

# Environmental statement

**2014**

of

**BEFESA**

Befesa Salzschlacke GmbH

for the

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30179 Hannover**

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## Foreword

This environmental statement is designed to inform the public about the current environmental situation of Befesa Salzschlacke GmbH, about actions already taken for the protection of the environment based on the company's certification pursuant to DIN EN ISO 14001 and the targets geared to mitigating the environmental impact of our activities.

This environmental statement has been developed in accordance with the eco-management and audit scheme / EMAS III regulation (EC) No. 1221/2009.

It has been prepared for the interested public to inform it about this subject in a concise and comprehensible form.

Should you have questions and suggestions, please turn to:

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## We and the environment

Befesa Salzschlacke GmbH has been certified under DIN EN ISO 9001:2008, DIN EN ISO 14001:2004, DIN EN ISO 14064-1:2006 and OHSAS 18001:2007. It is actively committed to the protection of the environment. Befesa Salzschlacke GmbH pursues the target to minimize the burden on the environment resulting from our industrial operations or better even, to prevent it entirely. We are also endeavouring to use a minimum of environmentally relevant materials and substances at our locations in Hanover and Lünen. This is the only way to safeguard continuous development.

### ➤ Responsibility

We take responsibility for all our products, services and other business activities. We are fully aware of the importance of environmental protection and set the highest standards in this field.

### ➤ Transparency

We promote the open dialogue on issues of environmental protection and strive to arouse and enhance the environmental awareness of our employees, suppliers and customers.

## The locations of Befesa Salzschlacke GmbH

### **The Hanover location**

The Hanover branch of Befesa Salzschlacke GmbH is located on the premises of a former forwarding company in Hannover Langenhagen with the following postal address:

#### **Befesa Salzschlacke GmbH**

Niederlassung Hannover

Am Brinker Hafen 6

30179 Hannover

On the site of the former Hanse GmbH and Alsa GmbH, respectively, which is now our Hanover location, industrial business has been conducted at Brinker Hafen since 1991. On an area of about 22,500 m<sup>2</sup> (of which about 19,500 m<sup>2</sup> are sealed) which is designated as industrial zone, our company operates its own boiler house for energy production and supply (natural gas < 10 MW). The city of Hanover provides the location with drinking water, and the water required for the plant is treated canal water.

The buildings were newly constructed in 1991 and have their own access road.

In the land use plan, the premises are designated as industrial zone. The nearest open waterway is the Mittelland canal. The location is situated in the direct neighbourhood of a nearby residential area.

### Site development

Currently, about 55 employees work on the site. The operating buildings and the administrative building include a car park for the vehicles of the personnel as well as various vehicle shelters. In addition, the premises accommodate a workshop with store room. The quantities of incoming and outgoing materials are determined on the company's own truck weighbridge.

The following plant units are operated:

- Dry section with storage, grinding and screening facilities
- Wet section with dissolving, waste gas treatment, alumina pre-treatment, evaporative crystallization facilities

|          |  |
|----------|--|
| Jan 1989 | Permit for salt slag treatment operations  |
| Jul 1990 | Construction of the new crushing, grinding and screening unit  |
| Apr 1997 | Trial operation of the new Serox storage facility  |
| May 1998 | Regular operation of the Serox storage facility  |
| Oct 1998 | Merger of Hannoversche Salzschlacke-Entsorgungsgesellschaft (Hanse) with Segl GmbH to form Alsa GmbH |
| Jan 2009 | Insolvency of the then parent company Agor AG  |
| Jun 2009 | Takeover of the activities by Befesa S.A.  |
| Jun 2013 | Sell-off of Befesa S.A. from Abengoa to Triton   |

### The Lünen location

The Lünen branch of Befesa Salzschlacke GmbH is located on the premises of Remondis - Lippewerk (formerly Vereinigte Aluminiumwerke AG - Lippewerk) in Lünen with the following postal address:

#### **Befesa Salzschlacke GmbH**

Niederlassung Lünen  
Brunnenstraße 138  
44536 Lünen

The site is located in the district of Lippholthausen, cadastral section 3, land parcel 125. For former industrial operations, the premises were used by Vereinigte Aluminiumwerke. At that time, the buildings accommodated electrolytic plants. The Lünen branch of Befesa Salzschlacke GmbH is making use of various infrastructure facilities of Remondis-Lippewerk. Access is facilitated through the general gate. Any transport operations are registered at the gate. Incoming and outgoing trucks are weighed on the Remondis weighbridge. The plants and buildings of Befesa Salzschlacke GmbH are supplied with energy, water, steam, compressed air and waste water management services by Remondis. The buildings and premises are partly owned by Befesa Salzschlacke GmbH and partly rented.

In the land use plan, the premises are designated as industrial zone. In the neighbourhood the Lippe river is the nearest open water body.

### Site development

Currently, about 55 employees work on the site. The operating buildings and the administrative building include a car park for the vehicles of the personnel as well as various vehicle shelters. In addition, the premises accommodate a workshop with store room. The quantities of incoming and outgoing materials are determined on the Remondis truck weighbridge.

The following plant units are operated:

- Dry section with storage, grinding and screening facilities
- Wet section with dissolving, waste gas treatment, alumina pre-treatment, evaporative crystallization facilities
- Serox product storage in kiln building I
- Storage of salt slag, melting salt and Serox in kiln building III

|          |   |
|----------|---|
| Apr 1986 | Commissioning of Segl I   |
| May 1988 | Installation of pre-crusher and roller grate for pre-treatment  |
| May 1989 | Construction of the new salt slag storage hall  |
| Apr 1991 | Commissioning of Segl II  |
| Mar 1997 | Amendment of permit to operate a recycling and recovery plant pursuant to item 8.10 of 4 <sup>th</sup> BImSchV (plant regulation)   |
| Oct 1998 | Merger of Salzschlacke-Entsorgungsgesellschaft Lünen mbH (Segl) with Hannoversche Salzschlacke-Entsorgungsgesellschaft mbH (Hanse) to form Aluminium-Salzschlacke Aufbereitungs-GmbH (Alsa) |
| Jun 1999 | Commissioning of wet grinding unit  |
| Jan 2009 | Insolvency of the then parent company Agor AG   |
| Jun 2009 | Takeover of the activities by Befesa S.A.   |
| Jun 2013 | Sell-off of Befesa S.A. from Abengoa to Triton  |



## Environmental policy

Befesa Salzschlacke GmbH is actively committed to the protection of the environment. The target and objective is to achieve the continuous improvement of pollution control, besides the optimization of quality, occupational health & safety and the economy of operations. The company undertakes to comply with existing laws and regulations which are in many respects complemented by the company's own, voluntary regulatory performance.

- Based on the environmental management system of Befesa Salzschlacke GmbH, its employees strive for continuous improvement of the company's environmental protection performance. This is ensured by regular analysis and evaluation of the environment-relevant activities and risks. The competences and responsibilities for all environment-relevant matters are therefore laid down in the management structure of the two locations, Hanover and Lünen.
- It is the strategy of Befesa Salzschlacke GmbH to detect weaknesses by regular reviews of the existing environment management system in order thus to improve the effectiveness of the integral system. To this end, regular audits are conducted within the company geared to checking conformance of the management system with the targets and objectives of the company's environmental policy and its guidelines.
- The impact on the environment and safety of each new activity and each new process is assessed in advance and monitored. This is to ensure that the operational environmental control is improved continuously.
- The impact of the current activities on the local neighbourhood and the working conditions is assessed and monitored and all material repercussions of such activities on the environment are analysed. This includes the following aspects, in particular: emissions to the atmosphere, accumulation of wastes, process water treatment, storage of hazardous and environment-relevant substances, noise, vibrational and odour nuisance.

