



Befesa is an international company that specializes in the integral management and recycling of industrial waste and in water management and generation, with full awareness of its social responsibility to help create a sustainable world.

www.befesa.com

International Presence



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Key Figures	2010	2009	Var. '10-'09 (%)
Revenue (€M)	833	722	+15.4
EBITDA (€M)	129	119	+8.2
Desalination capacity (M m ³ /day)	1.3	1.2	+8.3
Waste managed (Mt)	2.2	1.8	+22.2
Average number of employees	2,835	2,698	+5.1
Hours of training (h)	89,000	92,149	-3.4

Our Business

Befesa operates in two key areas: industrial waste recycling and water generation and management.

The industrial waste recycling market's main growth drivers are the rapidly expanding world population and the increased pressure from environmental laws and regulations.

These two macro trends are dictating the development and evolution of the market in which Befesa carries out its industrial waste recycling activities. Existing legislation and policies governing the environment do however vary considerably between countries and regions. For example, environmental regulation in Asia is still in its infancy, while companies operating in the United States or Latin America face more severe control. As these regions gradually adopt tougher regulatory policies, the market for industrial waste treatment and recycling will slowly open up.

The steel waste recycling business has experienced sharp year-on-year growth on the back of the gradual recovery of the European steel production industry. Aluminum waste recycling also rallied to return to the highs reported several years ago, driven largely by exports and government aid plans.

The water generation and management market is currently witnessing huge growth, with heavy investment expected to flow in from all regions of the world. The territories tagged as key with the greatest investment potential are currently the United States, China, the Middle East, India, North Africa and Latin America. This growth is mainly due to two global-scale events: on one hand, the world's growing population and, on the other, the scarcity of water resources, both magnified by the effects of global warming.

At present, the water market is highly fragmented, both in terms of water management companies and those that supply the technology, essentially meaning construction and engineering firms.



Truck at Befesa Zinc Duisburg facilities, Germany

Skikda desalination plant, Algeria



Befesa Zinc Aser's Waelz furnace in Erandio, Spain



Befesa aims at provide technologically innovative and viable solutions for industrial waste recycling and water generation and management, with the ultimate goal of becoming a world reference in the sectors in which it operates, while helping to forge a more sustainable world. This commitment is reflected in Befesa's various lines of business:

- Befesa recycles aluminum waste without generating new waste in the process, thus bringing the waste cycle full circle.
- Management of common steel and stainless steel waste, as well as waste from the galvanization process. The company therefore recycles a wide variety of metals, doing away with the need to dump them and minimizing the need for further mining.
- Befesa offers the iron and steel industry high value-added environmental services through the treatment and valorization of residual dust generated from common and special steel production processes, as well as other waste containing zinc from the steel galvanization sector.
- The company designs and constructs infrastructures to manage waste efficiently and safely, while protecting the environment.
- The company manages, transports, treats and temporarily stores hazardous and non-hazardous industrial waste for valorization, recovery, reuse or eventual controlled disposal.
- Befesa generates water by utilizing seawater desalination technologies, reusing urban wastewater and modernizing irrigation systems to reduce consumption.
- Befesa protects rivers and coastlines by purifying urban and industrial wastewater.
- It champions economic and social development by making water drinkable and helping to irrigate agricultural land and the environment.
- The company develops technologies to improve the efficiency of the integral water cycle, thus helping to bring access to water and sewage to everyone and making these essential rights a viable reality throughout all regions, particularly underprivileged ones.

Aluminum swarf dryers at Befesa Aluminio facilities in Las Franquesas del Valles, Spain



Befesa business focuses on environmental respect and protection, and is rooted in three key premises directly related to the company's contribution to sustainable development and the fight against climate change: i) strict compliance with all aspects of applicable environmental law; ii) minimizing consumption of natural resources and; iii) continuously streamlining technical, environmental and economic efficiency throughout all processes.

Befesa intends to become a world leader not only in industrial waste recycling and management, but also in water generation, management and transportation, thus contributing to sustainable development.

The main drivers helping Befesa to reach this objective are research, development and innovation (R&D&I), given that the company operates in areas where technology plays a crucial role. The purpose of its strategic R&D&I plan is therefore to coordinate and channel actions in this respect, gearing them towards value creation and healthy returns on investment.



