

The total area includes the landfill area as well as the areas for border strip, traffic, supply, premises and technical facilities :

- Total area [m²] 524.500
- Unit price real estate [EUR/m²] 2,00

3.2.1.2 External Preparation of Land

The external preparation of land depends on the region the landfill ist located. In a first approach a lump sum of 1.000.000 EUR is estimated.

3.2.1.3 Compensation Areas

According to german and european environmental law natural compensation areas for consumption of land have to be created in the same line. Prices see 3.2.1.1.

3.2.2 Construction Period

3.2.2.1 Surface conditioning

To realize the proposed concept the landfill area has to be prepared with an inclination of 1:3 (→ see figure 4: Cross section landfill). For necessary earth movements to condition the surface a unit price of 10 EUR/m² (total area) is calculated.

3.2.2.2 Base seal, drainage

The base seal is built up in multi-layer body according to the current technical standard in Germany (TASi), unit prices refer to tenders in 2005:

| | |
|---|---------------------------------|
| • Clay, 3x25 cm | 15,00 EUR/m ² |
| • Plastic liner, 2,5 mm | 11,00 EUR/m ² |
| • Geotextile, 2000 g/m ² | 8,00 EUR/m ² |
| • Drainage layer (gravel), 50 cm | 13,00 EUR/m ² |
| • Pipelines 7 x 150m (landfill base) + 900 m collector = 1950 m + pipeline cover 175 EUR/m = | approx. 1,00 EUR/m ² |
| Sub-total 1 | 48,00 EUR/m² |
| • 15 % building site equipment | 7,00 EUR/m ² |
| Sub-total 2 | 55,00 EUR/m² |
| • External quality control | 15,00 EUR/m ² |
| • Excess charge | 10,00 EUR/m ² |
| Total | 80,00 EUR/m² |

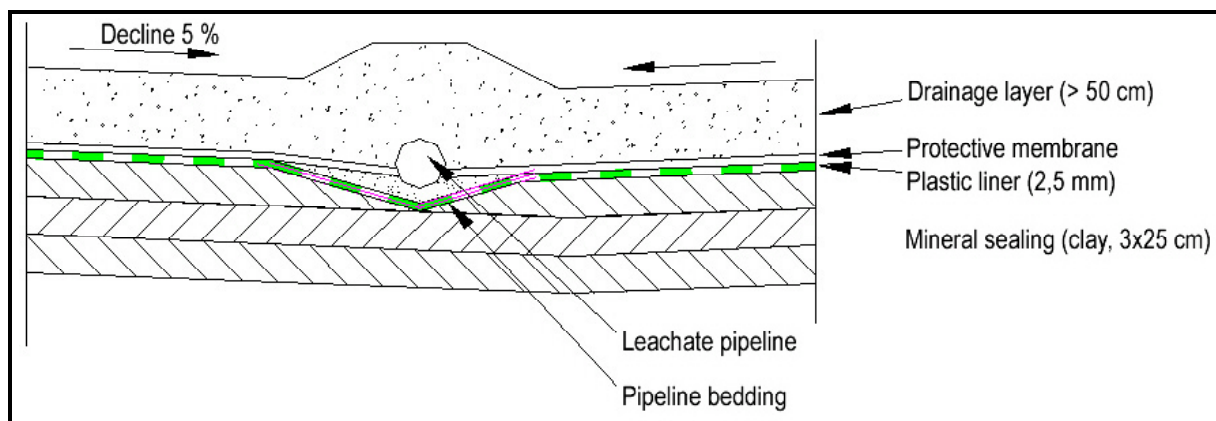
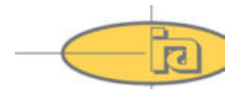


Figure 5: Base seal landfill

Total costs of ownership: landfill - incineration plant; 2006



3.2.2.3 Internal preparation of land, traffic areas

For preparation of border strips, traffic areas, supply, premises, technical facilities etc. a unit price of 20 EUR/m² (total area without landfill area) is calculated.

3.2.2.4 Leachate treatment facilities

Due to the long operational time of leachate treatment (20 years of operational time plus 40 years of aftercare) and to avoid the calculation of several necessary reinvestments, costs for constructions (pipes, pumps, technical facilities) of leachate treatment are included in a unit price per m³ for the expected leachate volume. (Volume calculation see 3.2.3.4)

3.2.2.5 Leachate basin

For the construction of a leachate basin a lump sum of 4.500.000 EUR is calculated.

3.2.2.6 Premises and weight bridges

For administration and personal facilities premises are built up next to the entrance of the area. They are completed by 4 weight bridges, 2 for the weighting of incoming trucks, 2 for the weighting of outgoing trucks.

3.2.2.7 Degasification

The degasification consists of several technical or constructional parts, which have to be built up according to the progress of the landfilling. In addition the technical parts, such as gas motors and gas control stations, have to be rebuilt periodically.

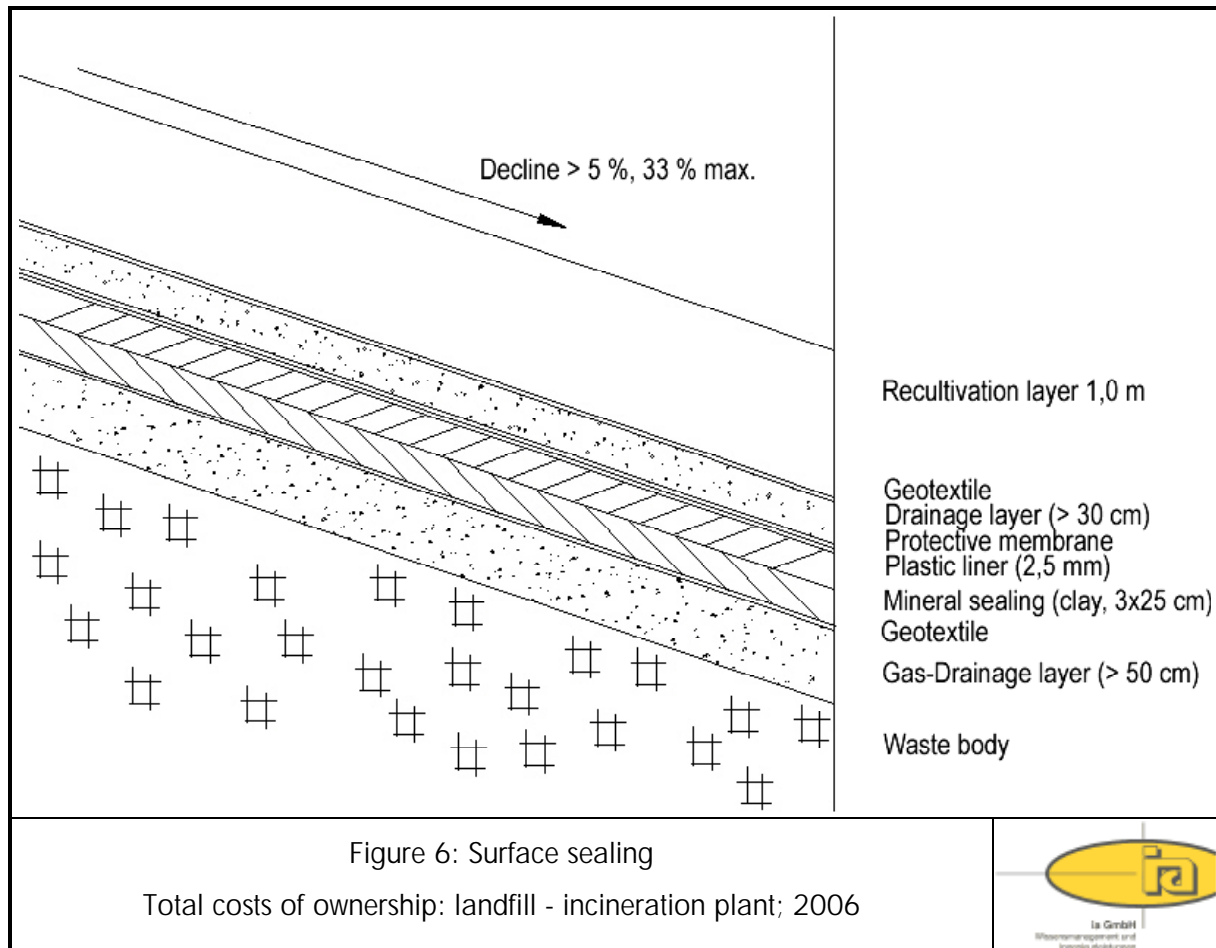
- *Gas recovery*
In each filling section a separate gas recovery system, including gas motor, compressor and container, is required. During the operating period these systems are replaced after 10 years, due to declining gas volume after the landfilling, half of the costs for reinvestments are expected in the aftercare period.
- *Gas well*
On average every 15 m a gas well is required on the landfill surface. In total these are 390 gas wells. Following unit prices, based on tenders in 2005, are calculated:
 - Vertical gas well with pipes and filter: 1.000 EUR/m x 40 m height = 40.000 EUR
 - Well head: 2.500 EUR
 - Connection pipes (on average 200 m per gas well)
= 200 x 12,50 EUR/m = 2.500 EUR
 - = total 45.000 EUR per gas well

- Gas control station*
 For every 15 gas wells a gas control station is required. Relating to 390 gas wells these are 26 gas control stations. To simplify the calculation during the operating period the costs for building up the gas control stations are annualised and sum up to 52.000 EUR per year. Necessary reinvestments start in 2018, also with annual costs of 52.000 EUR. In the aftercare period all gas control stations are already built, replacements are made consecutively with cost of 104.000 EUR per year.

3.2.2.8 Surface sealing, recultivation

In order to minimise the leachate volume, every filling section is closed with a surface sealing soon after subsidences die down. Recultivation layer follows. After the complete landfilling the last surface sealing is made in 2028.

For surface sealing and recultivation a unit price of 80 EUR/m² is calculated.





3.2.2.9 Reloading station

With a volume of approx. 1.500 tons per day and a filling area of 150 x 150 m the traffic on the landfill has to be organised properly. In addition normal garbage trucks are not suited to drive the open dumping area on the landfill. Therefore a reloading station at the entrance of the landfill area is recommended.

At a reloading station garbage trucks can unload the waste on bigger dump trucks which can drive waste bodies.

The construction is calculated with 2.000.000 EUR.

3.2.2.10 Planning

The costs for main planning depend on the total costs for construction and occur before or during the construction period. A proportion of 3 % of the total costs is proposed.

3.2.2.11 Detailed planning and building inspection

Costs for detailed planning and building inspection refer to constructions made in the corresponding year and require approx. 6 % of the construction costs.

3.2.3 Operating period

The total costs of ownership, that result from the planning, construction, operating and aftercare period have to be covered with the revenues from waste fees collected during the operating period or other revenues like gas recovery with production of electrical power during the whole operating and aftercare period.

Operational costs per year

3.2.3.1 Personnel

In the operating period the following amount of personnel is required:

| | |
|-----------------|-----------|
| Workers | 10 |
| Skilled workers | 10 |
| Executives | 4 |
| Administration | 5 |
| Guards | 6 |
| Total | 35 |

Due to illness and holidays an additional factor for absence of 15 % of the total personnel costs is calculated.



3.2.3.2 Energy

Most of the required energy is the fuel for the vehicle fleet. The consumption is calculated as followed:

| | |
|--|-----------------------|
| 2,5 Compactors x 8 h/day x 330 operating days/year x 30 l/h | 198.000 litres |
| 2,0 Wheel loaders x 8 h/day x 330 operating days/year x 30 l/h | 158.400 litres |
| 3,5 dump trucks x 8 h/day x 330 operating days/year x 25 l/h | 231.000 litres |
| Total | 587.400 litres |

In addition approx. 250.000 kWh electrical energy is needed. This consumption is more than compensated with the production of electrical energy generated by the gas recovery.

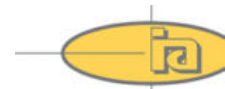
3.2.3.3 Degasification

Degasification includes costs for maintenance of the gas collection as well as the gas recovery (gas motors and compressors) including wear material and external service.

3.2.3.4 Leachate treatment and cleaning

The calculation of leachate volume differentiates between leachate due to the open landfill area and the already covered areas as well as leachate due to pressing water from thin layer filling. Surface water in unfilled areas is not included.

- *Leachate volume filling area:*
 - = open landfill area including border areas (150 m x 300 m)
 - x average rainfall per year (1500 mm)
 - x factor for evaporation 50 %
- *Leachate volume due to pressing water:*
 - = waste volume 500.000 Mg/year
 - x organic fraction (48 %)
 - x humidity of organic waste (80 %)
 - x resulting leachate volume (40 %)
- *Leachate volume other areas:*
 - = covered areas
 - x average rainfall per year (1500 mm)
 - x factor for covering 5 %
 - x 50 % for linear calculation during the whole operating period (1st year the covered area = 0 %, after the 20th year the covered area is 100 % → average: 50 %)



3.2.3.5 Vehicle fleet

For landfilling the following vehicles are required:

| | |
|---------------|----------|
| Compactors | 3 |
| Wheel loaders | 2 |
| Dump trucks | 4 |
| Total | 9 |

Annual costs for the vehicles are calculated as follows:

Purchase costs for the vehicles
x Runtime (10 years)
x Maintenance factor (15 % of purchase costs)

3.2.3.6 Administration

The costs for administration include general costs like accounting, office equipment etc. without personnel. The costs are calculated in % of total personnel costs.

Costs for administration personnel see 3.2.3.1.

Operational revenues per year

3.2.3.7 Gas recovery

To estimate the possible annual revenues for the gas recovery, a calculation of the achievable gas quantity has to be made. The following parameters are supposed:

Capacity of landfill gas approx. 175 m³ (m³=Standard cubic metre) per Mg waste
= 10.000.000 Mg x 175 m³ = 1.750.000.000 m³

x achievable level of collection: 50 %

= 875.000.000 m³

x achievable electrical energy approx. 1,25 KWh per m³

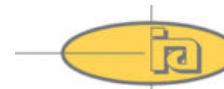
= 1.093.750.000 kWh

x revenue for power input: 0,02 EUR/kWh

= 21.875.000 EUR

spread over a runtime of 20 years operation period and 40 years aftercare period

= 365.000 EUR/year



3.2.3.8 Waste fees

As a result of the whole TCO comparison calculation the required waste fees related to Mg per year are a benchmark to valuate both methods. The results by using the landfill method is shown in 3.4.

3.2.4 Aftercare

In the aftercare period the cost parameters are similar to the operating period. Following single parameters are differencing the aftercare period:

3.2.4.1 Personnel

In the operating period the following amount of personnel is required:

| | |
|-----------------|----------|
| Workers | 2 |
| Skilled workers | 1 |
| Executives | 1 |
| Administration | 1 |
| Guards | 2 |
| Total | 7 |

3.2.4.2 Energy

Most of the required energy is the fuel for the vehicle fleet. The consumption is calculated as followed:

| | |
|--|----------------------|
| 1,0 Wheel loader x 1,5 h/day x 150 operating days/year x 30 l/h | 6.750 litres |
| 1,0 other vehicle x 1,5 h/day x 150 operating days/year x 25 l/h | 5.625 litres |
| Total | 12.375 litres |

In addition approx. 75.000 kWh electrical energy is needed.

3.2.4.3 Degasification

Equal cost level like in the operating period.

3.2.4.4 Leachate treatment and cleaning

In the aftercare period all the landfill area is covered with a surface sealing. In addition a decline of leachate volume of 5 % per year is expected:

Leachate volume:
= covered areas
x average rainfall per year (1500 mm)
x factor for covering 5 %
- 5 % decline per year



3.2.4.5 Vehicle fleet

For maintenance of the landfill the following vehicles are required:

| | |
|---------------|----------|
| Wheel loader | 1 |
| Other vehicle | 1 |
| Total | 2 |

Annual costs for the vehicles are calculated as follows:

Purchase costs for the vehicles
x Runtime (10 years)
x Maintenance factor (15 % of purchase costs)

3.2.4.6 Administration

The costs for administration include general costs like accounting, office equipment etc. without personnel. The costs are calculated in % of total personnel costs.

Costs for administration personnel see 3.2.4.1.

3.2.4.7 Gas recovery

Revenues for gas recovery during the aftercare period see 3.2.3.7

3.2.5 Renaturalisation

With termination of the aftercare period all operational facilities have to be removed to renaturalise the whole area. Basically these facilities are the 390 gas wells and the other facilities like premises, weight bridges, traffic areas, enclosing and the leachate basin.

The dismantling of gas wells and the closing of the surface sealing is calculated with 5.000 EUR per gas well. The removal of other facilities costs approx. 1.800.000 EUR.

3.2.6 Insurances

For the operating and aftercare period of a landfill several insurances are necessary and refer to the amount of personnel.

3.2.6.1 Environmental Liability Insurance

The environmental liability insurance provides the coverage for operators for third-party claims that are the result of pollution events on, at, under or coming from the covered location.

The insurance contribution depends on the amount of disposed waste and is 0,025 EUR per Mg waste input.



3.2.6.2 Directors and officers professional liability insurance

The directors & officers professional liability insurance provides coverage for companies and insured from financial impact when claims are made against their directors or officers for committing negligent acts, errors or omissions, or misleading statements. The calculations were made with a contribution of 2.500 EUR per year and person and an insurance sum of 10 million EUR per event. The coverage includes the 4 executives working at the landfill and 2 additional persons out of public bodies.

3.2.6.3 Accident insurance for employees

The accident insurance covers all costs due to accidents with employees during the operating as well as the aftercare period.

3.3 Total costs of ownership landfill

After fixing the basic data of costs and revenues during the lifetime of the landfill, there are several parameters, like interest rates for loans or inflation rate, that have a major influence on the results.