- On all hierarchical levels, the sense of responsibility for the environment is fostered among the employees. For this purpose it is essential that the employees are informed of the environmental relevance of their activities and that responsibility for the environment is conferred on them.
- All necessary measures are taken to prevent damage to the environment or to eliminate any grievances. Where this is not viable, any emissions affecting the environment and the waste generation by the company's operations are minimized and resources are spared; to this end, the best available ecologically compatible technologies are applied.
- The technologies employed are regularly reviewed to ascertain potential optimizations so that the continuous improvement of environmental protection is guaranteed. That is why at Befesa Salzschlacke GmbH suitable processes were introduced for the transmission of information to ensure regular and systematic exchange of experience.
- With a view to preventing incident-induced effects such as emissions, all necessary measures are taken and suitable processes developed in cooperation with the competent authorities and kept up to date. Such emergency precautionary and preventive initiatives are taken account of in the works organization and agreed with the respective authorities and bodies (e.g. regional administration of Arnsberg, fire brigade). An open dialogue is maintained and promoted with all representatives of authorities. The emergency management is regularly communicated to the employees and their awareness is heightened through trainings and practical exercises.
- Conformance of the environmental policy pursued by the company with the integrated management system is checked by regular surveillance procedures. To this end, measurements and audits are performed. Above and beyond the collection and assessment of environmental data the integrated management system is thus subject to permanent internal controls.
- Should it be observed that certain environmental principles are not complied with, procedures are applied which include measures to intercept the respective deficiencies and to initiate corrective action. The deficiencies found are documented and elucidated to those responsible for them.
- The relevant decision competence and scopes of action have been defined within the company.

- The management policy is made known to the group management, third parties and all employees by posting on the notice boards. Besides the environmental policy all further information required for understanding the environmental impact of the company's activities is communicated to the public; the company maintains an open dialogue with all stakeholders.
- Appropriate advice is provided for customers concerning the environmental aspects in connection with the proper handling and use of the company's products.
- Precautions are taken to ensure that the contract partners working on the company's premises adhere to the same environmental standards as the company itself.
- All and any reports about environment-relevant disturbances are transmitted to the top management of the respective location where they are analysed.
- The management of Befesa Salzschlacke GmbH is committed to comply with all relevant environmental laws and regulations as well as any other requirements within the scope of the organization's self-commitment. The objective is to perfect the level of environmental control in excess of such requirements. It is a tenet for all plants and technical facilities to deploy the best available techniques to the extent that this is economically reasonable.
- For activities pursued by third-party companies and subcontractors on the premises of the respective location, the same demands are imposed as on the company itself. The employees of Befesa Salzschlacke GmbH will see to the respective compliance by outside companies by applying suitable control procedures.

- Steady, continuous improvement of the protection of the environment is the target and objective of the integrated management system.
  
- Aside from questions of quality and environmental protection, the issue of health & safety at work is a central aspect of corporate policy. Hazard assessment is key to a successful occupational health & safety system. The pressure exerted by the community with its respective expectations reinforces the demands made on our organization with a view to reducing risks in terms of disease, accidents and injury. The goal of the management is therefore to warrant through technical and organizational measures that
  - accidents, personal injury and property damage are prevented
  - health & safety of employees, subcontractors and other third parties are safeguarded and
  - harm to the environment is avoided.
  
- Befesa Salzschlacke GmbH promotes the open dialogue on issues of environmental protection and strives to arouse and internalize the awareness of all employees, suppliers, customers and third-party companies for the environment. The relevant training and information of all employees is the pillar of success in implementing environmental protection measures in the corporation.
  
- The management assumes responsibility for all products and related business activities. The efforts geared to improving the environmental performance therefore comprise the entire treatment process from the receipt of the salt slag through to the delivery of the products made.
  
- In the same way, all process modifications as well as new products are analysed and evaluated in advance with respect to any anticipated environmental impact.

- Sense of responsibility and competence for such matters penetrate all levels of the corporation. By taking recourse to appropriate measures and resources, we endeavour to curb the impact of our activities on the environment and to minimize any unforeseen incidences and emergencies.
- The measures described are designed to contribute to a positive social working climate in our company over and above statutory requirements, to avert commercial losses and secure the continued existence of the corporation. Occupational health, safety and environment as well as warranted quality have utmost priority for our performance.

## Environment management system

The integrated environment, quality and occupational safety management system of Befesa Salzschlacke GmbH determines the course of action for environmental protection, quality assurance and safeguarding of health & safety in all areas of the company and contributes to the harmonized understanding of all activities within the corporation with relevance for the environment, quality and safety.

The integrated environment, quality and safety management system (IMS) describes the system as well as the definition of the necessary initiatives for safeguarding proper application, surveillance and documentation of the IMS.

It serves the purpose to:

- define the environmental policy and install the organizational structure for implementing the environmental policy. This includes organizational elements such as the environment management system, the allocation of tasks and resources, the determination of responsibility and competences, control of information flows, information of employees and communications with the public,
- collect and evaluate the environment-relevant repercussions,
- monitor environment-relevant processes and initiate corrective action, if necessary. This includes process instructions for mitigating the impact on the environment, avoiding and reusing wastes and sparing use of raw materials and energies,
- review the functionality and performance capability of the structural and workflow organization to assess if environment-relevant standards are met and the targets set have been achieved.

Consistent implementation of the integrated management system ensures that the protection of the environment, quality and the working atmosphere are improved continuously, all customer demands, laws, legal means, regulations, requirements, norms and standards as well as the company's own commitments are fulfilled with a view to protecting the people within the company, steadily minimizing environmental impacts and safeguarding long-term business relations with our customers.

The essential prerequisite for achieving environmental protection targets is an appropriate organization of the environmental protection system within the corporation.

The integrated management system embraces all spheres of duties pertaining to Befesa Salzschlacke GmbH.

## ➤ **Eco-audits and internal audits**

According to EMAS, companies are to be regularly subjected to an eco- audit. These audits are planned and performed by the environmental management officer. The individual items are derived from the regulation and the standards and focus on the subjects of waste and disposal management, resource and safety management, training and public relations. Regulatory requirements and internal rules are considered additionally.

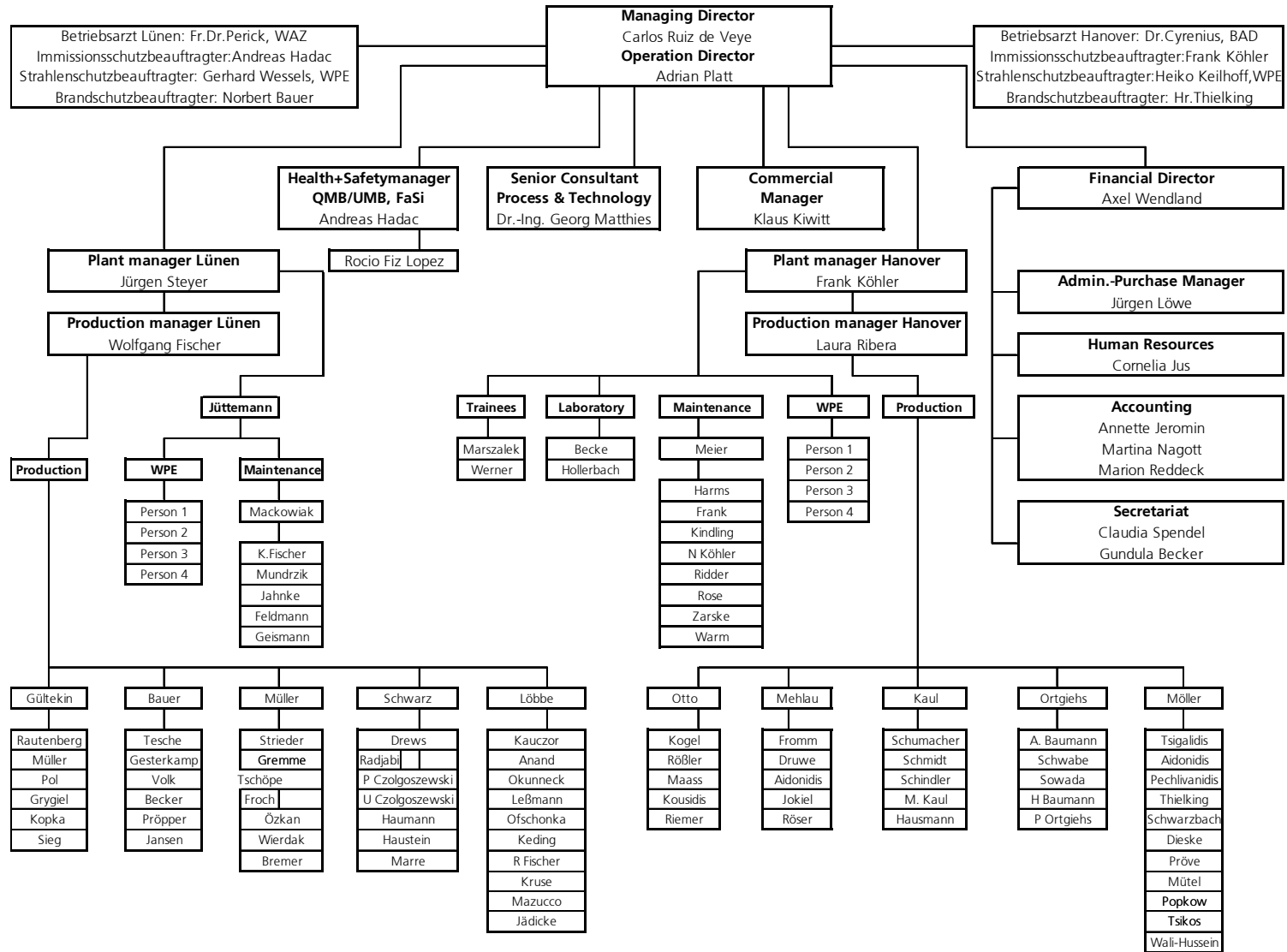
Audits are carried through within the scope of the existing audit plan for all sectors at least once a year. Measures for improving pollution control are taken up in an action plan based on the audit results. Audit schedules and those responsible are determined accordingly.

In our company, the following function managers are responsible for environmental protection:

- The management is responsible for the environmental and quality policy, for creating the preconditions for its implementation and the involvement of the employees in the environmental policy.
- The environmental management officer for the locations Hanover and Lünen is responsible and authorized to apply and maintain the environment management system
- The designated environment managers of the locations are responsible for the local enforcement and administration of the integrated management system.



- The plant representatives for pollution control, water conservation and radiation protection take statutory responsibility at their respective location.
- For each location, a health & safety specialist has been nominated.
- The production managers and the shift foremen bear responsibility for the appropriate plant operating conditions and for corrective measures in the event of deviations.
- The procurement manager is responsible for ecologically compatible procurement.
- The R&D manager considers in the development work any potential impacts on the environment within the scope of process or product modifications.



## Products of Befesa Salzschlacke GmbH

### Impact of the technological process on the environment

The technological process has been designed such that a harmful impact on the environment elements air, water and soil is virtually excluded.

### Input materials and products

At both locations of Befesa Salzschlacke GmbH aluminium-containing salt slag and dross are treated for full recovery. Four products are obtained from this feedstock. In detail, these are:

- Aluminium granulate (feedstock for aluminium melting plants)
- Melting salt (feedstock for aluminium melting plants)
- Serox (feedstock for the cement and mineral wool industries)
- Ammonium sulphate (feedstock for the fertilizer and chipboard industries)

For melting salt in Lünen potassium chloride has been produced in varying concentrations since 2002. Sodium chloride is marketed as road de-icing salt.

Sulphuric acid, hydrochloric acid and caustic soda solution are the main auxiliary materials and consumables used.

Detailed lists have been compiled under "environmental data" for the individual fiscal years.

The feed materials are processed in a combined process of mechanical and chemical-physical treatment.

In the first treatment stage, the so-called pre-crushing, the salt slag is selectively comminuted and the aluminium granulate product is separated.

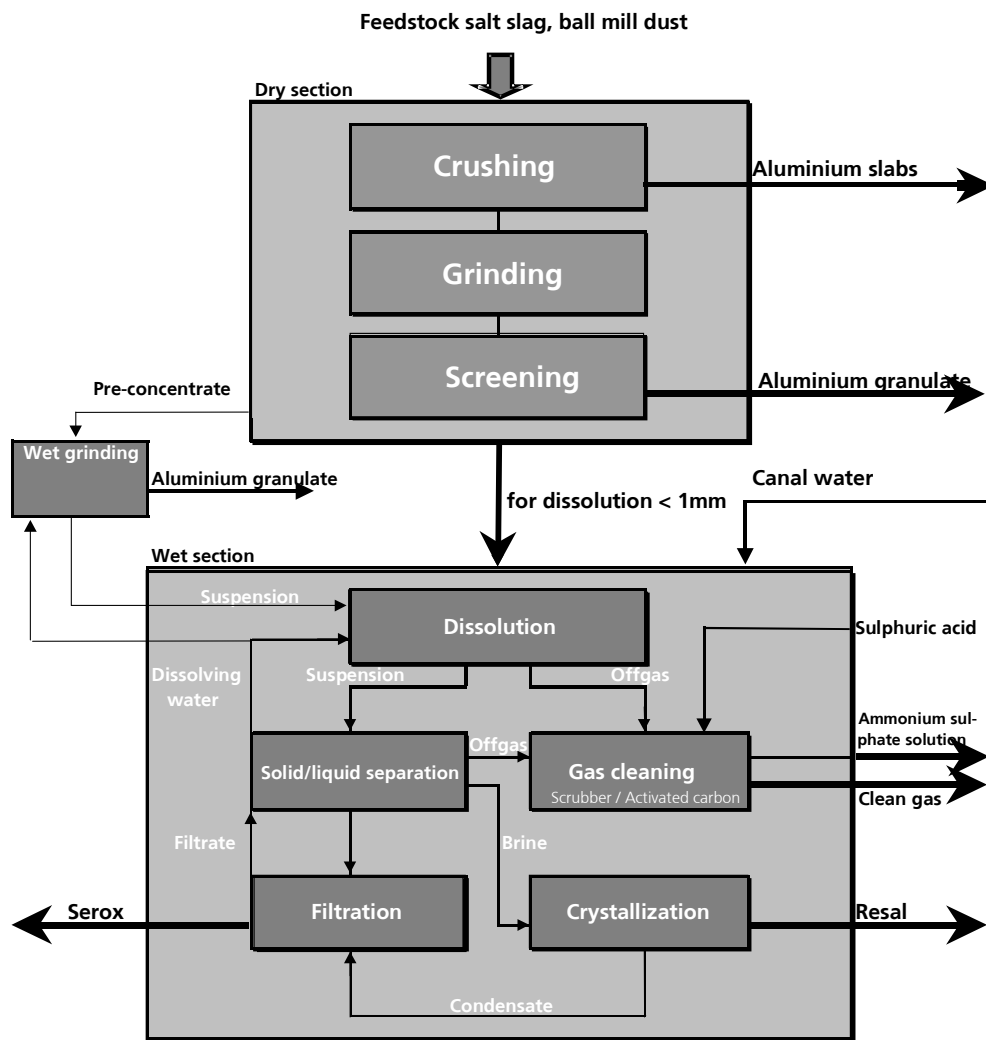
This is accomplished in a mechanical treatment process. The aluminium granulate is sold to aluminium melting plants.

The residual material (salt and insoluble oxides) is treated further in downstream processes (dissolving and solid/liquid separation). The dissolved salts are re-crystallized and constitute the second product (Resal) of the process. The salt is reused in aluminium remelting works.

The insoluble oxidic components (Serox) are washed to remove chloride and used in the cement industry and for mineral wool production.

The fourth product is ammonium sulphate. This product is recovered from the process offgases which contain  $\text{NH}_3$  by adding sulphuric acid. At the Lünen location, the ammonium sulphate is re-crystallized and sold as solid salt. At the Hanover location, it is delivered as ammonium sulphate solution. The ammonium sulphate is employed in the fertilizer and chipboard industries.