To allow the calculation of the TCO of landfill and incineration the following parameters are presumed:

Interest rate [debit]: 5,00%

Interest rate [credit]: 3,00%

Inflation rate: 2,00%

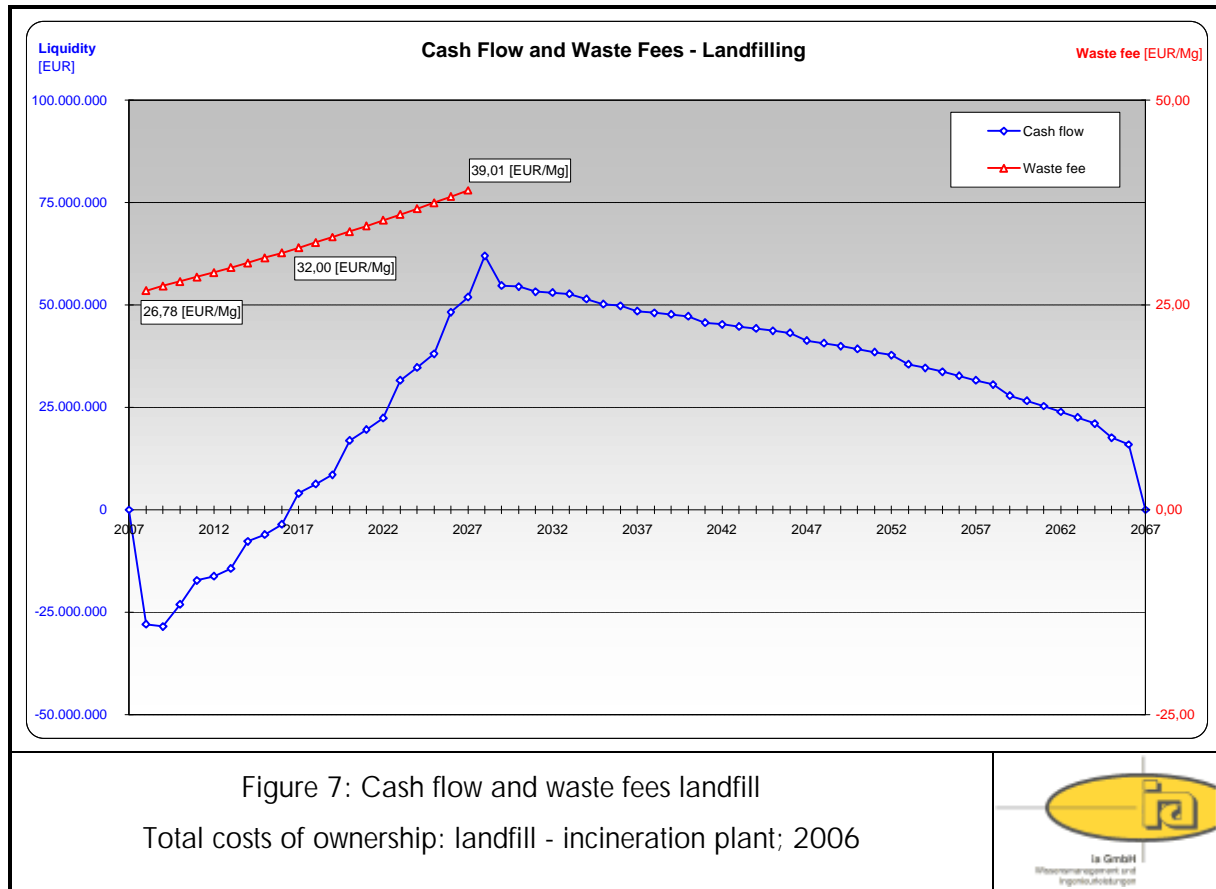
According to the inflation rate the calculated waste fees are increasing in the operating period:

1st year: 26,78 EUR/Mg

10th year: 32,00 EUR/Mg

20th year: 39,01 EUR/Mg

In order to cover the expenses in the aftercare period, all the required revenues have to be made in the operating period. First the initial investments and operating costs are covered by loans or overdrafts and are repayed with revenues from gas recovery and waste fees in the following years. In 2028 these revenues have created a cash flow of + 68.000.000 EUR. After 40 years of aftercare the cash flow is reduced to ± 0 EUR.



In figure 7 the waste fees are represented by the red line rising in accord with the inflation. Waste fees are only raised during the operating time. The reserves for the aftercare have to be set up during the operation period.

The blue line shows the liquidity in the construction, operating and aftercare period.

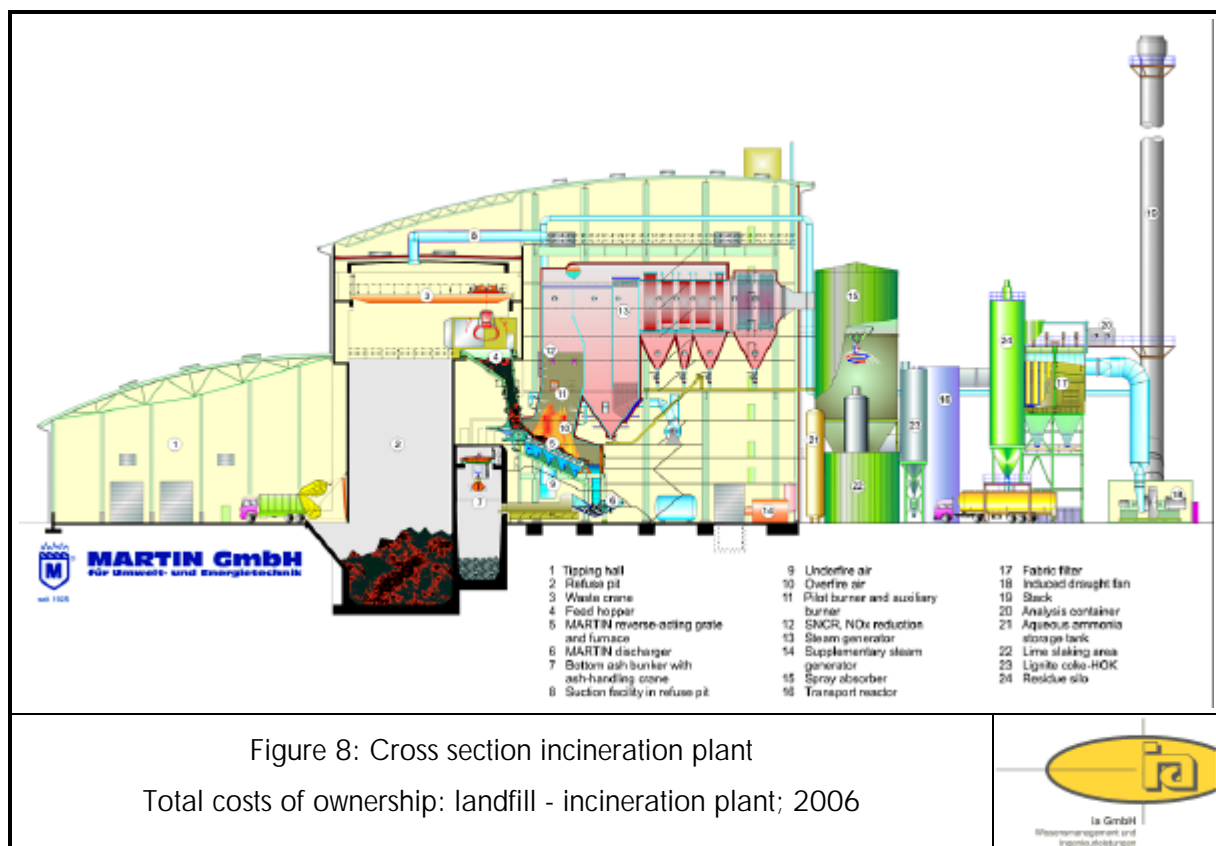
4 INCINERATION PLANT

4.1 Incineration Plant Data

According to the quantity and the composition of the household waste in the region of Sao Paulo (see chapter 2.2) the design point for the incineration plant is appointed by a heat value of 10.250 kJ/kg and a throuput of 500.000 Mg/a.

Technical equipment, lay out of the design and the estimated costs are based on the operational experience of Bavarian incineration plant operators, the longtime experience of the incineration plant contractor MARTIN GmbH and the planning bureau ia GmbH - Wissensmanagement und Ingenieurleistungen.

Subsequent cross section shows an incineration plant designed similar to the plant used for following TCO calculations.



| | |
|---|---------|
| Annual capacity [Mg/a] | 500.000 |
| Number of lines | 2 |
| Waste capacity per line [Mg/d] | 800 |
| Number of operating days per year | 313 |
| Amount of slag (18 % moisture content) [% of waste input] | 24,0 |



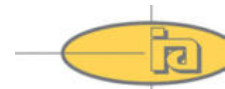
| | |
|--|----------|
| Slag recycling [% of slag amount] | 95 |
| Boiler and filter dust incl. reaction products out of flue gas cleaning [% of waste input] | 4,5 |
| Boiler and filter dust recycling [% Boiler and filter dust] | 100 |
| Ferrous metal [% of waste input] | 3,0 |
| Non-ferrous metal [% of waste input] | 2,0 |
| Thermal capacity per line [MW] | 95 |
| Steam output per line [Mg/h] | 112 |
| Steam pressure [bar] | 40 |
| Steam temperature [°C] | 400 |
| Industrial application steam pressure [bar] | 6 |
| Industrial application steam temperature [°C] | 160 |
| Industrial application steam output [Mg/h] | 180 |
| Joint district heating flow and return temperature [°C] | 110 / 60 |

The incineration plant used for this scenario contains following components:

- Acceptance region with 4 weightbridges, administration building and workshops,
- tipping hall with 12 dropping boxes,
- refuse tipp with a buffer volume of approx. 3-4 days and appropriate suction system,
- waste feed with crane system and hopper,
- boiler with reverse acting grate, furnace, discharger and burner,
- bottom ash bunker with crane system,
- steam generator,
- flue gas cleaning system,
- energy generation (with steam turbine and use of steam for industrial applications),
- connection to industrial applicateion,
- slag conditioning through sieving, metal deposition and conveyer systems.
- Plant installations like electric installations vacuum cleaning, air supplying or fire protection devices are included as well.

In the northern hemisphere the use of steam for district heating is state of the art, because efficiency and profitability of incineration rises remarkably and district heating can be used easily in adjoined residential areas. In the southern hemisphere it is more likely to use the released energy for industrial applications. For example in the production of bio ethanol the energy could be used for ethanol destillation and absolutation, as well as for biomass conditioning or acid recovery. In accordance to the incineration plants buildt in the northern hemisphere in this scenario the use steam with a temperature of 160°C and a pressure of 6 bar is observed.

The flue gas cleaning system is designed to meet the demands of the European directive on the incineration of waste (Annex V). Flue gas treatment is carried out with the quasi dry method using SNCR technology to reduce NO_x concentration as well as lime milk and activated charcoal (e.g. HOK) to adsorb the acidic gases, organic pollutants and heavy metals. The used activated charcoal is recirculated into the grate fire. Flue gas cleaning is carried out with a fabric filter. The allowed daily average emission values of the incineration plant are shown below.



| | |
|--|------|
| Total dust [mg/m ³] | 10 |
| Total Organic Carbon [mg/m ³] | 10 |
| CO [mg/m ³] | 50 |
| Hydrogen Chloride HCL [mg/m ³] | 10 |
| Hydrogen Fluoride HF [mg/m ³] | 1 |
| Sulphur Dioxide SO ₂ [mg/m ³] | 50 |
| Nitrogen monoxide (NO) and nitrogen dioxide (NO ₂), NO _x [mg/m ³] | 200 |
| Dioxins and furanes (ITE) [ng/m ³] | 0,1 |
| Heavy metals (Sb, As, Pb, Cr, Co, Cu, Mn, Ni, V) [mg/m ³] | 0,5 |
| Cadmium (Cd), Mercury (Hg), Thallium (Tl) [mg/m ³] | 0,05 |

4.2 Costs of Incineration Plant

In subsequent chapters the particular costs of the incineration plant scenario are explained. The calculations are shown in Appendix 2.

4.2.1 Real Estate

4.2.1.1 Purchase Real Estate

An area of 29.000 m² is needed to set up the designated incineration plant. The total size of the incineration plant from the tipping hall to the stack is about 80 to 160 meters. With an additional one storied administration building (size 40 m x 13 m) and four weightbridges the total plant area adds up to rounded 14.000 m². The area for the boarder strip, traffic, supply, premises and technical facilities adds up to another rounded 15.000 m².

Pre-condition for the choice of the real estate is the possibility to connect the incineration plant to an industrial application for steam use..

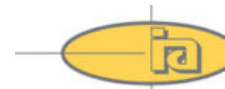
The unit price of the real estate is estimated at 35,- EUR per square meter.

4.2.1.2 Real Estate Development

The development of the area is estimated with a lump sum of 150.000 EUR.

4.2.1.3 Compensation Areas

According to german and european environmental law natural compensation areas for the consumption of land have to be created in the same line. Prices see 4.2.1.1.



4.2.2 Construction Period

4.2.2.1 Construction Building and Technical Equipment

Building

The total invest of buildings construction ads up to 23.700.000 EUR.

This price includes the construction of all buildings, workshops, pits, fundaments of weighbridges etc. No technical equipment is calculated in this price.

Technical Equipment

The total invest of technical equipment ads up to 178.500.000 EUR.

This price includes all technical equipment described in chapter 4.1.

4.2.2.2 Planning

Planning costs contain planning services performed by the planner or the owner. In detail preliminary planning, approval planning, proposals and submission, etc. Engineering and execution costs from the plant constructor are contained in the construction costs named in chapter 4.2.2.1. Planning costs are differentiated between planning activities for the construction of buildings and machinery and electrics in the following way.

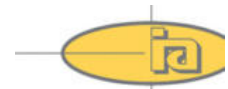
- Planning costs for the construction of buildings are estimated in 8 % of total construction costs.
- Planning costs for the machinery and electrics are estimated in 10 % of total machinery and electrics costs.

4.2.3 Operating Period

The total costs of ownership, that result from the planning, construction, operating and aftercare period have to be covered with the revenues from waste fees collected during the operating period or other revenues like production of electrical power or steam use during the whole operating period.

4.2.3.1 Operational Costs - Personnel

Subsequent table shows the number of employees working in the incineration plant. The plant is operated 24 hours a day in three shifts. Waste delivery is managed by the day shift. The number of employees is calculated with an additional factor for absence of 15 % due to illness and holidays.



| | |
|--|-----------|
| Worker (day shift) | 10 |
| Skilled worker (shift worker) | 20 |
| Executives (5 shift leader + 1 plant manager) | 6 |
| Administration | 5 |
| Guards | 4 |
| Total | 45 |

4.2.3.2 Operational Costs - Maintenance

All maintenance is carried out after the bases of preventive maintenance and repair to achieve maximum lifetime of the plant. So a higher approach in the set up of the maintenance costs is chosen to avoid complete mechanical and thermal wear after 20 operating years.

Longtime experiences of Bavarian plant operators show that 1 % of the construction costs are needed to maintain the fabric of the buildings and 3 % of the costs are needed to maintain machinery and electrics of the technical equipment to meet aforesaid requirements.

4.2.3.3 Operational Costs - Investments

Beside the operating costs for maintenance and repair also a budget for bigger investments has to be provided. Hereby the exchange of cost intensive plant components or wear- and spareparts can be accomplished.

Longterm experience show that 2,5% of the invest of the construction and technical equipment has to be calculated at a runtime of 20 years.

4.2.3.4 Operational Costs - Energy

The subsistence of electricity averages to 6.700 kWh/h per year. All this electricity can be gathered from the electricity which is produced in the incineration plant. The electricity produced in addition to this amount can be purchased and is described in chapter 4.2.3.9 Operational Revenues - Energy.

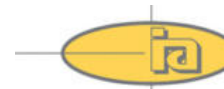
In addition to electricity natural gas is needed for support burners to start plant operation after service interruptions for example after maintenance.

4.2.3.5 Operational Costs - Resources

Further resources are needed to operate the flue gas cleaning system.

Due to the large specific surface area activated charcoal has a high retention of a number of pollutants like heavy metals, dioxins and furanes, hydrogen chloride, sulphur dioxide etc. Used activated charcole is recirculated into the grate fire. An amount of 400 Mg activated charcoal per year is needed to meet the emission standards described in chapter 4.1.

Lime is used to wash the flue gas in the spray absorber. 5.000 Mg lime per year are used in the flue gas cleaning system.



The SNCR method (Selective Non Catalytic Reduction) reduces nitrogen oxides (NO_x) to nitrogen and water vapour. NO_x removal takes place by a temperature between 850° and 1.050°C . Therefore ammonium hydroxide is sprayed into the combustion chamber. 3.000 Mg of ammonium hydroxide is needed to operate the SNCR system per year.

4.2.3.6 Operational Costs - Output to Recycling and Disposal

The quantity of slag output is 24% of the waste input. The moisture content of the slag is 18%. 95% of the slag can be recycled. After slag conditioning all ferrous and non-ferrous metals are separated. Revenues of these fractions are described in chapter 4.2.3.9. Recycled slag can be used for example in roadworks or as an aggregate in concrete production.

Amount of slag for recycling: 89.000 Mg/a

Amount of slag to landfill: 6.000 Mg/a

100% of the boiler and filter dust has to be conditioned before dumping. Amount of boiler and filter dust inclusive reaction products out of flue gas cleaning to landfill: 22.500 Mg/a

4.2.3.7 Operational Costs - Administration

Beside the already calculated personnel working in the administrative area of the plant another 10% of the personnel costs are held out for other administrative costs like accounting, office equipment etc.