## Process flow diagram of the Hanover plant

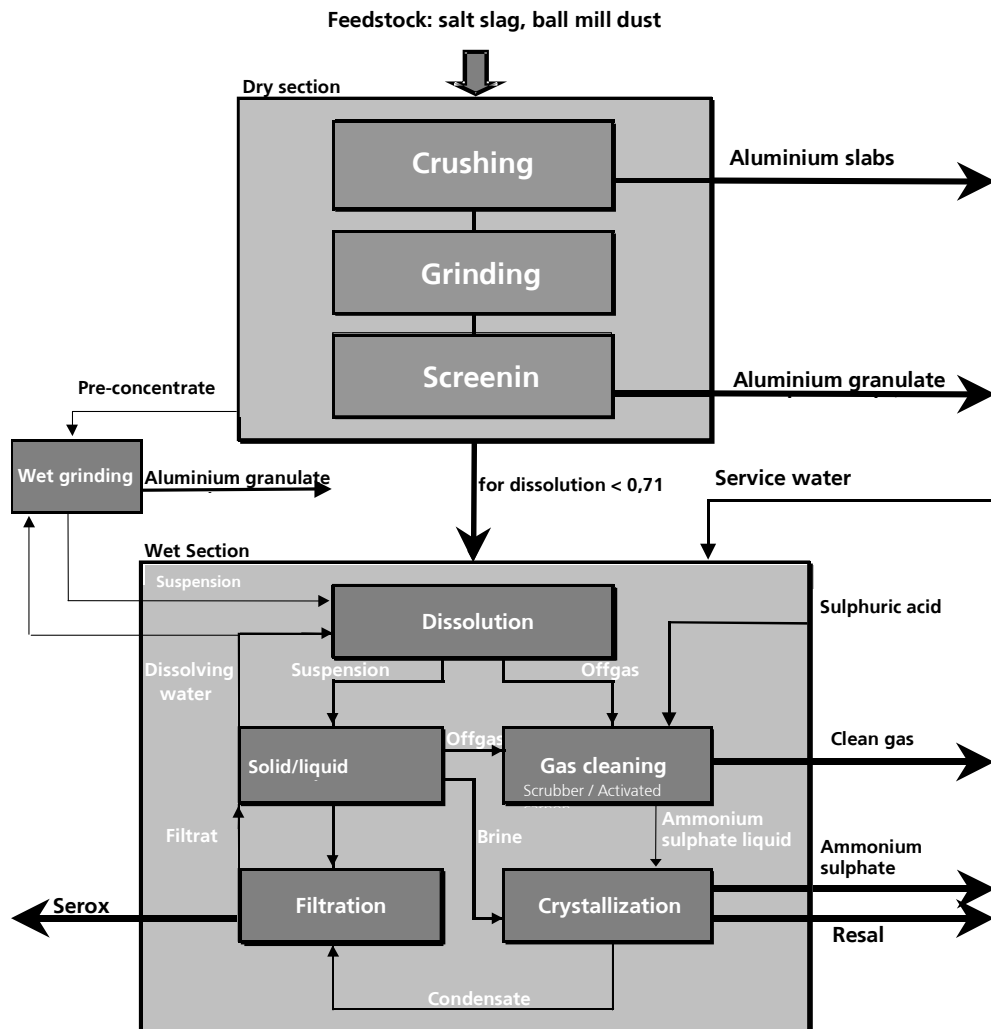


Feedstock: Salt slag and ball mill dust

Plant products:

1. Aluminium granulate/slabs
2. Resal
3. Serox
4. Ammonium sulphate solution

## Process flow diagram of the Lünen plant



Feedstock: Salt slag and ball mill dust

Plant products:

1. Aluminium granulate/slabs
2. Resal
3. Serox
4. Ammonium sulphate crystalline

## Environmental aspects

### Location characteristics

#### Biodiversity

##### Hanover location:

|                                      |                       |
|--------------------------------------|-----------------------|
| Total operating area                 | 25,380 m <sup>2</sup> |
| Of which sealed or constructed areas | 22,244 m <sup>2</sup> |

##### Lünen location:

|                            |                       |
|----------------------------|-----------------------|
| Total operating area       | 34,800 m <sup>2</sup> |
| Of which sealed areas      | 8,000 m <sup>2</sup>  |
| Of which constructed areas | 26,800 m <sup>2</sup> |

## Environmental aspects

### Emissions

#### **Air pollution/odours**

In connection with salt slag treatment, dusts (salt slag dusts) and gases (hydrogen, methane, ammonia, hydrogen phosphide (phosphine) and hydrogen sulphide) are produced.

In Lünen and in Hanover, offgas cleaning units are installed which are of almost similar design.

On both sites, the dusts are removed in bag filter systems and the gaseous impurities in one central multi-stage offgas cleaning unit each.

The dusts are separated in a state-of-the-art dust collection unit (throughput 120,000 m<sup>3</sup>/h), composed of about 1,700 filter bags, and returned to the process. The clean-gas section (stack) is measured and monitored by a continuous dust measuring system with online transmission to the control room. The residual dust contents are far below the admissible limit values.

The gases are routed to an efficient central gas cleaning unit where hydrogen and methane are diluted with air to a level below the lower explosion limit. The ammonia gas is reconverted with sulphuric acid to obtain ammonium sulphate solution. Hydrogen phosphide and hydrogen sulphide are separated in activated-carbon adsorbers. On both the raw gas and the clean gas side (stack) the individual gases are measured and monitored semicontinuously.



The residual hydrogen phosphide and hydrogen sulphide contents are far below the statutory limit values (typically by a factor of 10 to 100 – as a function of the adsorption capacity, i.e. the service time, of the activated carbon).

Ammonia smell may be noticeable as a result of diffuse ammonia emissions inside and outside of the production plant. Replicated ammonia measurements in the plant confirmed safe compliance with the OEL (MAK) limit of 20 ppm.

The lower saxony state bureau for ecology (“Niedersächsisches Landesamt für Ökologie”) in Hanover performed a long-term ammonia measuring campaign (10 days without interruption – 24 h/ day) at the site boundaries outside the plant. A maximal value of 3 ppm was measured during representative production operations as well as representative Serox handling and loading.

The measuring results remained distinctly below the statutory OEL value for ammonia.

Releases of heat, vibrations and optical impacts are of minor significance.

### Noise

For salt slag treatment, large machines and systems are deployed which generate noise. To reduce the nuisance impact of noise, individual machines were equipped with acoustic enclosures, and constructional solutions were found for acoustic insulation. The noise produced is below the area-related sound power level determined for Befesa Hanover with

|           |       |
|-----------|-------|
| daytime   | 60 dB |
| nighttime | 45 dB |

On the Lünen site, the respective limit values of the German technical guidelines for noise (“TA-Lärm”) are mandatory and complied with. Moreover, the plants in Lünen and Hanover are installed in confined production halls so that potential sources of noise are largely screened off. Equipment which could cause vibrations (e.g. pre-crusher, rod mill) have been installed on individual anti-vibration foundations.

### **Energy-related emissions**

The operation of the company’s vehicle fleet continues to produce emissions with an indirect impact on the environment.

The company is making endeavours to largely reduce motor fuel consumption by selecting a suitable vehicle pool comprising 5 forklifts, 3 wheel loaders and 1 company car (low-emission diesel vehicles). Internal transport-related emissions at the location itself are only of minor scope.

At the Hanover location, a natural gas fired boiler plant is operated. Thanks to the good combustion characteristics of natural gas, in this context only carbon dioxide emissions are relevant.

The Lünen location is provided with the various energy sources required (steam, natural gas, compressed air and electricity) from the works grid of Remondis GmbH.

## Emission data

From greenhousegas report 2013 for DIN EN ISO 14064-1:2006 certification

| Scope 1: Direct emissions (in t of CO <sub>2e</sub> ) |                        |                            |                          |                             |
|---|------------------------|----------------------------|--------------------------|-----------------------------|
| Emission sources                                      | Green-house Gas        | base year (Jan - Dec 2011) | last year (Jan-Dec 2012) | current year (Jan-Dec 2013) |
| Stationery combustion                                 | CO <sub>2e</sub>       | 10.920,74                  | 11.662,25                | 10.418,16                   |
|   | CH <sub>4</sub>        | 4,09                       | 0,70                     | 0,63                        |
|   | NO <sub>2</sub>        | 6,03                       | 21,30                    | 19,03                       |
|   | PFC                    | 0                          | 0                        | 0                           |
|   | HFC                    | 0                          | 0                        | 0                           |
|   | SF <sub>6</sub>        | 0                          | 0                        | 0                           |
|   | NF <sub>3</sub>        | 0                          | 0                        | 0                           |
| Fugitive emissions                                    | CO <sub>2e</sub>       | 4,93                       | 3,34                     | 0,63                        |
|   | CH <sub>4</sub>        | 0,30                       | 0,30                     | 0                           |
|   | NO <sub>2</sub>        | 0                          | 0                        | 0                           |
|   | PFC                    | 0                          | 0                        | 0                           |
|   | HFC                    | 0                          | 0                        | 0                           |
|   | SF <sub>6</sub>        | 0                          | 0                        | 0                           |
|   | NF <sub>3</sub>        | 0                          | 0                        | 0                           |
| Process   | CO <sub>2e</sub>       | 0                          | 0                        | 0                           |
|   | CH <sub>4</sub>        | 8.426,88*                  | 8.426,88*                | 21.942,10                   |
|   | NO <sub>2</sub>        | 0                          | 0                        | 0                           |
|   | PFC                    | 0                          | 0                        | 0                           |
|   | HFC                    | 0                          | 0                        | 0                           |
|   | SF <sub>6</sub>        | 0                          | 0                        | 0                           |
|   | NF <sub>3</sub>        | 0                          | 0                        | 0                           |
| Mobile combustion                                     | CO <sub>2e</sub>       | 261,40                     | 252,43                   | 0,23                        |
|   | CH <sub>4</sub>        | 0,29                       | 0,20                     | 0,16                        |
|   | NO <sub>2</sub>        | 4,29                       | 1,06                     | 0,97                        |
|   | PFC                    | 0                          | 0                        | 0                           |
|   | HFC                    | 0                          | 0                        | 0                           |
|   | SF <sub>6</sub>        | 0                          | 0                        | 0                           |
|   | NF <sub>3</sub>        | 0                          | 0                        | 0                           |
| <b>Total</b>  | <b>CO<sub>2e</sub></b> | <b>19.628,95</b>           | <b>20.368,46</b>         | <b>32.381,91</b>            |

\*without location Hanover

| <b>Scope 2: Indirect emissions (in t of CO<sub>2e</sub>)</b> |                                  |                                |                                   |
|--|----------------------------------|--------------------------------|-----------------------------------|
| Emission sources   | base year<br>(Jan - Dec<br>2011) | last year<br>(Jan-Dec<br>2012) | current year<br>(Jan-Dec<br>2013) |
| Electricity consumption                                      | 13.194,64                        | 15.501,40                      | 15.857,11                         |
| Steam purchased  | not reported                     | not reported                   | 12.261,41                         |
| <b>Total</b>   | <b>13.194,64</b>                 | <b>15.501,40</b>               | <b>28.118,52</b>                  |

| Emission sources | base year<br>(Jan - Dec<br>2011) | last year<br>(Jan-Dec<br>2012) | current year<br>(Jan-Dec<br>2013) |
|------------------|----------------------------------|--------------------------------|-----------------------------------|
| Scope 1          | 19.628,95                        | 20.368,46                      | 32.381,91                         |
| Scope 2          | 13.194,64                        | 15.501,40                      | 28.118,52                         |
| <b>Total</b>     | <b>32.823,59</b>                 | <b>35.869,86</b>               | <b>60.500,43</b>                  |

| <b>Salt slag throughput (in t)</b> |                                  |                                |                                   |
|------------------------------------|----------------------------------|--------------------------------|-----------------------------------|
| Plant                              | base year<br>(Jan - Dec<br>2011) | last year<br>(Jan-Dec<br>2012) | current year<br>(Jan-Dec<br>2013) |
| Hanover                            | 103.104,00                       | 112.660,00                     | 98.650,00                         |
| Lünen                              | 159.151,78                       | 163.187,64                     | 167.314,79                        |
| <b>Total</b>                       | <b>262.255,78</b>                | <b>275.847,64</b>              | <b>265.964,79</b>                 |

| <b>Specific emissions (in t of CO<sub>2e</sub> per t of salt slag throughput)</b> |                                  |                                |                                   |
|---|----------------------------------|--------------------------------|-----------------------------------|
|   | base year<br>(Jan - Dec<br>2011) | last year<br>(Jan-Dec<br>2012) | current year<br>(Jan-Dec<br>2013) |
| <b>Total</b>  | <b>0,1252</b>                    | <b>0,1300</b>                  | <b>0,2275</b>                     |

## Water supply and water consumption

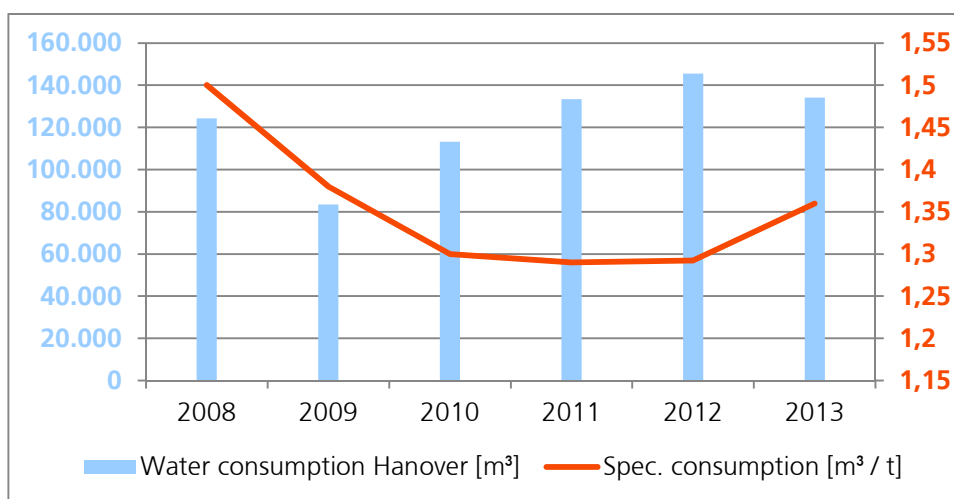
### Water

At both locations, substantial amounts of water are needed for production. The major portion of this water is not covered by drinking water but by service water (Lünen) and canal water (Hanover).

In Hanover, water is tapped from the public system (drinking water) and from the canal (service water). The consumption rates in the 2012 fiscal year amounted to 3,029 m<sup>3</sup> drinking water and 142,551 m<sup>3</sup> service water. Compared to prior years, the consumption of drinking water has been reduced furthermore. The use of service water raised in absolute figures, but remains on a low level in specific consumption.

### Water consumption since 2008

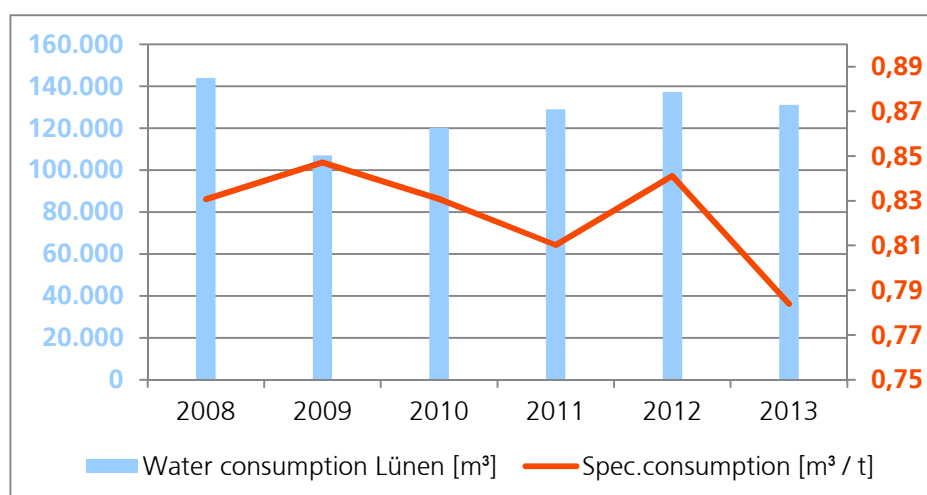
| Hanover                                       | 2008    | 2009   | 2010    | 2011    | 2012    | 2013    |
|---|---------|--------|---------|---------|---------|---------|
| Feed rate [ t ]                               | 124.421 | 67.853 | 105.036 | 103.104 | 112.660 | 98.650  |
| Service water use [ m <sup>3</sup> ]          | 120.630 | 80.407 | 110.057 | 130.048 | 142.551 | 130.659 |
| Drinking water consumption [ m <sup>3</sup> ] | 3.638   | 3.076  | 3.119   | 3.395   | 3.029   | 3.479   |
| Total water consumption [ m <sup>3</sup> ]    | 124.268 | 83.483 | 113.176 | 133.443 | 145.580 | 134.138 |
| Spec. consumption [ m <sup>3</sup> / t ]      | 1,5     | 1,38   | 1,3     | 1,29    | 1,29    | 1,36    |



On the Lünen site, water is tapped from the works system of Remondis. During the period mentioned, the consumption of drinking water was 17,129 m<sup>3</sup> and of service water, 120,130 m<sup>3</sup>

### Water consumption since 2008

| Lünen  | 2008    | 2009    | 2010    | 2011    | 2012    | 2013    |
|--|---------|---------|---------|---------|---------|---------|
| Feed rate [ t ]                              | 173.258 | 126.218 | 144.503 | 159.152 | 163.188 | 167.315 |
| Service water use [m <sup>3</sup> ]          | 128.909 | 96.382  | 110.650 | 115.478 | 120.130 | 118.100 |
| Drinking water consumption [m <sup>3</sup> ] | 15.020  | 10.537  | 9.408   | 13.478  | 17.129  | 13.047  |
| Total water consumption [ m <sup>3</sup> ]   | 143.929 | 106.919 | 120.058 | 128.956 | 137.259 | 131.147 |
| Spec. consumption [ m <sup>3</sup> / t ]     | 0,831   | 0,847   | 0,831   | 0,810   | 0,841   | 0,784   |



The water consumption on the Lünen site could become decreased again in comparison with the previous year both absolut and specific.