4.2.3.8 Operational Costs - Insurances

To minimise financial risks for the plant operator following insurances are contracted.

Environmental Liability Insurance

The Environmental liability insurance provides the coverage for operators for third-party claims that are the result of pollution events on, at, under or coming from the covered location. The insurance contribution depends on the throughput of the incineration plant.

Equipment Breakdown Insurance

The equipment breakdown insurance covers loss resulting from the accidental breakdown of almost any type of equipment that operates under pressure or that controls, transmits, transforms, or uses mechanical or electrical power. The insurance contribution depends on the value of the technical equipment.

To cover consequential loss through business interruption by equipment breakdown the equipment breakdown insurance is extended accordingly. Lost input revenue, disposal of waste and loss of electricity sale is covered by the consequential loss amendment. The insurance contribution depends on the value of the possible loss.



All Risk Property Insurance

The all risk property insurance covers replacement of all buildings and contents damaged by a wide range of occurrences, such as fire, flood, earth movement, explosion, lightning, etc. The insurance contribution depends on the value of buildings and technical equipment.

To cover consequential loss through business interruption by incidents described above the all risk property insurance insurance is extended accordingly. Lost input revenue, disposal of waste and loss of electricity sale is covered by the consequential loss amendment. The insurance contribution depends on the value of the possible loss.

Directors & Officers Professional Liability Insurance

The directors & officers professional liability insurance provides coverage for companies and insured from financial impact when claims are made against their directors or officers for committing negligent acts, errors or omissions, or misleading statements.

The coverage includes all executives working at the plant and 2 additional persons out of public bodies and provides an insurance sum of 10 million EUR per event.

Accident Insurance Employees

The accident insurance covers all costs due to accidents with employees during the operating as well as the aftercare period.

4.2.3.9 Operational Revenues -Energy

The gross efficiency of the electricity production of the incineration plant is 12 % with simultaneous steam use.

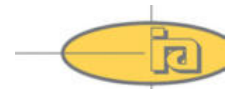
Beside the electricity which is produced for subsistence another 16.100 kWh per year can be inducted into the power supply system.

Additional to the electricity 102.600 kWh per year can be provided for the steam use in industrial applications. According to comparable incineration plants a unit price of 0,03 EUR/kWh is calculated. Substantial revenues can be realised through the provision of Energy through steam use. Economics of the incineration of waste is heavenly dependent on the margin that can be realised by the sale of steam use energy.

4.2.3.10 Operational Revenues - Recourses

According to the waste analysis the fraction of ferrous metal is 3% or 15.000 MG/a. This amount can be saled after slag conditioning.

According to the waste analysis the fraction of non-ferrous metal is 2% or 10.000 MG/a. This amount can be saled after slag conditioning.



4.2.3.11 Operational Revenues - Waste fees

As a result of the whole TCO comparison calculation the required waste fees related to Mg per year are a benchmark to value both methods. The results by using the incineration method is shown in 4.3.

4.2.4 Declining Balance

The observation of Bavarian incineration plants show that deconstructions do not take place and locations of incineration plants are not relocated after 20 years usually. In fact existing incineration plants are brought to the state of the art through replacement investments. Against this background the deconstruction of the plant and the sale of the real estate is not considered as a practical option furthermore.

Consecutively the declining balance of the incineration plant is estimated for the continuing operation instead. So the declining balance shows the estimated cost advantage a further operation of the incineration plant will have against a new plant on a new location.

4.2.4.1 Declining Balance - Buildings and Technical Equipment

Maintenance and repairs leave the traffic areas in a good condition. The steel facades and constructions of the buildings can still be used. Replacement investments are necessary in the areas with high operational demands for example the tipping hall or the refuse pit. The declining balance of the building is put up with 25% of the invest transacted in the beginning of the scenario.

The technical equipment is subject to a strong operational load. Most of the major equipment will have to be replaced in the operating years 21 to 25. So the declining balance for the technical equipment is calculated with 10% of the invest transacted in the beginning of the scenario.

4.2.4.2 Declining Balance - Real Estate

The real estate is not subdued to obsolescence, so the full investment of the real estate is calculated.

4.3 Total Costs of Ownership Incineration Plant

According to parameters defined in 3.4 following waste fees are necessary to achieve total cost recovery:

- 1st year: 19,59 EUR/Mg
- 10th year: 23,42 EUR/Mg
- 20th year: 28,54 EUR/Mg

With the waste fees and the revenues from steam use and materials (ferrous and non-ferrous) all operational costs and the repayment of loans or overdrafts during the operating period can be covered. In addition a declining balance for buildings and technical equipment as well as real estate is calculated and is subtracted at the end of the operating period in 2027.

In subsequent figure 9 the waste fees are shown by the red line and the liquidity by the blue line. In contrast to the landfill scenario no costs incur for aftercare.

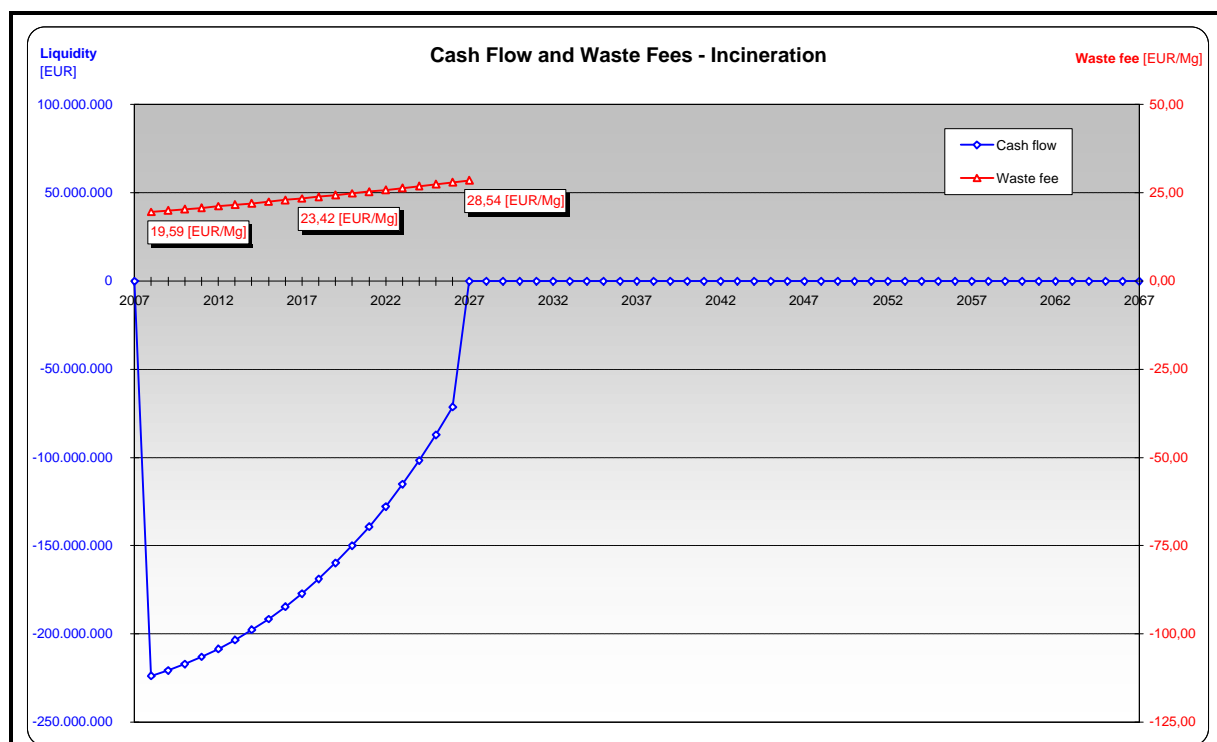


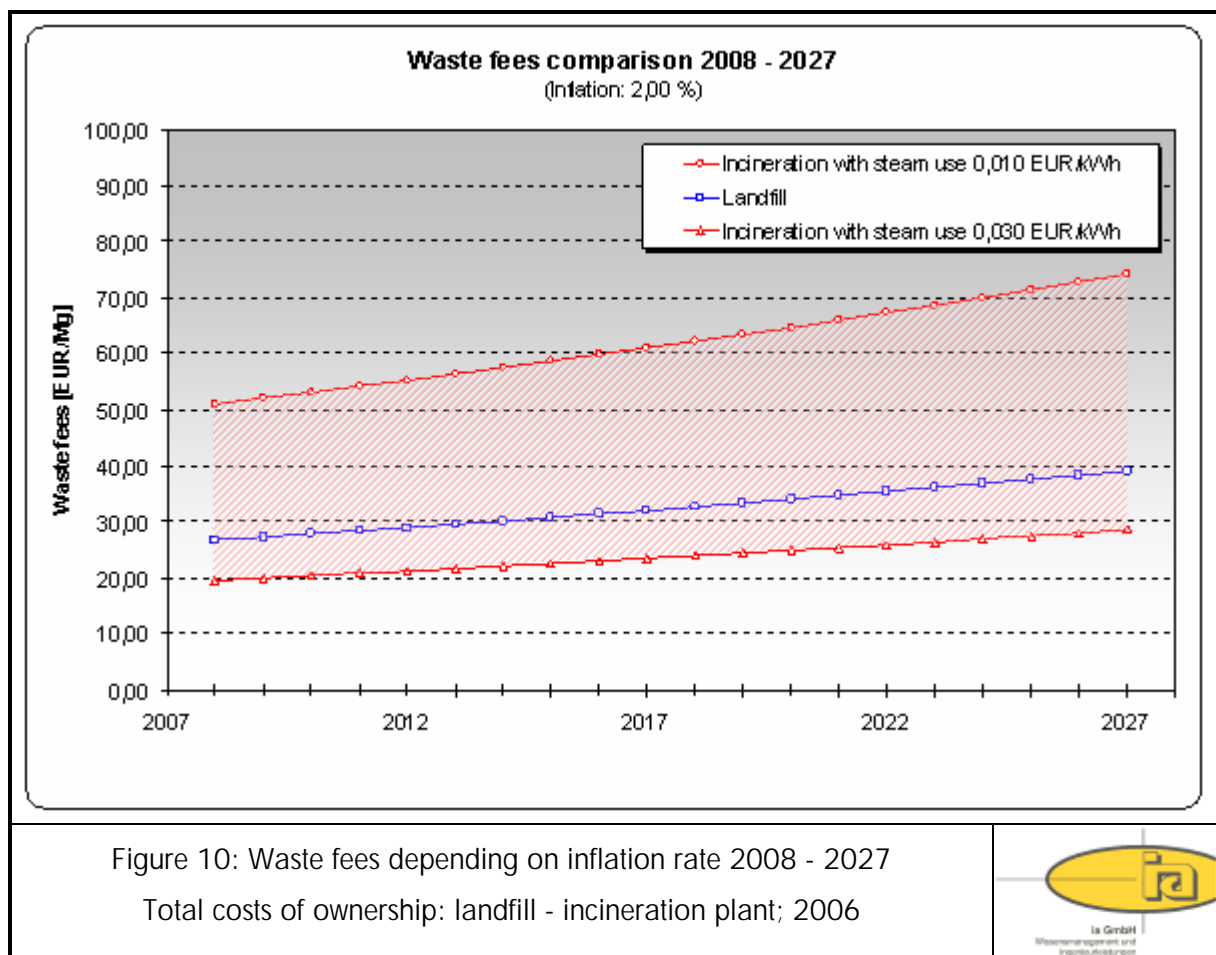
Figure 9: Cash flow and waste fees incineration
Total costs of ownership: landfill - incineration plant; 2006

5 SUMMARY AND TCO COMPARISON LANDFILL - INCINERATION

Based on the estimated parameters, described in chapter 3 and 4, following waste fees for landfill and incineration are calculated. The waste fees correspond to the particular TCO, because all expenses have to be covered with these. As the operating costs and investments of landfill and an incineration plant are mostly fixed, the cash flow is defined by waste fees and achievable revenues from energy production.

Further revenues opened up by the carbon credit market can be expected with the implementation of the clean development mechanism (CDM). These positive effects are not yet considered in this expertise.

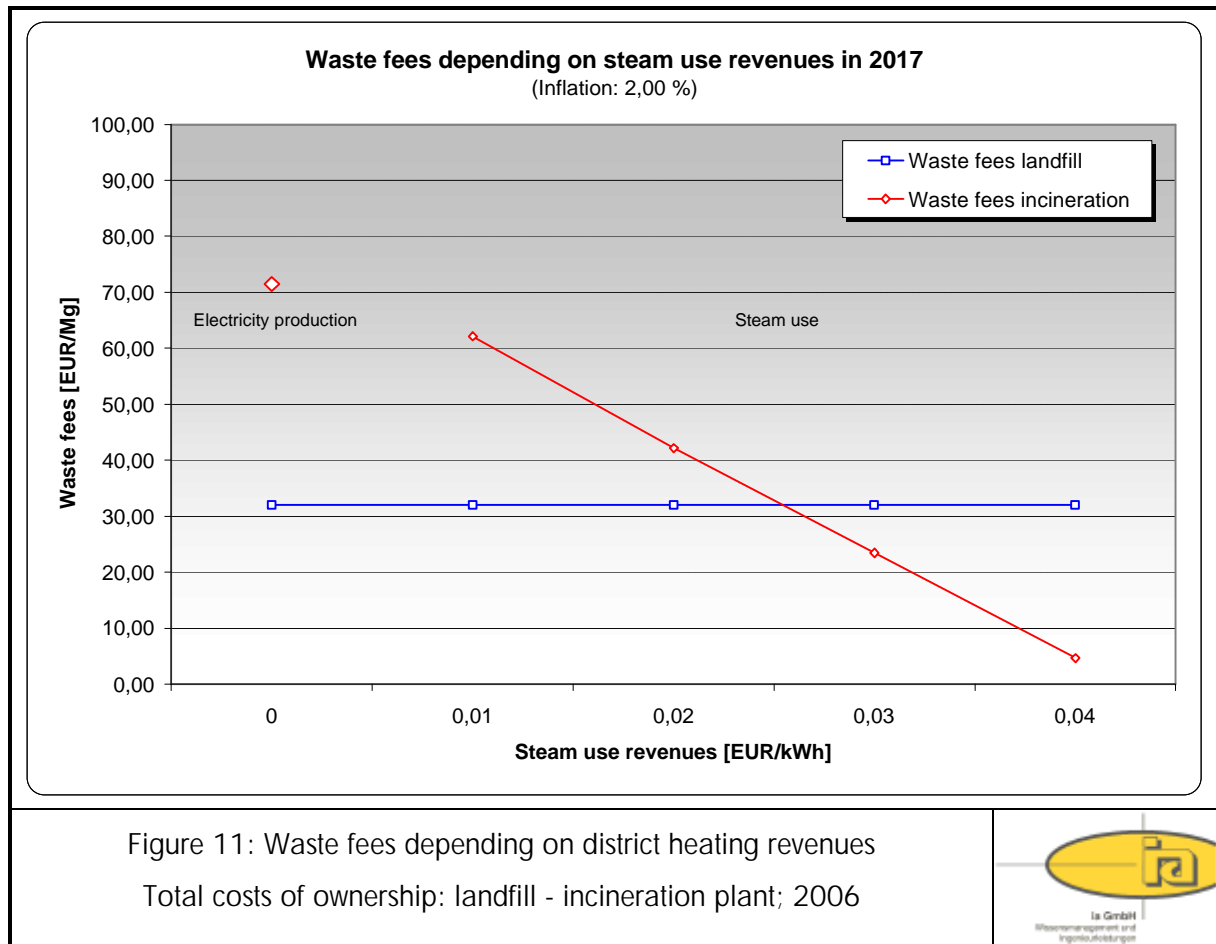
Especially the revenues of incineration plants depend heavily on the prices which can be realised by steam use. Therefore subsequent figure 10 shows the waste fees for incineration in a bandwidth subject to the revenues out of steam use. The bandwidth of incineration is marked in red. The landfill waste fees are shown by the blue line.



To show the bandwidth of the required waste fees in detail, the unit price for steam use is varied between 0,00 EUR/kWh and 0,04 EUR/kWh in the following chart.

At 0,00 EUR/kWh no technical equipment for steam use is calculated. In this case the investments for technical equipment have been reduced by Mio 3.5 EUR. The electricity production is based on an efficiency of 23 %, an electricity induction of 37 MW per year and revenues of 5.550.000 EUR per year.

Subsequent figure 11 shows the waste fees in the year of 2017 subject to the realised revenues on steam use and an inflation of 2 % per year. Above a price of 2,6 Euro Cent per kWh of steam use the waste fees of incineration are lying below the waste fees of landfill.



Both TCO scenarios for landfill and incineration are calculated with an inflation rate of 2% per year. Following figure 12 shows that the waste fees of landfill are rising with higher inflation rates due to the long aftercare period.

By contrast the waste fees of incineration are falling with higher inflation rates as a matter of fact that most of the investments are transacted by building up the incineration plant.

The cost allocations of both methods are shown in figure 13. In contrast to the incineration of waste the landfill method requires over 1/3 of the costs to finance the aftercare period.