## Effluents

At both locations sanitary wastewaters occur.

In Hanover the waste water is discharged to the municipal sewage system depending on where it accumulates and in Lünen via the sewage system of the Remondis site.

In Hanover the cooling tower discharge water is feeded back into the waste water canal. A discharge permit is existing.

In Lünen the cooling tower discharge water is recycelt internally and is used as process water furthermore.

Production related wastewaters are not existing at Befesa Salzschlacke GmbH

## Energy supply and energy consumption

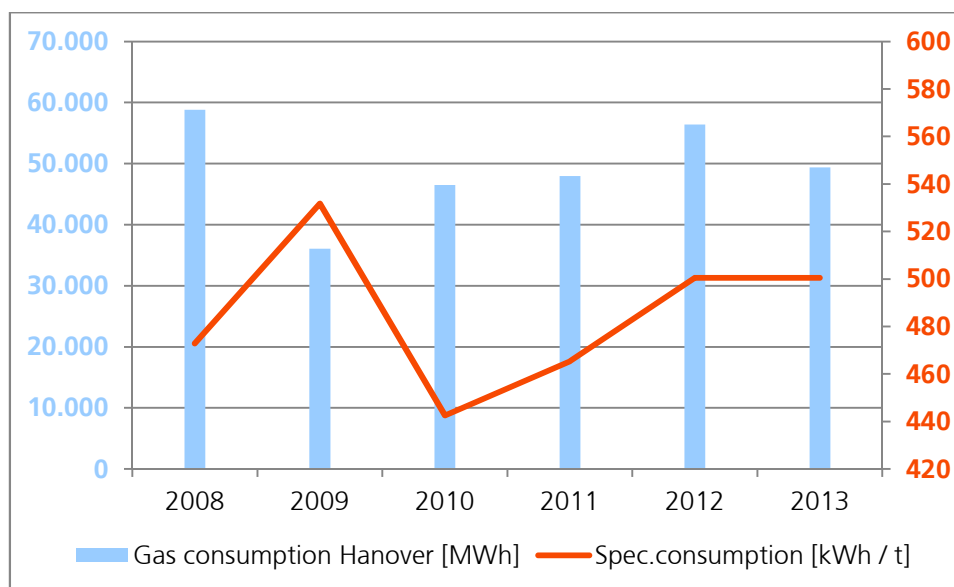
### Energy efficiency

Befesa Salzschlacke GmbH uses energy in the form of electric power, natural gas, steam and fuels.

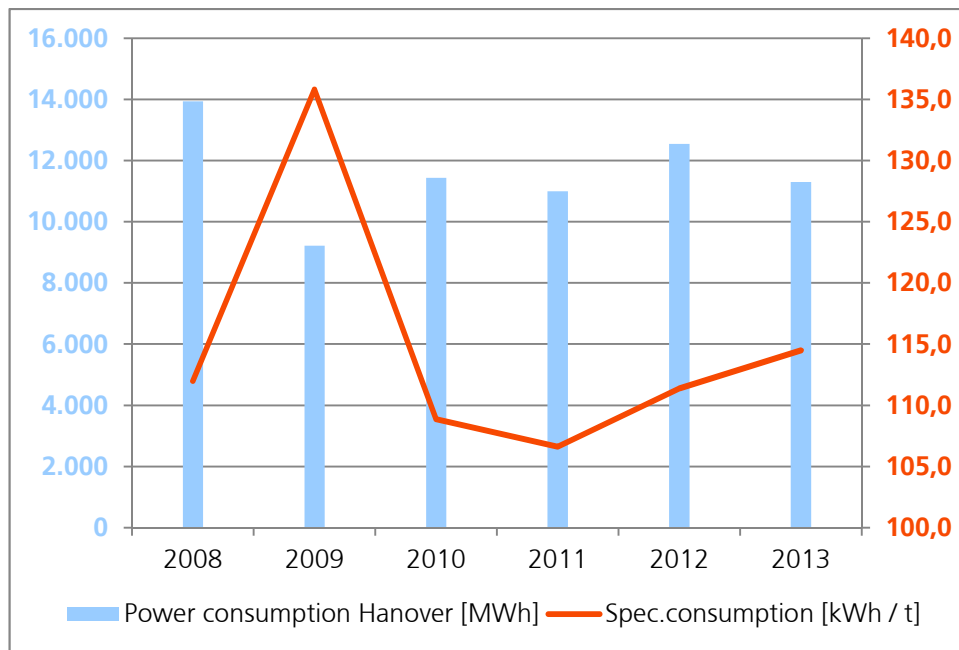
Electric power and natural gas are taken from the public network.

The Hanover site reported the following energy consumption figures:

| Hanover                            | 2008   | 2009   | 2010   | 2011   | 2012   | 2013   |
|------------------------------------|--------|--------|--------|--------|--------|--------|
| Natural gas [ MWh ]                | 58.832 | 36.078 | 46.487 | 47.979 | 56.390 | 49.379 |
| Spec. consumption [ kWh / t ]      | 473    | 532    | 443    | 465    | 501    | 501    |
| Electric power consumption [ MWh ] | 13.933 | 9.214  | 11.435 | 10.993 | 12.548 | 11.295 |
| Spec. consumption [ kWh / t ]      | 112,0  | 135,8  | 108,9  | 106,6  | 111,4  | 114,5  |
| Steam [ t ]                        | 61.406 | 39.506 | 52.961 | 51.690 | 58.974 | 53.116 |
| Spec. consumption [ t / t ]        | 0,49   | 0,58   | 0,50   | 0,50   | 0,52   | 0,54   |
| Total regenerative portion in %    |        |        |        | 3,8    | 3,7    | 5,8    |

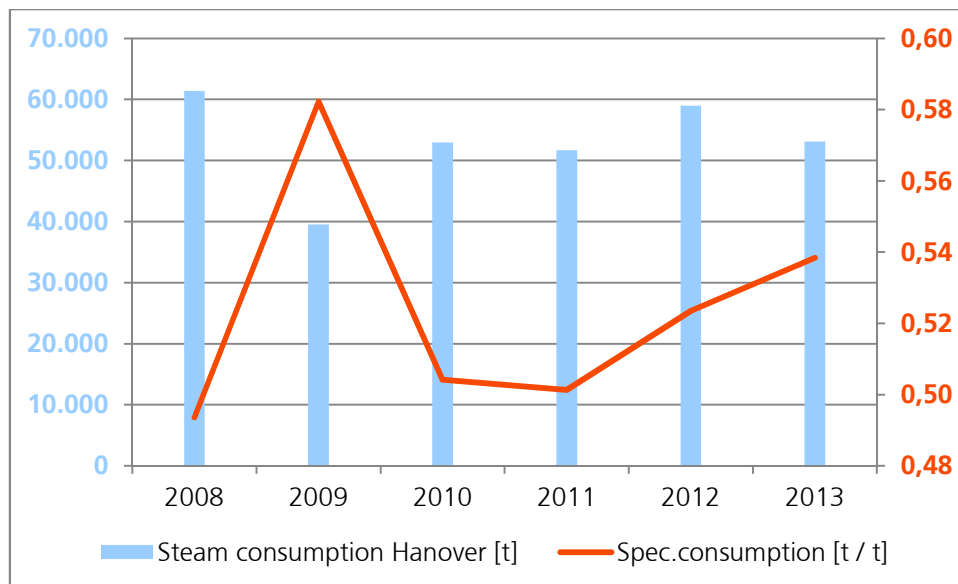






The energy source mix for the Hanover site is composed of:

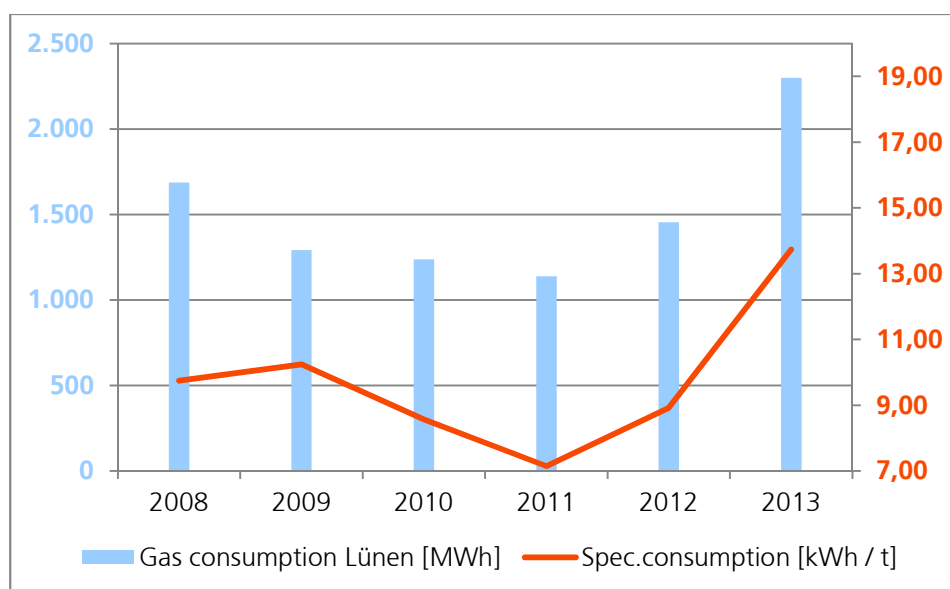
- Renewable energies : 30.9 %
- Fossil energy sources : 59.2 %
- Nuclear energy sources : 9.9 %



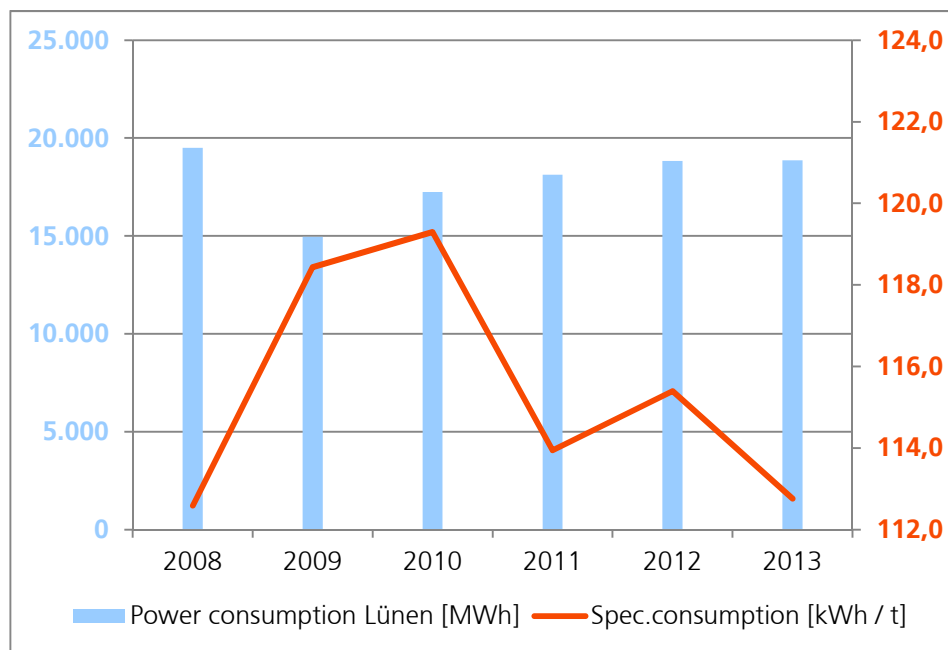
The main energy consumers are the evaporation crystallization unit and the machine drives

At the location Lünen the energy consumption figures were as follows:

| Lünen                              | 2008   | 2009   | 2010   | 2011   | 2012   | 2013   |
|------------------------------------|--------|--------|--------|--------|--------|--------|
| Natural gas [ MWh ]                | 1.688  | 1.292  | 1.238  | 1.138  | 1.455  | 2.299  |
| Spec. consumption [ kWh/t ]        | 9,74   | 10,24  | 8,57   | 7,15   | 8,91   | 13,74  |
| Electric power consumption [ MWh ] | 19.506 | 14.948 | 17.239 | 18.135 | 18.831 | 18.866 |
| Spec. consumption [ kWh/t ]        | 112,6  | 118,4  | 119,3  | 113,9  | 115,4  | 112,8  |
| Steam (regenerative) [ t ]         | 86.940 | 68.284 | 71.099 | 79.883 | 81.371 | 78.205 |
| Spec. consumption [ t/t ]          | 0,50   | 0,54   | 0,49   | 0,50   | 0,50   | 0,47   |
| Total regenerative portion in %    |        |        |        | 19,6   | 19,3   | 27,5   |

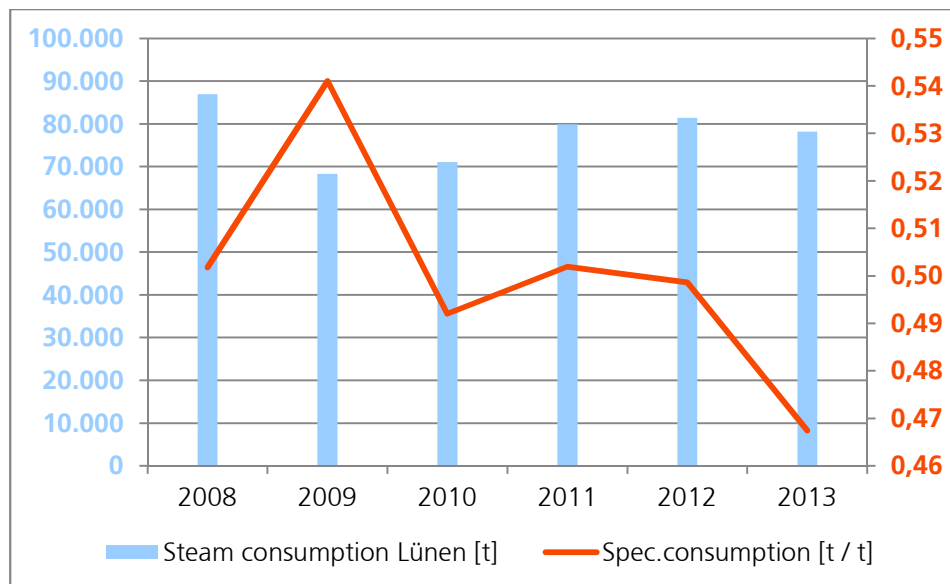


The higher gas consumption in absolute terms in Hanover is attributable to the internal steam generation whereas the Lünen site acquires the steam required for the process from Remondis GmbH. The climate-neutral share in the fuel consumption is 54.7 %. The increase of natural gas consumption at the Lünen site is caused in a higher production rate in the area of wet milling.



The energy source mix for the Lünen location is composed of:

- Renewable energies : 30.9 %
- Fossil energy sources : 59.2 %
- Nuclear energy sources : 9.9 %



On the Lünen site, the electricity- as well as the steam consumption could be stabilized on a low level due to rising throughputs.

## Wastes and residues

### Wastes

The feed materials of Befesa Salzschlacke GmbH are recovered at 100 %. The process itself does not produce any solid wastes or waste water.

The only wastes generated are:

- used grease and oils from the machines
- exchange of the activated carbon in the offgas cleaning unit
- packaging and pallet materials
- industrial waste similar to municipal waste

The only waste water produced is sanitary sewage. In Hanover the cooling tower discharge water, which is not process touched, is feeded back into the waste water canal.

Information relating to the nature, quantity and origin of wastes has been compiled in the waste balance sheets as well as the annually established "input / output analysis".

Appreciable amounts of hazardous waste are not generated at any of the two locations.

### Waste disposal

Waste separation is practiced on the two sites. The waste collecting points have been identified. The employees are regularly instructed on the subject of onsite waste separation.

## Water conservation / soil protection

The aluminium salt slags delivered to the works for treatment are stored in closed halls at both locations and processed. The soil is sealed with concrete and sheeting. Operating areas in the so-called wet section are additionally sealed with poured asphalt and sheeting. There is no groundwater pollution hazard.

The Lünen site is located at a distance of about 500 m from the river Lippe on the premises of the former VAW Lippewerk (now: Remondis GmbH). The premises have been protected from flooding by means of dykes alongside the river Lippe.

Hazardous substances are stored in operating areas specifically prepared for this purpose and secured against uncontrolled leaks by means of containment basins or double-wall tanks. Oil absorbents are available in sufficient quantity.

Technical and organizational safety facilities for hazardous substances are in place.

Substances hazardous to water and dangerous substances relevant for the environment are listed in the register of hazardous substances.