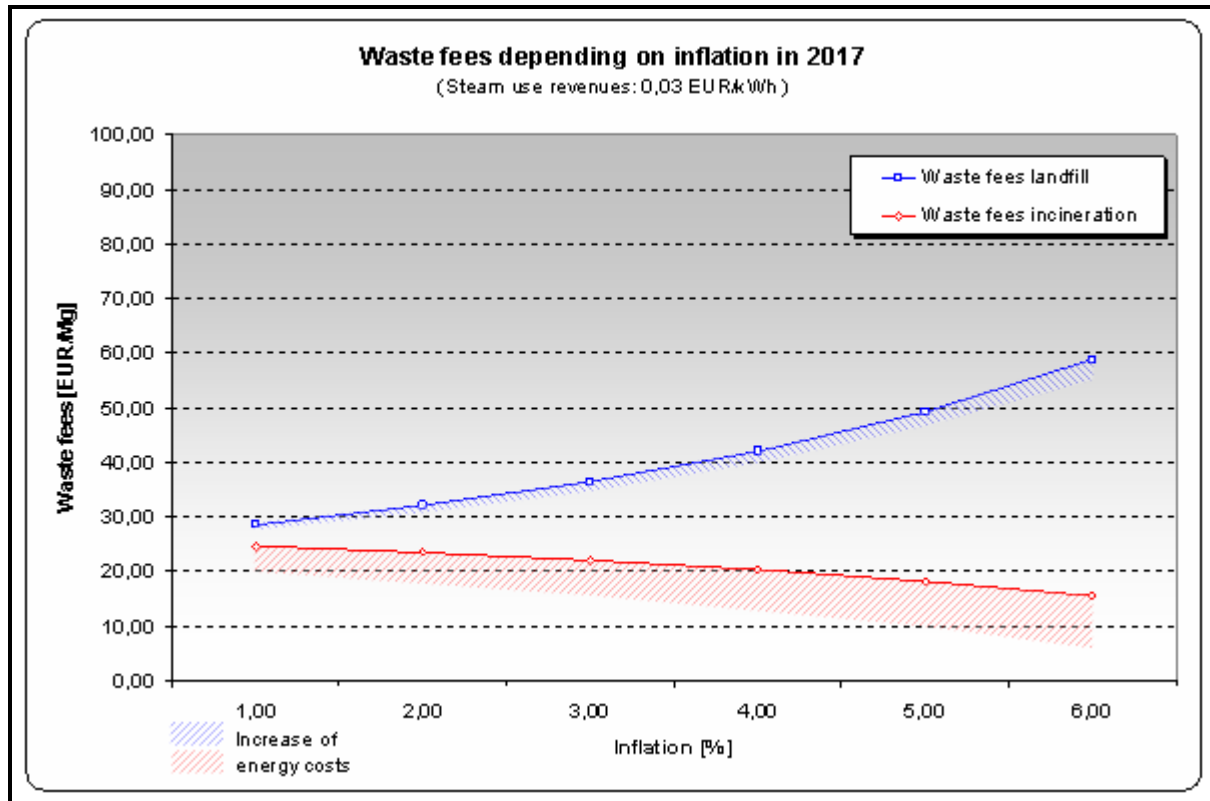


Figure 12: Waste fees depending inflation rate
 Total costs of ownership: landfill - incineration plant; 2006

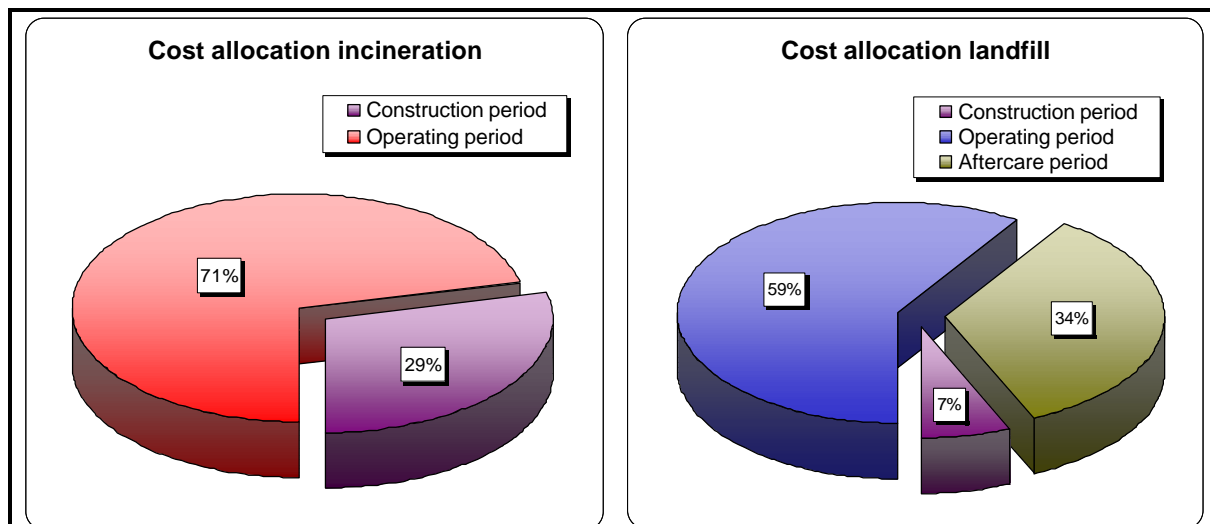
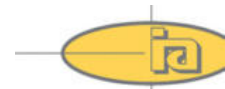


Figure 13: Cost allocation incineration - landfill
 Total costs of ownership: landfill - incineration plant; 2006



Independent of the parameters described above, which show clear advantages of the incineration of waste by high usage of energy or lower uncertainties of inflation during the aftercare period, the comparison of the two methods shows further advantages for the incineration of waste by the extension of the scenario period above 20 operating years.

The method of landfill requires planning and site selection clearly before the end of the operating period. Higher waste fees are expected for subsequent landfills due to the known problems in finding qualified sites and the longer transport.

The method of incineration does not require a new site because replacement investments allow further operation of the incineration plant. In combination with preventive maintenance the operation period can be continued with constant waste fees.

February 2006

ia GmbH - Wissensmanagement und Ingenieurleistungen

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Appendix 1

Cost Tables Landfill

Appendix 1 - Total Cost of Ownership (TCO) - Landfilling



| * Basisdaten | | Basic data | | | | | |
|-----------------------------------|---|--|-------------|------------|-------------|------------|--|
| 2.1 | Projektbeginn | Project start | | 1.1.2006 | | | |
| | Laufzeit Planung | Planning period | | 1 | | | |
| | Beginn Ablagerung | Landfill start | | 1.1.2008 | | | |
| | Laufzeit Ablagerung | Deposit period | | 20 | | | |
| | Laufzeit Nachsorge | Aftercare period | | 40 | | | |
| Charakteristika | | Characteristics | | | | | |
| 3.1 | - Hangdeponie | Inclination landfill | | | | | |
| | - Dünnschichteinbau | thin layer filling | | | | | |
| | - Vorsortierte Abfallmenge OHNE Plastikhohlkörper -> erzielbare Verdichtung 1 t/m³ | presorted waste without plastic hollowware | | | | | |
| | - Einbauflächen in Abschnitten, jeweils 150m x 150m | Filling areas in sectors, each 150m x 150m | | | | | |
| | - sukzessive Deponieerweiterung längs des Hangs in mehreren Bauabschnitten (ca. 6-7) | consecutive extension of the landfill along the inclination in several periods of construction | | | | | |
| Deponiedaten | | Landfill data | | | | | |
| 3.1 | Neigung Deponiekörper | Inclination landfill body | | 1:3 | | | |
| | Breite Deponiefuß [m] | Width landfill base [m] | | 150 | | | |
| | Gefälle Basisabdichtung [%] | Inclination base seal [%] | | 5 | | | |
| | Deponievolumen [m³] | Landfill volume [m³] | | 10.000.000 | | | |
| | abgelagerte Abfallmenge [Mg]: | Disposed waste [Mg] | | 500.000 | | | |
| | Deponiequerschnitt [m²] | Landfill profile [m²] | | 11.500 | | | |
| | Länge Deponie [m] | Length Landfill [m] | | 870 | | | |
| | Breite Basisabdichtung [m] | Width base seal [m] | | 390 | | | |
| | Fläche Basisabdichtung [m²] | Area base seal [m²] | | 339.300 | | | |
| | Breite Oberflächenabdichtung [m] | Width surface sealing [m] | | 397 | | | |
| Fläche Oberflächenabdichtung [m²] | Area surface sealing [m²] | | 345.390 | | | | |
| Kosten | | Costs | | | | | |
| Grundstück | | Real estate | | Unit Price | Amount | Total | |
| 3.2.1 | Deponiefläche [m²] | Area landfill [m²] | | 340.000 | | | |
| | Fläche für Umrandung, Verkehrsflächen, Ver- und Entsorgung, Betriebsgebäude, Technik [m²] | Area for border strip, traffic, supply, premises, technical facilities [m²] | | 184.500 | | | |
| | Gesamt [m²] | Total area [m²] | | 524.500 | | | |
| | EP Grundstück [EUR/m²] | Unit price real estate [EUR/m²] | | 2,00 | | | |
| | Investitionen | | Investments | | | | |
| | 3.2.1-01 Erwerb Grundstück [EUR] | 3.2.1-01 Purchase real estate [EUR] | | | | 1.049.000 | |
| | 3.2.1-02 Erschließung extern | 3.2.1-02 External preparation of land, traffic areas | | | | 1.000.000 | |
| | 3.2.1-03 Ausgleichsflächen | 3.2.1-03 Compensation areas | | | | 1.049.000 | |
| | | | | | | 3.098.000 | |
| | | | | | | | |
| Bauphase | | Construction period | | Unit Price | Amount | Total | |
| 3.2.2 | Investitionen | | Investments | | Unit Price | Total | |
| | 3.2.2-01 Herrichten Gelände [EUR/m²] | 3.2.2-01 Surface conditioning [EUR/m²] | | 10,00 | | 5.245.000 | |
| | 3.2.2-02 Basisabdichtung, Entwässerung inkl. Fremdüberwachung [EUR/m²] | 3.2.2-02 Base seal, drainage [EUR/m²] | | 80,00 | | 27.144.000 | |
| | 3.2.2-03 Erschließung intern, Verkehrsflächen, Umzäunung | 3.2.2-03 Internal preparation of land, traffic areas | | 20,00 | | 3.690.000 | |
| | 3.2.2-04 SiWa-Anlage (mit Betriebskosten abdeckt) | 3.2.2-04 Leachate treatment facilities | | | | 0 | |
| | 3.2.2-05 SiWa-Becken | 3.2.2-05 Leachate basin | | | | 4.500.000 | |
| | 3.2.2-06 Betriebsgebäude + 4 Waagen | 3.2.2-06 Premises + 4 weight bridges | | | | 2.100.000 | |
| | 3.2.2-07 Entgasung | 3.2.2-07 Degasification | | | | | |
| | 3.2.2-07-01 Gasmotor | 3.2.2-07-01 Gas recovery (gas motor, container) | | | | 3.850.000 | |
| | 3.2.2-07-02 Reinvest Gasmotor | 3.2.2-07-02 Reinvestment gas motor | | | | 3.850.000 | |
| | 3.2.2-07-03 Reinvest Gasmotor II | 3.2.2-07-03 Reinvestment gas motor II | | | | 3.850.000 | |
| | 3.2.2-07-04 Gasbrunnen | 3.2.2-07-04 Gas well | | | | 17.550.000 | |
| | 3.2.2-07-05 Gasregelstation | 3.2.2-07-05 Gas control station | | | | 1.040.000 | |
| | 3.2.2-07-06 Reinvest Gasregelstation | 3.2.2-07-06 Reinvestment gas control station | | | | 4.680.000 | |
| | 3.2.2-08 Oberflächenabdichtung, Rekultivierung [EUR/m²] | 3.2.2-08 Surface sealing, recultivation | | 80,00 | | 27.631.200 | |
| 3.2.2-09 Umladestation | 3.2.2-09 Reloading station | | | | 2.000.000 | | |
| | | | | | 107.130.200 | | |

* For explanations see indicated chapters.

Appendix 1 - Total Cost of Ownership (TCO) - Landfilling



| * Investitionen | | Investments | | | Total |
|---------------------------------------|--|--|------------|------------------|-------------|
| 3.2.2 | 3.2.2-10 Planung | 3.2.2-10 Planning | 3% | | 3.213.906 |
| | 3.2.2-11 Detailplanung und Bauüberwachung | 3.2.2-11 Detailed planning and building inspection | 6% | | 6.427.812 |
| | Baukosten inkl. Planung | Construction costs incl. planning | | | 116.771.918 |
| Betriebsphase | | Operating period | Unit Price | Amount | Total |
| Jährliche Betriebskosten | | Operational costs per year | Unit Price | Amount | Total |
| 3.2.3 | 3.2.3-01 Personal [EUR/a] | 3.2.3-01 Personnel | | | |
| | Arbeiter | Worker | 40.000 | 10 | 400.000 |
| | Facharbeiter | Skilled worker | 45.000 | 10 | 450.000 |
| | Führungspersonal | Executives | 50.000 | 4 | 200.000 |
| | Verwaltung | Administration | 45.000 | 5 | 225.000 |
| | Wachpersonal | Guards | 40.000 | 6 | 240.000 |
| | | | | 35,0 | 1.515.000 |
| | zuzügl. Faktor Urlaub+Krank | absence due to holidays/illness | | 15% | 227.250 |
| | 3.2.3-01 Personalkosten gesamt | 3.2.3-01 Personnel total | | | 1.742.250 |
| | 3.2.3-02 Energie | 3.2.3-02 Energy | | | |
| | Elektrizität | Electricity [EUR/kWh] | 0,02 | 250.000 | 5.000 |
| | Treibstoff | Fuel [EUR/l] | 1,00 | 587.400 | 587.400 |
| | | | | | 592.400 |
| | 3.2.3-03 Entgasung | 3.2.3-03 Degasification | | flat | 200.000 |
| | 3.2.3-04 Sickerwasserbehandlung/ -entsorgung | 3.2.3-04 Leachate treatment and cleaning | | | |
| | SiWa-Menge Einbaufläche (Regen) | Leachate volume filling area due to rainfall | 25,00 | 33.750 | 843.750 |
| | SiWa-Menge aus Presswasser | Leachate volume due to pressing water | 25,00 | 76.800 | 1.920.000 |
| | SiWa-Menge Restflächen (Regen) | Leachate volume other areas due to rainfall | 25,00 | 11.265 | 281.616 |
| | | | | | 3.045.366 |
| | 3.2.3-05 Fuhrpark | 3.2.3-05 Vehicle fleet | | | |
| Kompaktor | Compactor | 250.000,00 | 3 | 86.250 | |
| Radlader | Wheel loader | 80.000,00 | 2 | 18.400 | |
| sonstige mobile Geräte (Muldenkipper) | other vehicles (dump trucks) | 50.000,00 | 4 | 23.000 | |
| | | | | 127.650 | |
| 3.2.3-06 Verwaltung | 3.2.3-06 Administration | | | | |
| | in % of Personnel total (see pos. 3.2.3-01) | | 10% | 174.225 | |
| | | | | | |
| Summe jährliche Betriebskosten | Total annual operating costs | | | 5.881.891 | |
| Jährliche Betriebseinnahmen | | Operational revenues per year | Unit Price | Amount | Total |
| 3.2.3 | 3.2.3-07 Gasverwertung [kWh] | 3.2.3-07 Gas recovery [kWh] | 0,02 | 1.093.750.000 | 21.875.000 |
| | 3.2.3-08 Müllgebühren [EUR/Mg] | 3.2.3-08 Waste fees [EUR/Mg] | X | | |
| Nachsorge | | Aftercare | Unit Price | Amount | Total |
| * Investitionen | | Investments | Unit Price | Amount | Total |
| 3.2.2 | Siehe Reinvestitionen in 3.2.2 | See reinvestments in 3.2.2 | | | |

* For explanations see indicated chapters.