For each hazardous substance safety data sheets are available and operating instructions were prepared pursuant to § 14 GefStoffVO [*German Hazardous Substances Ordinance*].

## Transport and haulage

The delivery of feedstock and the dispatch of the products are mainly performed by road, with trucks.

Only Serox and rarely Resal is also transported by vessel.

For transports within the works premises, wheel loaders and forklift trucks are employed.

## Occupational health & safety

Safety at work is just as important for Befesa Salzschlacke GmbH as environmental protection. The company is certified under OHSAS 18001. The accident frequency at Befesa Salzschlacke GmbH is very low. We constantly sensitize and encourage our employees with the aim to prevent accidents also in the future.

Issues of safety at work are addressed in the process instructions and work procedures of the integrated management system.

Health & safety initiatives are not only restricted to the company's own employees but the employees of third-parties working on our premises are protected in the same way and are integrated into our safety policy.

## Input / output tables

### Materials efficiency

The data for the input / output representation were collected in collaboration with the environmental management officer, the local environment management representatives and the plant managers of the company. To this end, the relevant measuring records, notifications and balances were evaluated. Where no accurate figures are available, the data were reliably estimated.

The respective results have been compiled in the following input / output tables:



## Input table 2013

|                                     | Quantity   |            | Unit             |
|-------------------------------------|------------|------------|------------------|
|                                     | Hanover    | Lünen      |                  |
| <b>1. Feed material input</b>       |            |            |                  |
| - Salt slag                         | 98,650     | 167,315    | t                |
| - Ball mill dust                    | 0          | 0          | t                |
| <b>2. Auxiliary materials input</b> |            |            |                  |
| - Sulphuric acid (96 %)             | 3,991      | 9,304      | t                |
| - Fluorspar                         | 51         | 228        | t                |
| - Caustic soda solution             | 236        | 564        | t                |
| - Polyelectrolyte                   | 7.28       | 12.6       | t                |
| - Hydrochloric acid                 | 20         | 55         | t                |
| - Diesel fuel                       | 32,319     | 53,985     | l                |
| - Hydraulic and lube oils           | 1.4        | 1.6        | t                |
| <b>Water</b>                        |            |            |                  |
| - Service water input               | 130,659    | 118,100    | m <sup>3</sup>   |
| - Drinking water input              | 3,479      | 13,047     | m <sup>3</sup>   |
| <b>Energy</b>                       |            |            |                  |
| - Electricity                       | 11,294,900 | 18,866,335 | kWh              |
| - Steam                             | 53,116     | 78,205     | t                |
| - Compressed air                    | 5.45       | 5.96       | M m <sup>3</sup> |
| <b>Gases/fuel oil</b>               |            |            |                  |
| - Natural gas input                 | 49,378,866 | 2,298,506  | kWh              |
| - Fuel oil consumption              | -          | -          | t                |

## Output table 2013

|   | Quantity |         | Unit           |
|---|----------|---------|----------------|
|   | Hanover  | Lünen   |                |
| <b>Products</b>                         |          |         |                |
| - Resal (moist)                         | 51,295   | 69,147  | t              |
| - Serox (moist)                         | 71,166   | 140,208 | t              |
| - Aluminium granulate                   | 7,369    | 15,139  | t              |
| - Ammonium sulphate, crystalline        | -        | 10,599  | t              |
| - Ammonium sulphate solution            | 9,952    | 2,832   | t              |
| - Condensate return                     | -        | 46,345  | m <sup>3</sup> |
| <b>Wastes</b>                           |          |         |                |
| - Waste paper, cardboard, cartons       | 33.19    | 10.15   | t              |
| - Industrial similar to municipal waste | 52       | 73.6    | t              |
| - Used oil                              | -        | 1.93    | t              |
| - Oily wastes                           | 3.09     | 3.18    | t              |
| - Timber                                | 2.32     | 12.92   | t              |
| - Activated carbon                      | 38.10    | 76.90   | t              |
| - Cooling tower blow-down water         | 25,180   | -       | m <sup>3</sup> |
| - COD                                   | 1.36     | -       | kg             |
| - AOX                                   | -        | -       |                |
| - TOC                                   | -        | -       |                |
| - BOD5                                  | -        | -       |                |
| - Nitrogen                              | -        | -       |                |
| - Phosphorus                            | -        | -       |                |
| - Sanitary sewage                       | 1,242    | 912.5   | m <sup>3</sup> |
| <b>Emissions</b>                        |          |         |                |
| - Total dust                            | 296      | 316     | kg             |

**Materials efficiency Hanover: 0.93**

**Materials efficiency Lünen : 0.96**

At the locations of Befesa Salzschlacke GmbH, all constructional, safety-relevant, statutory and ecologically compatible prerequisites for handling and storing the mentioned substances are strictly met.

Befesa Salzschlacke GmbH has established an effective organization for danger prevention and hazard control (alarm plan) in order to ensure that any necessary safety measures can be promptly taken in the event of imminent or prevailing danger caused by the substances to be processed although such hazards are not to be expected.

## Environmental targets and programs

### Targets 2012 through 2015

#### Hanover

1. Curbing noise and dust emissions  
Renewal of doors and roller gates of the production building and salt slag storage hall for dust and noise reduction  
  
Responsible: plant manager
2. Reduction of specific energy by 2 % until the end of 2014 compared to 2011  
Installation of frequency converters for exhaust air fans of group 300 to save about 500 MWh/a.  
  
Responsible: plant manager
3. Improve safety in emergency cases  
Renewal of emergency lighting installation for the entire works  
  
Responsibility: plant managers
4. Enhancement of plant safety in regard to H<sub>2</sub> emissions  
Installation of a throughput measuring system in the exhaust unit of the decanter for safeguarding riskless plant operation  
  
Responsible: plant manager
5. Enhancement of plant safety in regard to H<sub>2</sub> emissions  
Installation of 9 temperature measuring systems at the exhaust lines of the individual decanter chambers for safeguarding riskless plant operation  
  
Responsible: plant manager

## Targets 2012 to 2015

### Lünen

1. Scrapping / gutting Segl I

Actioned stamp: Target complete

2. Curbing the specific energy by 2 % until 2014 compared to 2011

- Improvement of the dust collection efficiency in Group 1000 by separation of its dust collection system from the dust collection system of Group 100. This will have the benefit of fan G95 becoming redundant during the weekend which leads to energy savings of about 250 MWh/a.

Actioned stamp: Target complete

- Installation of a time switch for lighting the Serox storage hall leading to energy savings of about 18 MWh/a
- Replacement of electric motors by high-efficiency motors
- Replacement of mercury vapour lamps and neon tubes in the salt slag storage hall of the pre-crusher hall and of the mechanical treatment section for energy saving and more efficient lighting
- Installation of the latest WinCC version for efficient plant control and reduction of customer complaints

Responsible: plant manager

3. Improvement of plant safety  
Installation of a new fluorspar silo

Actioned stamp: Target complete

# Validation

## (Declaration of the environmental verifiers)

The  
environmental verifiers  
Dipl.-Ing. Henning von Knobelsdorff and Dr. Wolfgang Ulrici  
Mozartstraße 44 Blücherstraße 13  
53115 Bonn

have verified the environment management system, the eco-audit, its results, environmental performance and consolidated environmental statement of the organization

## **Befesa Salzschlacke GmbH**

at the locations

**Am Brinker Hafen 6 in 30179 Hannover**

**Brunnenstraße 138 in 44536 Lünen**

in accordance with NACE Code 38.2 “waste treatment and disposal” and validated its conformance with regulation (EC) No. 1221/2009 of the European parliament and the council of 25 November 2009 concerning the voluntary commitment of organizations to participate in a community system for eco-management and the eco-audit (EMASIII) and rated the present environmental declaration to be valid.

It is confirmed that

- the assessment and validation were performed in full agreement with the requirements of regulation (EC) No. 1221/2009,
  - there is no evidence of non-compliance with valid environmental regulations,
  - the data and information contained in the environmental declaration relating to the aforementioned locations comprising 55 employees each within the assessed area provide a reliable, creditable and trustful picture of all activities of the locations within the area covered by the environmental declaration.

The next consolidated environmental declaration will be submitted to the registration agency by 10 December 2015 at the latest. In the years 2013 and 2014 validated updates will be published.

Bonn, December 19<sup>th</sup> 2014

Henning von Knobelsdorff Dr. Wolfgang Ulrici  
environmental verifiers  
DE-V-0090 DE-V-0120