Appendix 1 - Total Cost of Ownership (TCO) - Landfilling



| Betriebskosten | | Unit Price | Amount | Total |
|---|---|-------------------|---------------|--------------------|
| 3.2.4-01 Personal [EUR/a] (GER) | 3.2.4-01 Personnel | | | |
| Arbeiter | Worker | 40.000 | 2 | 80.000 |
| Facharbeiter | Skilled worker | 45.000 | 1 | 45.000 |
| Führungspersonal | Executives | 50.000 | 1 | 50.000 |
| Verwaltung | Administration | 45.000 | 1 | 45.000 |
| Wachpersonal | Guards | 40.000 | 2 | 80.000 |
| | | | 7,0 | 300.000 |
| zuzügl. Faktor Urlaub+Krank | absence due to holidays/illness | | 15% | 45.000 |
| 3.2.4-01 Personalkosten gesamt | 3.2.4-01 Personnel total | | | 345.000 |
| 3.2.4-02 Energie | 3.2.4-02 Energy | | | |
| Elektrizität | Electricity [EUR/kWh] | 0,02 | 75.000 | 1.500 |
| Treibstoff | Fuel [EUR/l] | 1,00 | 12.375 | 12.375 |
| | | | | 13.875 |
| 3.2.4-03 Entgasung | 3.2.4-03 Degasification | | flat | 200.000 |
| 3.2.4-04 Sickerwasserbehandlung/ -entsorgung | 3.2.4-04 Leachate treatment and cleaning | | | |
| SiWa-Menge Einbaufläche | Leachate volume filling area | 25,00 | 0 | 0 |
| SiWa-Menge Restflächen | Leachate volume other areas | 25,00 | 25.904 | 647.606 |
| | | | | 647.606 |
| 3.2.4-05 Fuhrpark | 3.2.4-05 Vehicle fleet | | | |
| Radlader | Wheel loader | 80.000,00 | 1 | 9.200 |
| sonstige mobile Geräte | other vehicles | 50.000,00 | 1 | 5.750 |
| | | | | 14.950 |
| 3.2.4-06 Verwaltung | 3.2.4-06 Administration | | | |
| | in % of Personnel total (see pos. 3.2.4-01) | | 10% | 34.500 |
| Summe jährliche Nachsorgekosten | | | | 1.255.931 |
| Jährliche Betriebseinnahmen | Operational revenues per year | Unit Price | Amount | Total |
| 3.2.4-07 Gasverwertung [kWh] | 3.2.4-07 Gas recovery [kWh] | 0,02 | 1.093.750.000 | 21.875.000 |
| 3.2.4-08 Müllgebühren [EUR/Mg] | 3.2.4-08 Waste fees [EUR/Mg] | | | 0 |
| Deponierückbau | Renaturalisation | Unit Price | Amount | Total |
| Investitionen | Investments | Unit Price | Amount | Total |
| 3.2.5-01 Gasbrunnen | 3.2.5-01 Gas well | 5.000,00 | 390 | 1.950.000 |
| 3.2.5-02 sonstige Betriebseinrichtungen (Gasverwertungsanlagen, SiWa-Becken, Gebäude, Verkehrsflächen, Umzäunung) | 3.2.5-02 Other operational facilities (premises, weight bridges, traffic areas, enclosing and the leachate basin) | | flat | 1.800.000 |
| Versicherungen | Insurances | Unit Price | Amount | Total |
| | | Unit Price | Amount | Total |
| 3.2.6-01 Umwelthaftpflichtversicherung [EUR/ Mg] | 3.2.6-01 Environmental liability insurance [EUR/ Mg disposed waste] | 0,025 | | max 250.000 |
| 3.2.6-02 D&O Vermögensschadenshaftpflicht für leitende Angestellte | 3.2.6-02 D&O-Directors and officers professional liability insurance | | | |
| | Operating period | | | 15.000 |
| | Aftercare period | | | 5.000 |
| 3.2.6-03 Unfallversicherung für Angestellte | 3.2.6-03 Accident insurance for employees | | | |
| | Operating period | | | 3.500 |
| | Aftercare period | | | 700 |
| Gesamte Versicherungssumme | Total contribution | | | max 274.200 |

* For explanations see indicated chapters.

| Sao Paulo Landfill | | | | | | | | | | |
|--|-------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| | Summe | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
| Inflation | 2,00% | 1,00 | 1,02 | 1,04 | 1,06 | 1,08 | 1,10 | 1,13 | 1,15 | 1,17 |
| Capital spending plan | | | | | | | | | | |
| 3.2.1-01 Purchase real | | 1.049.000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.1-02 External preparation | | 1.000.000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.1-03 Buffer areas | | 0 | 1.069.980 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-01 Surface conditioning | | 5.245.000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-02 Base seal | | 3.877.714 | 3.955.268 | 0 | 0 | 0 | 4.281.310 | 0 | 0 | 4.543.360 |
| 3.2.2-03 Internal preparation | | 3.690.000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-05 Leachate basin | | 4.500.000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-06 Premises | | 2.100.000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-07-01 Gasmotor | | 0 | 561.000 | 0 | 0 | 595.338 | 0 | 0 | 631.777 | 0 |
| 3.2.2-07-02 ReInv1 Gasmotor | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-07-03 ReInv2 Gasmotor | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-07-04 Gas well | | 0 | 895.050 | 912.951 | 931.210 | 949.834 | 968.831 | 988.208 | 1.007.972 | 1.028.131 |
| 3.2.2-07-05 GasConS | | 0 | 53.040 | 54.101 | 55.183 | 56.286 | 57.412 | 58.560 | 59.732 | 60.926 |
| 3.2.2-07-06 ReInv GasConS | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-08 Surface sealing | | 0 | 0 | 0 | 0 | 4.272.700 | 0 | 0 | 4.534.223 | 0 |
| 3.2.2-09 Reloading station | | 2.000.000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-10 Planning | | 3.213.906 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-11 Detailed planning | | 1.284.763 | 327.862 | 58.023 | 59.184 | 352.450 | 318.453 | 62.806 | 374.022 | 337.945 |
| 3.2.5-01 Gas well | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.5-02 Other facilities | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Investment total | | 27.960.383 | 6.862.200 | 1.025.075 | 1.045.576 | 6.226.608 | 5.626.006 | 1.109.574 | 6.607.726 | 5.970.363 |
| Cost element plan | | | | | | | | | | |
| 3.2.3-01 Personel | | 0 | 1.777.095 | 1.812.637 | 1.848.890 | 1.885.867 | 1.923.585 | 1.962.056 | 2.001.298 | 2.041.324 |
| 3.2.3-02 Energy | | 0 | 604.248 | 616.333 | 628.660 | 641.233 | 654.057 | 667.139 | 680.481 | 694.091 |
| 3.2.3-03 Degasification | | 0 | 204.000 | 208.080 | 212.242 | 216.486 | 220.816 | 225.232 | 229.737 | 234.332 |
| 3.2.3-04 Leachate treatment | | 0 | 3.106.273 | 3.168.399 | 3.231.767 | 3.296.402 | 3.362.330 | 3.429.577 | 3.498.168 | 3.568.132 |
| 3.2.3-05 Vehicle fleet | | 0 | 130.203 | 132.807 | 135.463 | 138.172 | 140.936 | 143.755 | 146.630 | 149.562 |
| 3.2.3-06 Administration | | 0 | 177.710 | 181.264 | 184.889 | 188.587 | 192.358 | 196.206 | 200.130 | 204.132 |
| 3.2.3-07 Gas recovery | | 0 | -371.875 | -379.312 | -386.898 | -394.636 | -402.529 | -410.580 | -418.791 | -427.167 |
| 3.2.3-08 Waste fees | | 0 | -13.388.979 | -13.656.759 | -13.929.894 | -14.208.492 | -14.492.661 | -14.782.515 | -15.078.165 | -15.379.728 |
| 3.2.4-01 Personel | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.4-02 Energy | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.4-03 Degasification | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.4-04 Leachate treatment | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.4-05 Vehicle fleet | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.4-06 Administration | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.6-01 Environmental liabili | | 0 | 12.750 | 26.010 | 39.795 | 54.122 | 69.005 | 84.462 | 100.510 | 117.166 |
| 3.2.6-02 D&O-insurance | | 0 | 15.300 | 15.606 | 15.918 | 16.236 | 16.561 | 16.892 | 17.230 | 17.575 |
| 3.2.6-03 Accident insurance | | 0 | 3.570 | 3.641 | 3.714 | 3.789 | 3.864 | 3.942 | 4.020 | 4.101 |
| Direct costs total | | 0 | -7.729.705 | -7.871.294 | -8.015.455 | -8.162.233 | -8.311.677 | -8.463.834 | -8.618.752 | -8.776.481 |
| Costs affecting expenses | | 0 | 6.031.149 | 6.164.777 | 6.301.337 | 6.440.895 | 6.583.513 | 6.729.261 | 6.878.205 | 7.030.414 |
| Operating revenues | | 0 | -13.760.854 | -14.036.071 | -14.316.792 | -14.603.128 | -14.895.191 | -15.193.094 | -15.496.956 | -15.806.895 |
| Liquidity plan | | | | | | | | | | |
| OPERNING STOCK | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Investments | | -27.960.383 | -6.862.200 | -1.025.075 | -1.045.576 | -6.226.608 | -5.626.006 | -1.109.574 | -6.607.726 | -5.970.363 |
| Costs affecting expenses | | 0 | -6.031.149 | -6.164.777 | -6.301.337 | -6.440.895 | -6.583.513 | -6.729.261 | -6.878.205 | -7.030.414 |
| Loan redemption | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Interest rate of loan | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Clearing of overdraft | | 0 | 0 | -5.421.674 | -5.816.417 | -1.072.985 | -1.876.680 | -6.639.103 | -1.627.824 | -2.504.308 |
| Interest rate of overdraft | | 0 | -1.398.019 | -1.424.545 | -1.153.461 | -862.640 | -808.991 | -715.157 | -383.202 | -301.811 |
| COSTS | | -27.960.383 | -14.291.368 | -14.036.071 | -14.316.792 | -14.603.128 | -14.895.191 | -15.193.094 | -15.496.956 | -15.806.895 |
| Interest rate for financial investment | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Promotions | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Contributions | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sales revenue | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Operating revenues | | 0 | 13.760.854 | 14.036.071 | 14.316.792 | 14.603.128 | 14.895.191 | 15.193.094 | 15.496.956 | 15.806.895 |
| REVENUES | | 0 | 13.760.854 | 14.036.071 | 14.316.792 | 14.603.128 | 14.895.191 | 15.193.094 | 15.496.956 | 15.806.895 |
| Borrowing of loan | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Borrowing of overdraft | | 27.960.383 | 530.514 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| BALANCE | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| Sao Paulo Landfill | | | | | | | | | | |
|--|--------------------|--------------------|--------------------|-------------------|--------------------|--------------------|-------------------|--------------------|--------------------|--------------------|
| | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
| Inflation | 1,20 | 1,22 | 1,24 | 1,27 | 1,29 | 1,32 | 1,35 | 1,37 | 1,40 | 1,43 |
| Capital spending plan | | | | | | | | | | |
| 3.2.1-01 Purchase real | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.1-02 External preparation | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.1-03 Buffer areas | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-01 Surface conditioning | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-02 Base seal | 0 | 0 | 4.821.450 | 0 | 0 | 5.116.561 | 0 | 0 | 5.429.736 | 0 |
| 3.2.2-03 Internal preparation | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-05 Leachate basin | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-06 Premises | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-07-01 Gasmotor | 0 | 670.447 | 0 | 0 | 711.484 | 0 | 0 | 755.032 | 0 | 0 |
| 3.2.2-07-02 ReInv1 Gasmotor | 0 | 0 | 683.856 | 0 | 0 | 725.713 | 0 | 0 | 770.133 | 0 |
| 3.2.2-07-03 ReInv2 Gasmotor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-07-04 Gas well | 1.048.694 | 1.069.668 | 1.091.061 | 1.112.882 | 1.135.140 | 1.157.843 | 1.180.999 | 1.204.619 | 1.228.712 | 1.253.286 |
| 3.2.2-07-05 GasConS | 62.145 | 63.388 | 64.655 | 65.949 | 67.268 | 68.613 | 69.985 | 71.385 | 72.813 | 74.269 |
| 3.2.2-07-06 ReInv GasConS | 0 | 0 | 64.655 | 65.949 | 67.268 | 68.613 | 69.985 | 71.385 | 72.813 | 74.269 |
| 3.2.2-08 Surface sealing | 0 | 4.811.754 | 0 | 0 | 5.106.272 | 0 | 0 | 5.418.816 | 0 | 0 |
| 3.2.2-09 Reloading station | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-10 Planning | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-11 Detailed planning | 66.650 | 396.916 | 403.541 | 74.687 | 425.246 | 428.241 | 79.258 | 451.274 | 454.453 | 84.109 |
| 3.2.5-01 Gas well | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.5-02 Other facilities | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Investment total | 1.177.489 | 7.012.172 | 7.129.219 | 1.319.466 | 7.512.676 | 7.565.584 | 1.400.228 | 7.972.512 | 8.028.658 | 1.485.933 |
| Cost element plan | | | | | | | | | | |
| 3.2.3-01 Personel | 2.082.150 | 2.123.793 | 2.166.269 | 2.209.594 | 2.253.786 | 2.298.862 | 2.344.839 | 2.391.736 | 2.439.571 | 2.488.362 |
| 3.2.3-02 Energy | 707.973 | 722.132 | 736.575 | 751.306 | 766.333 | 781.659 | 797.292 | 813.238 | 829.503 | 846.093 |
| 3.2.3-03 Degasification | 239.019 | 243.799 | 248.675 | 253.648 | 258.721 | 263.896 | 269.174 | 274.557 | 280.048 | 285.649 |
| 3.2.3-04 Leachate treatment | 3.639.494 | 3.712.284 | 3.786.530 | 3.862.260 | 3.939.506 | 4.018.296 | 4.098.662 | 4.180.635 | 4.264.248 | 4.349.533 |
| 3.2.3-05 Vehicle fleet | 152.554 | 155.605 | 158.717 | 161.891 | 165.129 | 168.431 | 171.800 | 175.236 | 178.741 | 182.316 |
| 3.2.3-06 Administration | 208.215 | 212.379 | 216.627 | 220.959 | 225.379 | 229.886 | 234.484 | 239.174 | 243.957 | 248.836 |
| 3.2.3-07 Gas recovery | -435.710 | -444.425 | -453.313 | -462.379 | -471.627 | -481.060 | -490.681 | -500.494 | -510.504 | -520.714 |
| 3.2.3-08 Waste fees | -15.687.323 | -16.001.069 | -16.321.091 | -16.647.513 | -16.980.463 | -17.320.072 | -17.666.473 | -18.019.803 | -18.380.199 | -18.747.803 |
| 3.2.4-01 Personel | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.4-02 Energy | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.4-03 Degasification | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.4-04 Leachate treatment | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.4-05 Vehicle fleet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.4-06 Administration | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.6-01 Environmental liabili | 134.448 | 152.374 | 170.964 | 190.236 | 210.211 | 230.909 | 252.350 | 274.557 | 297.551 | 321.355 |
| 3.2.6-02 D&O-insurance | 17.926 | 18.285 | 18.651 | 19.024 | 19.404 | 19.792 | 20.188 | 20.592 | 21.004 | 21.424 |
| 3.2.6-03 Accident insurance | 4.183 | 4.266 | 4.352 | 4.439 | 4.528 | 4.618 | 4.711 | 4.805 | 4.901 | 4.999 |
| Direct costs total | -8.937.072 | -9.100.576 | -9.267.045 | -9.436.533 | -9.609.094 | -9.784.782 | -9.963.654 | -10.145.768 | -10.331.180 | -10.519.951 |
| Costs affecting expenses | 7.185.961 | 7.344.918 | 7.507.359 | 7.673.359 | 7.842.996 | 8.016.349 | 8.193.500 | 8.374.530 | 8.559.523 | 8.748.567 |
| Operating revenues | -16.123.033 | -16.445.494 | -16.774.404 | -17.109.892 | -17.452.090 | -17.801.132 | -18.157.154 | -18.520.297 | -18.890.703 | -19.268.517 |
| Liquidity plan | | | | | | | | | | |
| OPERNING STOCK | 0 | 4.051.081 | 6.261.018 | 8.586.675 | 16.961.343 | 19.566.601 | 22.372.797 | 31.607.407 | 34.728.885 | 38.073.274 |
| Investments | -1.177.489 | -7.012.172 | -7.129.219 | -1.319.466 | -7.512.676 | -7.565.584 | -1.400.228 | -7.972.512 | -8.028.658 | -1.485.933 |
| Costs affecting expenses | -7.185.961 | -7.344.918 | -7.507.359 | -7.673.359 | -7.842.996 | -8.016.349 | -8.193.500 | -8.374.530 | -8.559.523 | -8.748.567 |
| Loan redemption | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Interest rate of loan | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Clearing of overdraft | -3.531.906 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Interest rate of overdraft | -176.595 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| COSTS | -12.071.952 | -14.357.090 | -14.636.577 | -8.992.825 | -15.355.672 | -15.581.933 | -9.593.728 | -16.347.042 | -16.588.181 | -10.234.500 |
| Interest rate for financial investment | 0 | 121.532 | 187.831 | 257.600 | 508.840 | 586.998 | 671.184 | 948.222 | 1.041.867 | 1.142.198 |
| Promotions | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Contributions | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sales revenue | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Operating revenues | 16.123.033 | 16.445.494 | 16.774.404 | 17.109.892 | 17.452.090 | 17.801.132 | 18.157.154 | 18.520.297 | 18.890.703 | 19.268.517 |
| REVENUES | 16.123.033 | 16.567.026 | 16.962.234 | 17.367.492 | 17.960.930 | 18.388.130 | 18.828.338 | 19.468.519 | 19.932.570 | 20.410.715 |
| Borrowing of loan | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Borrowing of overdraft | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| BALANCE | 4.051.081 | 6.261.018 | 8.586.675 | 16.961.343 | 19.566.601 | 22.372.797 | 31.607.407 | 34.728.885 | 38.073.274 | 48.249.490 |

| Sao Paulo Landfill | | | | | | | | | | |
|--|--------------------|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 |
| Inflation | 1,46 | 1,49 | 1,52 | 1,55 | 1,58 | 1,61 | 1,64 | 1,67 | 1,71 | 1,74 |
| Capital spending plan | | | | | | | | | | |
| 3.2.1-01 Purchase real | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.1-02 External preparation | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.1-03 Buffer areas | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-01 Surface conditioning | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-02 Base seal | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-03 Internal preparation | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-05 Leachate basin | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-06 Premises | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-07-01 Gasmotor | 801.246 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-07-02 ReInv1 Gasmotor | 0 | 817.271 | 0 | 0 | 867.295 | 0 | 0 | 920.380 | 0 | 0 |
| 3.2.2-07-03 ReInv2 Gasmotor | 0 | 0 | 833.616 | 0 | 0 | 0 | 0 | 0 | 938.788 | 0 |
| 3.2.2-07-04 Gas well | 1.278.352 | 1.303.919 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-07-05 GasConS | 75.754 | 77.269 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-07-06 ReInv GasConS | 75.754 | 77.269 | 157.629 | 160.782 | 163.998 | 167.277 | 170.623 | 174.035 | 177.516 | 181.067 |
| 3.2.2-08 Surface sealing | 5.750.491 | 0 | 5.982.811 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-09 Reloading station | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-10 Planning | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-11 Detailed planning | 478.896 | 136.544 | 418.444 | 9.647 | 61.878 | 10.037 | 10.237 | 65.665 | 66.978 | 10.864 |
| 3.2.5-01 Gas well | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.5-02 Other facilities | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Investment total | 8.460.494 | 2.412.272 | 7.392.500 | 170.429 | 1.093.170 | 177.314 | 180.860 | 1.160.080 | 1.183.282 | 191.931 |
| Cost element plan | | | | | | | | | | |
| 3.2.3-01 Personel | 2.538.129 | 2.588.892 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.3-02 Energy | 863.015 | 880.275 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.3-03 Degasification | 291.362 | 297.189 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.3-04 Leachate treatment | 4.436.523 | 4.525.254 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.3-05 Vehicle fleet | 185.962 | 189.681 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.3-06 Administration | 253.813 | 258.889 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.3-07 Gas recovery | -531.129 | -541.751 | -552.586 | -563.638 | -574.911 | -586.409 | -598.137 | -610.100 | -622.302 | -634.748 |
| 3.2.3-08 Waste fees | -19.122.759 | -19.505.214 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.4-01 Personel | 0 | 0 | 522.905 | 533.363 | 544.030 | 554.911 | 566.009 | 577.329 | 588.876 | 600.653 |
| 3.2.4-02 Energy | 0 | 0 | 21.030 | 21.450 | 21.879 | 22.317 | 22.763 | 23.219 | 23.683 | 24.157 |
| 3.2.4-03 Degasification | 0 | 0 | 303.133 | 309.196 | 315.380 | 321.687 | 328.121 | 334.684 | 341.377 | 348.205 |
| 3.2.4-04 Leachate treatment | 0 | 0 | 981.555 | 951.126 | 921.642 | 893.071 | 865.385 | 838.558 | 812.563 | 787.374 |
| 3.2.4-05 Vehicle fleet | 0 | 0 | 22.659 | 23.112 | 23.575 | 24.046 | 24.527 | 25.018 | 25.518 | 26.028 |
| 3.2.4-06 Administration | 0 | 0 | 52.290 | 53.336 | 54.403 | 55.491 | 56.601 | 57.733 | 58.888 | 60.065 |
| 3.2.6-01 Environmental liabili | 345.993 | 371.487 | 378.917 | 386.495 | 394.225 | 402.109 | 410.152 | 418.355 | 426.722 | 435.256 |
| 3.2.6-02 D&O-insurance | 21.852 | 22.289 | 7.578 | 7.730 | 7.885 | 8.042 | 8.203 | 8.367 | 8.534 | 8.705 |
| 3.2.6-03 Accident insurance | 5.099 | 5.201 | 1.061 | 1.082 | 1.104 | 1.126 | 1.148 | 1.171 | 1.195 | 1.219 |
| Direct costs total | -10.712.139 | -10.907.808 | 1.738.542 | 1.723.254 | 1.709.211 | 1.696.392 | 1.684.773 | 1.674.334 | 1.665.054 | 1.656.914 |
| Costs affecting expenses | 8.941.748 | 9.139.158 | 2.291.128 | 2.286.892 | 2.284.122 | 2.282.801 | 2.282.910 | 2.284.434 | 2.287.356 | 2.291.662 |
| Operating revenues | -19.653.888 | -20.046.965 | -552.586 | -563.638 | -574.911 | -586.409 | -598.137 | -610.100 | -622.302 | -634.748 |
| Liquidity plan | | | | | | | | | | |
| OPERNING STOCK | 48.249.490 | 51.948.620 | 62.002.614 | 54.731.650 | 54.479.918 | 53.311.934 | 53.037.586 | 52.763.081 | 51.511.559 | 50.208.570 |
| Investments | -8.460.494 | -2.412.272 | -7.392.500 | -170.429 | -1.093.170 | -177.314 | -180.860 | -1.160.080 | -1.183.282 | -191.931 |
| Costs affecting expenses | -8.941.748 | -9.139.157 | -2.291.128 | -2.286.892 | -2.284.122 | -2.282.801 | -2.282.910 | -2.284.434 | -2.287.356 | -2.291.662 |
| Loan redemption | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Interest rate of loan | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Clearing of overdraft | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Interest rate of overdraft | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| COSTS | -17.402.242 | -11.551.430 | -9.683.629 | -2.457.320 | -3.377.292 | -2.460.115 | -2.463.770 | -3.444.514 | -3.470.638 | -2.483.593 |
| Interest rate for financial investment | 1.447.485 | 1.558.459 | 1.860.078 | 1.641.950 | 1.634.398 | 1.599.358 | 1.591.128 | 1.582.892 | 1.545.347 | 1.506.257 |
| Promotions | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Contributions | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sales revenue | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Operating revenues | 19.653.888 | 20.046.965 | 552.586 | 563.638 | 574.911 | 586.409 | 598.137 | 610.100 | 622.302 | 634.748 |
| REVENUES | 21.101.372 | 21.605.424 | 2.412.665 | 2.205.587 | 2.209.308 | 2.185.767 | 2.189.265 | 2.192.992 | 2.167.649 | 2.141.005 |
| Borrowing of loan | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Borrowing of overdraft | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| BALANCE | 51.948.620 | 62.002.614 | 54.731.650 | 54.479.918 | 53.311.934 | 53.037.586 | 52.763.081 | 51.511.559 | 50.208.570 | 49.865.982 |

| Sao Paulo Landfill | | | | | | | | | | | |
|--|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 |
| Inflation | 1,78 | 1,81 | 1,85 | 1,88 | 1,92 | 1,96 | 2,00 | 2,04 | 2,08 | 2,12 | 2,16 |
| Capital spending plan | | | | | | | | | | | |
| 3.2.1-01 Purchase real | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.1-02 External preparation | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.1-03 Buffer areas | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-01 Surface conditioning | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-02 Base seal | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-03 Internal preparation | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-05 Leachate basin | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-06 Premises | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-07-01 Gasmotor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-07-02 ReInV1 Gasmotor | 976.715 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-07-03 ReInV2 Gasmotor | 0 | 0 | 0 | 0 | 1.057.227 | 0 | 0 | 0 | 0 | 0 | 1.190.610 |
| 3.2.2-07-04 Gas well | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-07-05 GasConS | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-07-06 ReInV GasConS | 184.688 | 188.382 | 192.149 | 195.992 | 199.912 | 203.910 | 207.989 | 212.148 | 216.391 | 220.719 | 225.133 |
| 3.2.2-08 Surface sealing | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-09 Reloading station | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-10 Planning | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-11 Detailed planning | 69.684 | 11.303 | 11.529 | 11.760 | 75.428 | 12.235 | 12.479 | 12.729 | 12.983 | 13.243 | 84.945 |
| 3.2.5-01 Gas well | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.5-02 Other facilities | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Investment total | 1.231.087 | 199.685 | 203.678 | 207.752 | 1.332.568 | 216.145 | 220.468 | 224.877 | 229.375 | 233.962 | 1.500.688 |
| Cost element plan | | | | | | | | | | | |
| 3.2.3-01 Personel | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.3-02 Energy | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.3-03 Degasification | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.3-04 Leachate treatment | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.3-05 Vehicle fleet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.3-06 Administration | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.3-07 Gas recovery | -647.443 | -660.392 | -673.599 | -687.071 | -700.813 | -714.829 | -729.126 | -743.708 | -758.582 | -773.754 | -789.229 |
| 3.2.3-08 Waste fees | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.4-01 Personel | 612.666 | 624.920 | 637.418 | 650.167 | 663.170 | 676.433 | 689.962 | 703.761 | 717.836 | 732.193 | 746.837 |
| 3.2.4-02 Energy | 24.640 | 25.133 | 25.635 | 26.148 | 26.671 | 27.204 | 27.748 | 28.303 | 28.870 | 29.447 | 30.036 |
| 3.2.4-03 Degasification | 355.169 | 362.272 | 369.518 | 376.908 | 384.446 | 392.135 | 399.978 | 407.977 | 416.137 | 424.460 | 432.949 |
| 3.2.4-04 Leachate treatment | 762.965 | 739.313 | 716.395 | 694.186 | 672.666 | 651.814 | 631.608 | 612.028 | 593.055 | 574.670 | 556.855 |
| 3.2.4-05 Vehicle fleet | 26.549 | 27.080 | 27.621 | 28.174 | 28.737 | 29.312 | 29.898 | 30.496 | 31.106 | 31.728 | 32.363 |
| 3.2.4-06 Administration | 61.267 | 62.492 | 63.742 | 65.017 | 66.317 | 67.643 | 68.996 | 70.376 | 71.784 | 73.219 | 74.684 |
| 3.2.6-01 Environmental liabili | 443.961 | 452.840 | 461.897 | 471.135 | 480.558 | 490.169 | 499.972 | 509.972 | 520.171 | 530.575 | 541.186 |
| 3.2.6-02 D&O-insurance | 8.879 | 9.057 | 9.238 | 9.423 | 9.611 | 9.803 | 9.999 | 10.199 | 10.403 | 10.611 | 10.824 |
| 3.2.6-03 Accident insurance | 1.243 | 1.268 | 1.293 | 1.319 | 1.346 | 1.372 | 1.400 | 1.428 | 1.456 | 1.486 | 1.515 |
| Direct costs total | 1.649.897 | 1.643.983 | 1.639.158 | 1.635.405 | 1.632.710 | 1.631.058 | 1.630.436 | 1.630.833 | 1.632.236 | 1.634.635 | 1.638.020 |
| Costs affecting expenses | 2.297.339 | 2.304.375 | 2.312.757 | 2.322.476 | 2.333.522 | 2.345.887 | 2.359.562 | 2.374.541 | 2.390.819 | 2.408.389 | 2.427.249 |
| Operating revenues | -647.443 | -660.392 | -673.599 | -687.071 | -700.813 | -714.829 | -729.126 | -743.708 | -758.582 | -773.754 | -789.229 |
| Liquidity plan | | | | | | | | | | | |
| OPERNING STOCK | 49.865.982 | 48.480.978 | 48.091.740 | 47.691.656 | 47.279.249 | 45.732.349 | 45.257.117 | 44.763.926 | 44.251.133 | 43.717.056 | 43.159.970 |
| Investments | -1.231.087 | -199.685 | -203.678 | -207.752 | -1.332.568 | -216.145 | -220.468 | -224.877 | -229.375 | -233.962 | -1.500.688 |
| Costs affecting expenses | -2.297.339 | -2.304.375 | -2.312.757 | -2.322.476 | -2.333.522 | -2.345.887 | -2.359.562 | -2.374.541 | -2.390.819 | -2.408.389 | -2.427.249 |
| Loan redemption | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Interest rate of loan | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Clearing of overdraft | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Interest rate of overdraft | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| COSTS | -3.528.426 | -2.504.059 | -2.516.436 | -2.530.228 | -3.666.090 | -2.562.032 | -2.580.030 | -2.599.419 | -2.620.194 | -2.642.352 | -3.927.937 |
| Interest rate for financial investment | 1.495.979 | 1.454.429 | 1.442.752 | 1.430.750 | 1.418.377 | 1.371.970 | 1.357.714 | 1.342.918 | 1.327.534 | 1.311.512 | 1.294.799 |
| Promotions | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Contributions | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sales revenue | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Operating revenues | 647.443 | 660.392 | 673.599 | 687.071 | 700.813 | 714.829 | 729.126 | 743.708 | 758.582 | 773.754 | 789.229 |
| REVENUES | 2.143.422 | 2.114.821 | 2.116.352 | 2.117.821 | 2.119.190 | 2.086.800 | 2.086.839 | 2.086.626 | 2.086.116 | 2.085.266 | 2.084.028 |
| Borrowing of loan | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Borrowing of overdraft | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| BALANCE | 48.480.978 | 48.091.740 | 47.691.656 | 47.279.249 | 45.732.349 | 45.257.117 | 44.763.926 | 44.251.133 | 43.717.056 | 43.159.970 | 41.316.062 |

| Sao Paulo Landfill | | | | | | | | | | | |
|--|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 |
| Inflation | 2,21 | 2,25 | 2,30 | 2,34 | 2,39 | 2,44 | 2,49 | 2,54 | 2,59 | 2,64 | 2,69 |
| Capital spending plan | | | | | | | | | | | |
| 3.2.1-01 Purchase real | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.1-02 External preparation | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.1-03 Buffer areas | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-01 Surface conditioning | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-02 Base seal | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-03 Internal preparation | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-05 Leachate basin | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-06 Premises | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-07-01 Gasmotor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-07-02 RelnV1 Gasmotor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-07-03 RelnV2 Gasmotor | 0 | 0 | 0 | 0 | 0 | 1.340.820 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-07-04 Gas well | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-07-05 GasConS | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-07-06 RelnV GasConS | 229.636 | 234.229 | 238.913 | 243.692 | 248.566 | 253.537 | 258.608 | 263.780 | 269.055 | 274.436 | 279.925 |
| 3.2.2-08 Surface sealing | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-09 Reloading station | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-10 Planning | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-11 Detailed planning | 13.778 | 14.054 | 14.335 | 14.622 | 14.914 | 95.661 | 15.516 | 15.827 | 16.143 | 16.466 | 16.796 |
| 3.2.5-01 Gas well | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.5-02 Other facilities | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Investment total | 243.414 | 248.283 | 253.248 | 258.313 | 263.479 | 1.690.018 | 274.124 | 279.607 | 285.199 | 290.903 | 296.721 |
| Cost element plan | | | | | | | | | | | |
| 3.2.3-01 Personel | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.3-02 Energy | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.3-03 Degasification | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.3-04 Leachate treatment | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.3-05 Vehicle fleet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.3-06 Administration | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.3-07 Gas recovery | -805.014 | -821.114 | -837.536 | -854.287 | -871.373 | -888.800 | -906.576 | -924.708 | -943.202 | -962.066 | -981.307 |
| 3.2.3-08 Waste fees | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.4-01 Personel | 761.774 | 777.009 | 792.549 | 808.400 | 824.568 | 841.060 | 857.881 | 875.039 | 892.539 | 910.390 | 928.598 |
| 3.2.4-02 Energy | 30.637 | 31.249 | 31.874 | 32.512 | 33.162 | 33.825 | 34.502 | 35.192 | 35.896 | 36.614 | 37.346 |
| 3.2.4-03 Degasification | 441.608 | 450.440 | 459.449 | 468.638 | 478.011 | 487.571 | 497.322 | 507.269 | 517.414 | 527.762 | 538.318 |
| 3.2.4-04 Leachate treatment | 539.593 | 522.866 | 506.657 | 490.950 | 475.731 | 460.983 | 446.693 | 432.845 | 419.427 | 406.425 | 393.826 |
| 3.2.4-05 Vehicle fleet | 33.010 | 33.670 | 34.344 | 35.031 | 35.731 | 36.446 | 37.175 | 37.918 | 38.677 | 39.450 | 40.239 |
| 3.2.4-06 Administration | 76.177 | 77.701 | 79.255 | 80.840 | 82.457 | 84.106 | 85.788 | 87.504 | 89.254 | 91.039 | 92.860 |
| 3.2.6-01 Environmental liabili | 552.010 | 563.050 | 574.311 | 585.797 | 597.513 | 609.464 | 621.653 | 634.086 | 646.768 | 659.703 | 672.897 |
| 3.2.6-02 D&O-insurance | 11.040 | 11.261 | 11.486 | 11.716 | 11.950 | 12.189 | 12.433 | 12.682 | 12.935 | 13.194 | 13.458 |
| 3.2.6-03 Accident insurance | 1.546 | 1.577 | 1.608 | 1.640 | 1.673 | 1.707 | 1.741 | 1.775 | 1.811 | 1.847 | 1.884 |
| Direct costs total | 1.642.381 | 1.647.709 | 1.653.997 | 1.661.238 | 1.669.424 | 1.678.550 | 1.688.611 | 1.699.602 | 1.711.519 | 1.724.358 | 1.738.118 |
| Costs affecting expenses | 2.447.394 | 2.468.823 | 2.491.533 | 2.515.525 | 2.540.797 | 2.567.350 | 2.595.187 | 2.624.309 | 2.654.721 | 2.686.424 | 2.719.425 |
| Operating revenues | -805.014 | -821.114 | -837.536 | -854.287 | -871.373 | -888.800 | -906.576 | -924.708 | -943.202 | -962.066 | -981.307 |
| Liquidity plan | | | | | | | | | | | |
| OPERNING STOCK | 41.316.062 | 40.669.749 | 39.993.850 | 39.286.420 | 38.545.462 | 37.768.922 | 35.533.422 | 34.636.690 | 33.696.582 | 32.710.762 | 31.676.824 |
| Investments | -243.414 | -248.283 | -253.248 | -258.313 | -263.479 | -1.690.018 | -274.124 | -279.607 | -285.199 | -290.903 | -296.721 |
| Costs affecting expenses | -2.447.394 | -2.468.823 | -2.491.533 | -2.515.525 | -2.540.797 | -2.567.350 | -2.595.187 | -2.624.309 | -2.654.721 | -2.686.424 | -2.719.425 |
| Loan redemption | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Interest rate of loan | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Clearing of overdraft | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Interest rate of overdraft | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| COSTS | -2.690.809 | -2.717.106 | -2.744.782 | -2.773.838 | -2.804.276 | -4.257.368 | -2.869.311 | -2.903.916 | -2.939.919 | -2.977.327 | -3.016.146 |
| Interest rate for financial investment | 1.239.482 | 1.220.092 | 1.199.815 | 1.178.593 | 1.156.364 | 1.133.068 | 1.066.003 | 1.039.101 | 1.010.897 | 981.323 | 950.305 |
| Promotions | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Contributions | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sales revenue | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Operating revenues | 805.014 | 821.114 | 837.536 | 854.287 | 871.373 | 888.800 | 906.576 | 924.708 | 943.202 | 962.066 | 981.307 |
| REVENUES | 2.044.496 | 2.041.206 | 2.037.352 | 2.032.880 | 2.027.737 | 2.021.868 | 1.972.579 | 1.963.808 | 1.954.099 | 1.943.389 | 1.931.612 |
| Borrowing of loan | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Borrowing of overdraft | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| BALANCE | 40.669.749 | 39.993.850 | 39.286.420 | 38.545.462 | 37.768.922 | 35.533.422 | 34.636.690 | 33.696.582 | 32.710.762 | 31.676.824 | 30.592.291 |

| Sao Paulo Landfill | | | | | | | | | | |
|--|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|--------------------|
| | 2058 | 2059 | 2060 | 2061 | 2062 | 2063 | 2064 | 2065 | 2066 | 2067 |
| Inflation | 2,75 | 2,80 | 2,86 | 2,91 | 2,97 | 3,03 | 3,09 | 3,15 | 3,22 | 3,28 |
| Capital spending plan | | | | | | | | | | |
| 3.2.1-01 Purchase real | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.1-02 External preparation | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.1-03 Buffer areas | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-01 Surface conditioning | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-02 Base seal | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-03 Internal preparation | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-05 Leachate basin | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-06 Premises | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-07-01 Gasmotor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-07-02 ReInV1 Gasmotor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-07-03 ReInV2 Gasmotor | 1.509.981 | 0 | 0 | 0 | 0 | 0 | 1.700.484 | 0 | 0 | 0 |
| 3.2.2-07-04 Gas well | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-07-05 GasConS | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-07-06 ReInV GasConS | 285.524 | 291.234 | 297.059 | 303.000 | 309.060 | 315.241 | 321.546 | 327.977 | 334.536 | 341.227 |
| 3.2.2-08 Surface sealing | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-09 Reloading station | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-10 Planning | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.2-11 Detailed planning | 107.730 | 17.474 | 17.824 | 18.180 | 18.544 | 18.914 | 121.322 | 19.679 | 20.072 | 20.474 |
| 3.2.5-01 Gas well | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6.398.010 |
| 3.2.5-02 Other facilities | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5.905.855 |
| Investment total | 1.903.235 | 308.708 | 314.882 | 321.180 | 327.604 | 334.156 | 2.143.352 | 347.656 | 354.609 | 12.665.566 |
| Cost element plan | | | | | | | | | | |
| 3.2.3-01 Personel | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.3-02 Energy | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.3-03 Degasification | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.3-04 Leachate treatment | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.3-05 Vehicle fleet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.3-06 Administration | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.3-07 Gas recovery | -1.000.933 | -1.020.952 | -1.041.371 | -1.062.199 | -1.083.442 | -1.105.111 | -1.127.214 | -1.149.758 | -1.172.753 | -1.196.208 |
| 3.2.3-08 Waste fees | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.2.4-01 Personel | 947.170 | 966.113 | 985.435 | 1.005.144 | 1.025.247 | 1.045.752 | 1.066.667 | 1.088.000 | 1.109.760 | 1.131.956 |
| 3.2.4-02 Energy | 38.093 | 38.855 | 39.632 | 40.424 | 41.233 | 42.057 | 42.899 | 43.757 | 44.632 | 45.524 |
| 3.2.4-03 Degasification | 549.084 | 560.066 | 571.267 | 582.692 | 594.346 | 606.233 | 618.358 | 630.725 | 643.339 | 656.206 |
| 3.2.4-04 Leachate treatment | 381.617 | 369.787 | 358.324 | 347.216 | 336.452 | 326.022 | 315.915 | 306.122 | 296.632 | 287.436 |
| 3.2.4-05 Vehicle fleet | 41.044 | 41.865 | 42.702 | 43.556 | 44.427 | 45.316 | 46.222 | 47.147 | 48.090 | 49.051 |
| 3.2.4-06 Administration | 94.717 | 96.611 | 98.544 | 100.514 | 102.525 | 104.575 | 106.667 | 108.800 | 110.976 | 113.196 |
| 3.2.6-01 Environmental liabili | 686.355 | 700.082 | 714.084 | 728.365 | 742.933 | 757.791 | 772.947 | 788.406 | 804.174 | 820.258 |
| 3.2.6-02 D&O-insurance | 13.727 | 14.002 | 14.282 | 14.567 | 14.859 | 15.156 | 15.459 | 15.768 | 16.083 | 16.405 |
| 3.2.6-03 Accident insurance | 1.922 | 1.960 | 1.999 | 2.039 | 2.080 | 2.122 | 2.164 | 2.208 | 2.252 | 2.297 |
| Direct costs total | 1.752.795 | 1.768.388 | 1.784.897 | 1.802.321 | 1.820.659 | 1.839.913 | 1.860.084 | 1.881.174 | 1.903.186 | 1.926.121 |
| Costs affecting expenses | 2.753.728 | 2.789.340 | 2.826.268 | 2.864.519 | 2.904.101 | 2.945.024 | 2.987.298 | 3.030.932 | 3.075.938 | 3.122.329 |
| Operating revenues | -1.000.933 | -1.020.952 | -1.041.371 | -1.062.199 | -1.083.442 | -1.105.111 | -1.127.214 | -1.149.758 | -1.172.753 | -1.196.208 |
| Liquidity plan | | | | | | | | | | |
| OPERNING STOCK | 30.592.291 | 27.854.030 | 26.612.554 | 25.311.151 | 23.946.985 | 22.517.132 | 21.018.577 | 17.645.699 | 15.946.240 | 14.166.833 |
| Investments | -1.903.235 | -308.708 | -314.882 | -321.180 | -327.604 | -334.156 | -2.143.352 | -347.656 | -354.609 | -12.665.566 |
| Costs affecting expenses | -2.753.728 | -2.789.340 | -2.826.268 | -2.864.519 | -2.904.101 | -2.945.024 | -2.987.298 | -3.030.932 | -3.075.939 | -3.122.329 |
| Loan redemption | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Interest rate of loan | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Clearing of overdraft | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Interest rate of overdraft | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| COSTS | -4.656.963 | -3.098.049 | -3.141.151 | -3.185.699 | -3.231.705 | -3.279.180 | -5.130.649 | -3.378.588 | -3.430.547 | -15.787.895 |
| Interest rate for financial investment | 917.769 | 835.621 | 798.377 | 759.335 | 718.410 | 675.514 | 630.557 | 529.371 | 478.387 | 425.005 |
| Promotions | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Contributions | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sales revenue | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Operating revenues | 1.000.933 | 1.020.952 | 1.041.371 | 1.062.199 | 1.083.442 | 1.105.111 | 1.127.214 | 1.149.758 | 1.172.753 | 1.196.208 |
| REVENUES | 1.918.702 | 1.856.573 | 1.839.748 | 1.821.533 | 1.801.852 | 1.780.625 | 1.757.771 | 1.679.129 | 1.651.140 | 1.621.213 |
| Borrowing of loan | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Borrowing of overdraft | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| BALANCE | 27.854.030 | 26.612.554 | 25.311.151 | 23.946.985 | 22.517.132 | 21.018.577 | 17.645.699 | 15.946.240 | 14.166.833 | 151 |

Appendix 2

Cost Tables Incineration Plant

Appendix 2 - Total Cost of Ownership (TCO) - Incineration



| * Basisdaten | | Basic data | | | | | |
|-------------------------------------|--|--|---|---------------|-----------------|-------------|------------|
| | Abfallmenge [t/a]: | Waste production [tons/year] | | | 500.000 | | |
| | Projektbeginn | Project start | | | 01.01.2006 | | |
| | Laufzeit Planung | Planning period | | | 1 | | |
| | Laufzeit Anlage | Runtime of incineration plant | | | 20 | | |
| Charakteristika | | Characteristics | | | | | |
| 4 | Thermische Behandlungsanlage | Incineration plant | | | | | |
| | - Vorsortierte Abfallmenge ohne Plastikhohlkörper -> erzielbare Verdichtung 1 t/m ³ | presorted waste without plastic hollowware | | | | | |
| | Heizwert Abfallinput [kJ/kg] | Heating value of waste input [kJ/kg] | | | 10.250 | | |
| Daten Thermische Behandlungsanlage | | Incineration plant datas | | | | | |
| 4.1 | Jahreskapazität [Mg/a] | Annual capacity [Mg/a] | | | 500.000 | | |
| | Anzahl Linien | Number of Lines | | | 2 | | |
| | Verbrennungsleistung pro Linie [Mg/d] | Waste capacity per line [Mg/d] | | | 800 | | |
| | Anzahl Betriebstage pro Jahr | Number of operating days per year | | | 313 | | |
| | Schlackemenge (ca. 18% Feuchte) [% Abfallinput] | Amount of slag [% of waste input] (18 % moisture content) | | | 24,0 | | |
| | Schlacke zur Verwertung [% der Schlackemenge] | Slag recycling [% of slag amount] | | | 95 | | |
| | Kessel- und Filterstaub inkl. Reaktionsprodukte aus der Abgasreinigung [% Abfallinput] | Boiler and filter dust incl. Reaction products out of flue gas cleaning [% of waste input] | | | 4,5 | | |
| | Kessel- und Filterstaub aufbereitet zur Ablagerung [% Kessel- und Filterstaub] | Boiler and filter dust conditioning [% Boiler and filter dust] | | | 100 | | |
| | Eisenmetalle [% Abfallinput] | Ferrous metal [% of waste input] | | | 3,0 | | |
| | NE-Metalle [% Abfallinput] | Non-ferrous metal [% of waste input] | | | 2,0 | | |
| | Thermische Leistung pro Linie [MW] | Thermal capacity per line [MW] | | | 95 | | |
| | Dampfleistung pro Linie [Mg/h] | Steam output per line [Mg/h] | | | 112 | | |
| | Dampfdruck [bar] | Steam pressure [bar] | | | 40 | | |
| | Dampftemperatur [°C] | Steam temperature [°C] | | | 400 | | |
| | Fernwärmeauskopplung (Vor- und Rücklauftemperatur in °C) | Use of Steam for District Heating [flow and return temperature °C] | | | 110 / 60 | | |
| Dampfnutzung [bar / °C / Mg/h] | Use of Steam [bar / °C / Mg/h] | | | 6 / 160 / 180 | | | |
| Kosten Thermische Behandlungsanlage | | Costs of incineration plant | | | Unit Price | Amount | Total |
| 4.2.1 | Grundstück | | Real estate | | | | |
| | | Fläche thermische Behandlungsanlage [m ²] | Area incineration plant [m ²] | | 14.000 | | |
| | | Fläche für Umrandung, Verkehrsflächen, etc. [m ²] | Area for border strip, traffic, etc. [m ²] | | 15.000 | | |
| | | Gesamt [m ²] | Total area [m ²] | | 29.000 | | |
| | | EP Grundstück [EUR/m ²] | Unit price real estate [EUR/m ²] | | 35,00 | | |
| | | Gesamtpreis Grundstück [EUR] | Total price real estate [EUR] | | | | 1.015.000 |
| | | Erschließung | Development | | pauschal / flat | | 150.000 |
| | | Ausgleichsflächen [EUR/m ²] | Compensation area [EUR/m ²] | | 35,00 | | 1.015.000 |
| | | | | | | 2.180.000 | |
| Bauphase | | Construction Period | | | Unit Price | Amount | Total |
| 4.2.2.1 | Bauteil | | Construction Building | | | | |
| | | | | | | | |
| | | Gesamt-Invest | Total invest | | 23.700.000 | | 23.700.000 |
| | | | | | | | |
| Technische Ausrüstung | | Technical equipment | | | Unit Price | Amount | Total |
| | | | | | | | |
| | Gesamt-Invest | Total invest | | 178.500.000 | | 178.500.000 | |
| | | | | | | | |
| * Planung | | Planning | | | | | |
| 4.2.2.2 | | Planung Bauteil [% von Baukosten] | Planning Construction [% of construction] | | 8 | | 1.896.000 |
| | | Planung M+E [% von Anlagentechnik] | Planning machinery and electrics [% of machinery and electrics] | | 10,0 | | 17.850.000 |
| | | | | | | | 19.746.000 |

* For explanations see indicated chapters.

Appendix 2 - Total Cost of Ownership (TCO) - Incineration



| Betriebsphase | Operating Period | Unit Price | Amount | Total |
|---------------------------------|--|--|---------|------------|
| Betriebskosten | | Operational costs | | |
| 4.2.3.1 | Personal [EUR/a] | Personnel [EUR/a] | | |
| | Arbeiter (Tagschicht) | 40.000 | 10 | 400.000 |
| | Facharbeiter (Schichtpersonal) | 45.000 | 20 | 900.000 |
| | Führungspersonal (5 Schichtleiter + 1 Betriebsleiter) | 50.000 | 6 | 300.000 |
| | Verwaltung | 45.000 | 5 | 225.000 |
| | Wachpersonal | 40.000 | 4 | 160.000 |
| | | | | 45 |
| | | | | 1.985.000 |
| 4.2.3.2 | Wartung / Reparaturen | Maintenance and Repair | | |
| | Wartung/ Rep. M+E - Teil [% von technischer Ausrüstung] | 3,00 | | 5.355.000 |
| | Wartung/ Rep. Bau - Teil [% von Baukosten] | 1,00 | | 237.000 |
| | | | | 5.592.000 |
| 4.2.3.3 | Investitionen / Revisionen | Investments | | |
| | Verschleiß- und Ersatzteile Gesamtanlage [% von Baukosten und technischer Ausrüstung] | 2,50 | | 5.055.000 |
| | | | | 5.055.000 |
| 4.2.3.4 | Energie (Eigenbedarf) | Energy | | |
| | Elektrizität (Eigenbedarf - selbst erzeugt) | 0,00 | 6.700 | 0 |
| | Erdgas | 0,28 | 415.000 | 116.200 |
| | | | | 116.200 |
| 4.2.3.5 | Betriebsmittel | Resources [Mg/a] | | |
| | Aktivkohle | 130,00 | 400 | 52.000 |
| | CaO | 140,00 | 5.000 | 700.000 |
| | NH4OH (25%) | 180,00 | 3.000 | 540.000 |
| | | | | 1.292.000 |
| 4.2.3.6 | Anlagenoutput zur Verwertung / Entsorgung | Output to recycling and disposal [Euro/Mg] [Mg/a] | | |
| | Schlacke zur Verwertung (ohne FE- + NE-Metalle) | 35,00 | 89.000 | 3.115.000 |
| | Schlacke zur Ablagerung auf Deponie | 200,00 | 6.000 | 1.200.000 |
| | Kessel- und Filterstäube zur Beseitigung | 205,00 | 22.500 | 4.612.500 |
| | | | | 8.927.500 |
| 4.2.3.7 | Verwaltung | Administration | | |
| | Zuzügliche Verwaltungskosten | 1.985.000,00 | 10% | 198.500 |
| | | | | 198.500 |
| 4.2.3.8 | Versicherungen | Insurance | | |
| | UHV Umwelthaftpflichtversicherung | Environmental Liability Insurance [EUR/Mg Input] | | 125.000 |
| | Maschinenbruchversicherung | Equipment Breakdown Insurance | | 446.250 |
| | Erweiterung MBU - Betriebsunterbrechung | Consequential Loss Equipment Breakdown | | 71.000 |
| | Sachversicherung all Risk (Feuerversicherung, Blitzschutz, etc.) | All Risk Property Insurance | | 404.400 |
| | Erweiterung BU - Betriebsunterbrechung | Consequential Loss Property Insurance | | 71.000 |
| | D&O Vermögensschadenshaftpflicht für Vorstände und leitende Angestellte | Directors & Officers Professional Liability Insurance [EUR/person] | | 20.000 |
| | Unfallversicherung Mitarbeiter | Accident insurance employees [EUR/person] | | 4.500 |
| | Gesamte Versicherungssumme | Total contribution | | 1.142.150 |
| Jährliche Betriebskosten | | Yearly operational costs [EUR/a] | | |
| | | | | 24.308.350 |

* For explanations see indicated chapters.

Appendix 2 - Total Cost of Ownership (TCO) - Incineration



| * Betriebseinnahmen | | Operational revenues | | Unit Price | Amount | Total |
|---------------------|---|--|--|----------------|---------|------------|
| 4.2.3.9 | Energie | Energy | | [EUR/kWh] | kW | [EUR/a] |
| | Elektrizität netto (ohne Eigenbedarf) | Electricity (without subsistence) | | 0,02 | 16.100 | 2.415.000 |
| | Ferndampf | Steam Use | | 0,03 | 102.600 | 23.085.000 |
| | | | | | | 25.500.000 |
| 4.2.3.10 | Materialien | Materials | | Euro/Mg | Mg/a | |
| | Eisenmetalle | Ferrous metal | | 100,00 | 15.000 | 1.500.000 |
| | NE-Metalle | Non-ferrous metal | | 150,00 | 10.000 | 1.500.000 |
| | | | | | | 3.000.000 |
| | Müllgebühren [EUR/Mg] | Waste fees [EUR/Mg] | | X | | |
| | Jährliche Betriebseinnahmen | Yearly operational revenues | | | | 28.500.000 |
| Restwert | | Declining Balance | | Unit Price | Amount | Total |
| 4.2.4.1 | Restwert Bauteil und technische Ausrüstung | Declining Balance Buildings and Technical Equipment | | | | |
| | Bauteil | Buildings | | 23.700.000,00 | 25% | 5.925.000 |
| | Technische Ausrüstung | Technical Equipment | | 178.500.000,00 | 10% | 17.850.000 |
| | | | | | | 23.775.000 |
| 4.2.4.2 | Restwert Grundstück | Declining Balance Real Estate | | | | |
| | Gesamt [m²] | Total area [m²] | | 29.000 | | |
| | EP Grundstück [EUR/m²] | Unit price real estate [EUR/m²] | | 35,00 | | |
| | Gesamtpreis Grundstück [EUR] | Total price real estate [EUR] | | | | 1.015.000 |
| | | | | | | 1.015.000 |
| | Gesamter Restwert | Total declining balance | | | | 24.790.000 |

* For explanations see indicated chapters.

| Sao Paulo Incineration + District heating | | 102.600 kW | | 0,030 [EUR/kWh] | | 2,00% | |
|--|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| | Summe | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
| Inflation | 2,00% | 1,00 | 1,02 | 1,04 | 1,06 | 1,08 | 1,10 |
| Capital spending plan | | 0 | | | | | |
| 4.2.1 Real estate | | 2.180.000 | 0 | 0 | 0 | 0 | 0 |
| 4.2.2.1 Construction building | | 23.700.000 | 0 | 0 | 0 | 0 | 0 |
| 4.2.2.1 Technical equipment | | 178.500.000 | 0 | 0 | 0 | 0 | 0 |
| 4.2.2.2 Planning construction | | 1.896.000 | 0 | 0 | 0 | 0 | 0 |
| 4.2.2.2 Planning machinery an | | 17.500.000 | 0 | 0 | 0 | 0 | 0 |
| Investment total | | 223.776.000 | 0 | 0 | 0 | 0 | 0 |
| Cost element plan | | | | | | | |
| 4.2.3.1 Personnel | | 0 | 2.024.700 | 2.065.194 | 2.106.498 | 2.148.628 | 2.191.600 |
| 4.2.3.2 Maintenance | | 0 | 5.596.740 | 5.708.675 | 5.822.848 | 5.939.305 | 6.058.091 |
| 4.2.3.3 Investments | | 0 | 5.066.850 | 5.168.187 | 5.271.551 | 5.376.982 | 5.484.521 |
| 4.2.3.4 Energy | | 0 | 118.524 | 120.894 | 123.312 | 125.779 | 128.294 |
| 4.2.3.5 Resources | | 0 | 1.317.840 | 1.344.197 | 1.371.081 | 1.398.502 | 1.426.472 |
| 4.2.3.6 Output to recycling an | | 0 | 9.106.050 | 9.288.171 | 9.473.934 | 9.663.413 | 9.856.681 |
| 4.2.3.7 Administration | | 0 | 202.470 | 206.519 | 210.650 | 214.863 | 219.160 |
| 4.2.3.8 Insurance | | 0 | 1.108.230 | 1.130.395 | 1.153.002 | 1.176.063 | 1.199.584 |
| 4.2.3.9 Energy | | 0 | -26.010.000 | -26.530.200 | -27.060.804 | -27.602.020 | -28.154.060 |
| 4.2.3.10 Materials | | 0 | -3.060.000 | -3.121.200 | -3.183.624 | -3.247.296 | -3.312.242 |
| 4.2.3.11 Waste fees | | 0 | -9.796.896 | -9.992.834 | -10.192.691 | -10.396.544 | -10.604.475 |
| 4.2.4.1 DB Buildings and Technical Equipment | | 0 | 0 | 0 | 0 | 0 | 0 |
| 4.2.4.2 DB Real Estate | | 0 | 0 | 0 | 0 | 0 | 0 |
| Direct costs total | | 0 | -14.325.492 | -14.612.002 | -14.904.242 | -15.202.327 | -15.506.373 |
| Costs affecting expenses | | 0 | 24.541.404 | 25.032.232 | 25.532.877 | 26.043.534 | 26.564.405 |
| Operating revenues | | 0 | -38.866.896 | -39.644.234 | -40.437.119 | -41.245.861 | -42.070.778 |
| Liquidity plan | | | | | | | |
| OPERNING STOCK | | 0 | 0 | 0 | 0 | 0 | 0 |
| Investments | | -223.776.000 | 0 | 0 | 0 | 0 | 0 |
| Costs affecting expenses | | 0 | -24.541.404 | -25.032.232 | -25.532.877 | -26.043.534 | -26.564.405 |
| Loan redemption | | 0 | 0 | 0 | 0 | 0 | 0 |
| Interest rate of loan | | 0 | 0 | 0 | 0 | 0 | 0 |
| Clearing of overdraft | | 0 | -3.136.692 | -3.580.036 | -4.051.278 | -4.551.927 | -5.083.570 |
| Interest rate of overdraft | | 0 | -11.188.800 | -11.031.965 | -10.852.964 | -10.650.400 | -10.422.803 |
| COSTS | | -223.776.000 | -38.866.896 | -39.644.234 | -40.437.119 | -41.245.861 | -42.070.778 |
| Interest rate for financial investment | | 0 | 0 | 0 | 0 | 0 | 0 |
| Promotions | | 0 | 0 | 0 | 0 | 0 | 0 |
| Contributions | | 0 | 0 | 0 | 0 | 0 | 0 |
| Sales revenue | | 0 | 0 | 0 | 0 | 0 | 0 |
| Operating revenues | | 0 | 38.866.896 | 39.644.234 | 40.437.119 | 41.245.861 | 42.070.778 |
| REVENUES | | 0 | 38.866.896 | 39.644.234 | 40.437.119 | 41.245.861 | 42.070.778 |
| Borrowing of loan | | 0 | 0 | 0 | 0 | 0 | 0 |
| Borrowing of overdraft | | 223.776.000 | 0 | 0 | 0 | 0 | 0 |
| BALANCE | | 0 | 0 | 0 | 0 | 0 | 0 |
| Liquidity requirement | | 0 | 0 | 0 | 0 | 0 | 0 |
| Calculation result | | | | | | | |
| Waste deposit fee [EUR/Mg] | 19,21 | | 19,59 | 19,99 | 20,39 | 20,79 | 21,21 |
| Cash flow [debit] | Interest rate 5,00% | 0 | -223.776.000 | -220.639.308 | -217.059.272 | -213.007.993 | -208.456.066 |
| Cash flow [credit] | Interest rate 3,00% | 0 | 0 | 0 | 0 | 0 | 0 |
| Cash Flow - total | | 0 | -223.776.000 | -220.639.308 | -217.059.272 | -213.007.993 | -208.456.066 |
| Unit price for district heating [EUR/kWh] | 0,030 | | | | | | |

| Sao Paulo Incineration + District heating | | Inflation | | | | | | | |
|--|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|--|
| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | |
| Inflation | 1,13 | 1,15 | 1,17 | 1,20 | 1,22 | 1,24 | 1,27 | 1,29 | |
| Capital spending plan | | | | | | | | | |
| 4.2.1 Real estate | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 4.2.2.1 Construction building | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 4.2.2.1 Technical equipment | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 4.2.2.2 Planning construction | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 4.2.2.2 Planning machinery an | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Investment total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Cost element plan | | | | | | | | | |
| 4.2.3.1 Personnel | 2.235.432 | 2.280.141 | 2.325.744 | 2.372.259 | 2.419.704 | 2.468.098 | 2.517.460 | 2.567.809 | |
| 4.2.3.2 Maintenance | 6.179.253 | 6.302.838 | 6.428.895 | 6.557.473 | 6.688.622 | 6.822.395 | 6.958.843 | 7.098.020 | |
| 4.2.3.3 Investments | 5.594.212 | 5.706.096 | 5.820.218 | 5.936.622 | 6.055.355 | 6.176.462 | 6.299.991 | 6.425.991 | |
| 4.2.3.4 Energy | 130.860 | 133.477 | 136.147 | 138.870 | 141.647 | 144.480 | 147.370 | 150.317 | |
| 4.2.3.5 Resources | 1.455.002 | 1.484.102 | 1.513.784 | 1.544.060 | 1.574.941 | 1.606.440 | 1.638.568 | 1.671.340 | |
| 4.2.3.6 Output to recycling an | 10.053.815 | 10.254.891 | 10.459.989 | 10.669.189 | 10.882.573 | 11.100.224 | 11.322.229 | 11.548.673 | |
| 4.2.3.7 Administration | 223.543 | 228.014 | 232.574 | 237.226 | 241.970 | 246.810 | 251.746 | 256.781 | |
| 4.2.3.8 Insurance | 1.223.575 | 1.248.047 | 1.273.008 | 1.298.468 | 1.324.437 | 1.350.926 | 1.377.945 | 1.405.504 | |
| 4.2.3.9 Energy | -28.717.142 | -29.291.485 | -29.877.314 | -30.474.861 | -31.084.358 | -31.706.045 | -32.340.166 | -32.986.969 | |
| 4.2.3.10 Materials | -3.378.487 | -3.446.057 | -3.514.978 | -3.585.278 | -3.656.983 | -3.730.123 | -3.804.725 | -3.880.820 | |
| 4.2.3.11 Waste fees | -10.816.565 | -11.032.896 | -11.253.554 | -11.478.625 | -11.708.198 | -11.942.362 | -12.181.209 | -12.424.833 | |
| 4.2.4.1 DB Buildings and Technical Equipment | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 4.2.4.2 DB Real Estate | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Direct costs total | -15.816.501 | -16.132.831 | -16.455.487 | -16.784.597 | -17.120.289 | -17.462.695 | -17.811.949 | -18.168.188 | |
| Costs affecting expenses | 27.095.693 | 27.637.607 | 28.190.359 | 28.754.166 | 29.329.250 | 29.915.835 | 30.514.151 | 31.124.434 | |
| Operating revenues | -42.912.194 | -43.770.438 | -44.645.846 | -45.538.763 | -46.449.539 | -47.378.529 | -48.326.100 | -49.292.622 | |
| Liquidity plan | | | | | | | | | |
| OPERNING STOCK | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Investments | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Costs affecting expenses | -27.095.693 | -27.637.607 | -28.190.359 | -28.754.166 | -29.329.250 | -29.915.835 | -30.514.151 | -31.124.434 | |
| Loan redemption | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Interest rate of loan | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Clearing of overdraft | -5.647.876 | -6.246.600 | -6.881.586 | -7.554.775 | -8.268.206 | -9.024.022 | -9.824.477 | -10.671.940 | |
| Interest rate of overdraft | -10.168.625 | -9.886.231 | -9.573.901 | -9.229.822 | -8.852.083 | -8.438.673 | -7.987.472 | -7.496.248 | |
| COSTS | -42.912.194 | -43.770.438 | -44.645.846 | -45.538.763 | -46.449.539 | -47.378.529 | -48.326.100 | -49.292.622 | |
| Interest rate for financial investment | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Promotions | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Contributions | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Sales revenue | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Operating revenues | 42.912.194 | 43.770.438 | 44.645.846 | 45.538.763 | 46.449.539 | 47.378.529 | 48.326.100 | 49.292.622 | |
| REVENUES | 42.912.194 | 43.770.438 | 44.645.846 | 45.538.763 | 46.449.539 | 47.378.529 | 48.326.100 | 49.292.622 | |
| Borrowing of loan | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Borrowing of overdraft | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| BALANCE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Liquidity requirement | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Calculation result | | | | | | | | | |
| Waste deposit fee [EUR/Mg] | 21,63 | 22,07 | 22,51 | 22,96 | 23,42 | 23,88 | 24,36 | 24,85 | |
| Cash flow [debit] | -203.372.496 | -197.724.620 | -191.478.021 | -184.596.434 | -177.041.659 | -168.773.453 | -159.749.431 | -149.924.954 | |
| Cash flow [credit] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Cash Flow - total | -203.372.496 | -197.724.620 | -191.478.021 | -184.596.434 | -177.041.659 | -168.773.453 | -159.749.431 | -149.924.954 | |
| Unit price for district heating [EUR/kWh] | | | | | | | | | |

| Sao Paulo Incineration + District heating | | | | | | | |
|--|---------------------|---------------------|---------------------|---------------------|--------------------|--------------------|--------------------|
| | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 |
| Inflation | 1,32 | 1,35 | 1,37 | 1,40 | 1,43 | 1,46 | 1,49 |
| Capital spending plan | | | | | | | |
| 4.2.1 Real estate | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4.2.2.1 Construction building | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4.2.2.1 Technical equipment | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4.2.2.2 Planning construction | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4.2.2.2 Planning machinery an | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Investment total | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cost element plan | | | | | | | |
| 4.2.3.1 Personnel | 2.619.165 | 2.671.549 | 2.724.980 | 2.779.479 | 2.835.069 | 2.891.770 | 2.949.606 |
| 4.2.3.2 Maintenance | 7.239.980 | 7.384.780 | 7.532.475 | 7.683.125 | 7.836.787 | 7.993.523 | 8.153.393 |
| 4.2.3.3 Investments | 6.554.511 | 6.685.601 | 6.819.313 | 6.955.699 | 7.094.813 | 7.236.710 | 7.381.444 |
| 4.2.3.4 Energy | 153.323 | 156.390 | 159.518 | 162.708 | 165.962 | 169.281 | 172.667 |
| 4.2.3.5 Resources | 1.704.767 | 1.738.862 | 1.773.639 | 1.809.112 | 1.845.294 | 1.882.200 | 1.919.844 |
| 4.2.3.6 Output to recycling an | 11.779.647 | 12.015.240 | 12.255.544 | 12.500.655 | 12.750.668 | 13.005.682 | 13.265.795 |
| 4.2.3.7 Administration | 261.917 | 267.155 | 272.498 | 277.948 | 283.507 | 289.177 | 294.961 |
| 4.2.3.8 Insurance | 1.433.614 | 1.462.286 | 1.491.532 | 1.521.362 | 1.551.790 | 1.582.825 | 1.614.482 |
| 4.2.3.9 Energy | -33.646.708 | -34.319.643 | -35.006.035 | -35.706.156 | -36.420.279 | -37.148.685 | -37.891.659 |
| 4.2.3.10 Materials | -3.958.436 | -4.037.605 | -4.118.357 | -4.200.724 | -4.284.739 | -4.370.434 | -4.457.842 |
| 4.2.3.11 Waste fees | -12.673.330 | -12.926.796 | -13.185.332 | -13.449.039 | -13.718.020 | -13.992.380 | -14.272.228 |
| 4.2.4.1 DB Buildings and Technical Equipment | 0 | 0 | 0 | 0 | 0 | 0 | -34.808.318 |
| 4.2.4.2 DB Real Estate | 0 | 0 | 0 | 0 | 0 | 0 | -1.508.237 |
| Direct costs total | -18.531.551 | -18.902.182 | -19.280.226 | -19.665.831 | -20.059.147 | -20.460.330 | -57.186.091 |
| Costs affecting expenses | 31.746.923 | 32.381.861 | 33.029.499 | 33.690.089 | 34.363.890 | 35.051.168 | -564.363 |
| Operating revenues | -50.278.474 | -51.284.044 | -52.309.725 | -53.355.919 | -54.423.038 | -55.511.498 | -56.621.728 |
| Liquidity plan | | | | | | | |
| OPERNING STOCK | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Investments | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Costs affecting expenses | -31.746.923 | -32.381.861 | -33.029.499 | -33.690.089 | -34.363.890 | -35.051.168 | -35.752.192 |
| Loan redemption | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Interest rate of loan | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Clearing of overdraft | -11.568.901 | -12.517.977 | -13.521.919 | -14.583.620 | -15.706.117 | -16.892.606 | -54.461.873 |
| Interest rate of overdraft | -6.962.651 | -6.384.206 | -5.758.307 | -5.082.211 | -4.353.030 | -3.567.724 | -2.723.094 |
| COSTS | -50.278.474 | -51.284.044 | -52.309.725 | -53.355.919 | -54.423.038 | -55.511.498 | -92.937.158 |
| Interest rate for financial investment | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Promotions | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Contributions | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sales revenue | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Operating revenues | 50.278.474 | 51.284.044 | 52.309.725 | 53.355.919 | 54.423.038 | 55.511.498 | 92.938.283 |
| REVENUES | 50.278.474 | 51.284.044 | 52.309.725 | 53.355.919 | 54.423.038 | 55.511.498 | 92.938.283 |
| Borrowing of loan | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Borrowing of overdraft | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| BALANCE | 0 | 0 | 0 | 0 | 0 | 0 | 1.124 |
| Liquidity requirement | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Calculation result | | | | | | | |
| Waste deposit fee [EUR/Mg] | 25,35 | 25,85 | 26,37 | 26,90 | 27,44 | 27,98 | 28,54 |
| Cash flow [debit] | -139.253.014 | -127.684.113 | -115.166.136 | -101.644.217 | -87.060.597 | -71.354.479 | -54.461.873 |
| Cash flow [credit] | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cash Flow - total | -139.253.014 | -127.684.113 | -115.166.136 | -101.644.217 | -87.060.597 | -71.354.479 | 1.124 |
| Unit price for district heating [EUR/kWh] | | | | | | | |

Appendix 3

Literature

Bewertung des Betriebs der mechanisch biologischen Abfallbehandlungsanlage in São Sebastião, Brasilien, Projekt - Nr.: 97.2044.2-001.00 São Sebastião & Berlin, GTZ, BRD -Eschborn, November/Dezember 2001

Directive 2000/76/EG of the European Parliament and of the Council on the incineration of waste; December 2000

Machbarkeitsstudie zur Produktion von Ethanol durch Biokonversion an einem Standort in Bayern, atz Entwicklungszentrum, TU München und ia GmbH im Auftrag des Bayerischen Staatsministeriums für Landwirtschaft und Forsten, Juli 2005

Einladung zur Konferenz über Infrastruktur- und Logistikinvestitionen in Brasilien für den 30.01.2006 in Frankfurt, VUBIC Verband Unabhängig Beratender Ingenieure und Consultants e.V., BRD - Berlin

Kostenstrukturen bei der thermischen Abfallbehandlung; Dipl.-Ing. Edgar Kaufhold, Dipl.-Ing. Rolf Kaufmann, Dipl.-Ing. Helge Goedecke, BKB Aktiengesellschaft, Helmstedt; 10. Fachtagung Thermische Abfallbehandlung; Schriftenreihe des Instituts für Abfallwirtschaft und Altlasten Technische Universität Dresden; Dresden 2005