Unveiling of the Chennai desalination plant, India

Befesa is involved in two different activities, industrial waste recycling and water, which in turn comprise various sub-activities. The industrial waste recycling segment encompasses steel waste recycling, aluminum waste and salt slag recycling and industrial waste management. The water segment, on the other hand, includes the engineering, procurement and construction (EPC) and water concessions divisions. The company manages over 2.2 Mt of waste, channeling in excess of 1.2 Mt into the production of new materials through recycling, thus curbing annual CO₂ emissions by 0.7 Mt. Befesa is able to desalinate over 1.3 M m³ of water per day, enough to supply 8 M people.

The company enjoys a truly impressive international presence, with offices in 27 countries on four of the five continents. In Europe, Befesa's steel waste, salt slag and aluminum waste recycling activity is carried out at treatment plants in Spain, Germany, France, Sweden, the United Kingdom and, from 2010 onward, Turkey. The industrial waste management unit has built up a significant presence throughout Spain and Latin America. With regard to the water business, Befesa boasts a prominent global presence, with important projects in China, India, North Africa, the Middle East, the United States and Latin America.



View of the Alcoy WWT plant, Spain

Slag falling from the Waelz furnace at Befesa Zinc Aser facilities, Spain



In order to continue growing in its existing markets, Befesa has an ambitious strategic plan in place based on organic and non-organic growth.

Growth in the steel recycling business has largely stemmed from organic growth in Europe and inorganic growth in other strategic territories. The greater the regulatory pressure from applicable environmental law, the faster this worldwide market grows. This pressure has reached different maturity levels in different parts of the world, with Europe being the most advanced. In the case of Befesa, the patented and proprietary Waelz-SDHL processes carried out at its plants afford the company hugely important energy savings, increased capacity and enhanced performance for zinc recovery, making it one of the most technologically advanced companies in the world within its sector. It also has an ambitious plan to step up its capacity and expand internationally.

The aluminum and salt slag recycling area is looking into new markets with huge potential, such as Iceland, Eastern Europe, Norway and the United States, and is similarly developing new recycling alternatives for waste managed through dumping. Befesa is also seeking to expand in its industrial waste management business.

In the water segment, growth is driven by two complementary factors: major contracts awarded under concession, which require a long-term investment; and the innovation as the differentiation strategy, improving quality and competitiveness of its assets.

To fend off competitors and remain at the forefront of the desalination sector, it is hugely important to offer a unique range of water treatment, waster reuse and hydraulic infrastructure products through continuous work in R&D&I and by devising new prototypes, and Befesa has made sure of this when setting up subsidiaries in countries such as India, China and the United States and when expanding into other promising territories, such as the Middle East, Brazil, Singapore and Libya.



View of the Tenes desalination site, Algeria

Befesa business has witnessed impressive growth over recent years in terms of staff and geographical scope, and this has been made possible thanks to the company's highly qualified human team, which has lent its extensive experience to the different areas of business.

Befesa is committed to attracting and retaining human talent and this is one of the cornerstones underpinning its strategy of future growth. This is because the nature of the company's activities, in which technological leadership plays a fundamental role, means that attracting and retaining both technical and commercial talent is key to ensuring future success.

Side view of the Waelz furnace at Befesa Zinc Aser facilities, Spain





Tank truck at Befesa Zinc Aser facilities, Spain

Befesa business is based on sustainable development, around which the company centers its activities and strategies. Because of this, the company's mission and values reflect its firm commitment to financial and social progress, environmental protection and respect for fundamental rights. Through this business model, Befesa's activities are aimed at:

- Creating long-term value for shareholders.
- Providing customer service.
- The professional and human development of its employees.
- Growth of the societies and communities in which it operates.
- Developing sustainable solutions for managing industrial waste and the integral water cycle, while fully respecting and protecting the environment.
- Reintroducing secondary raw materials into productive cycles.
- Waste-free production.
- Offering a new range of waste treatment services for industry.

Befesa's main goals for 2011 include full integration of its steel dust recycling plant in Turkey, coupled with further expansion into the steel dust recycling market. Befesa will also keep its eyes over 2011 for possible opportunities for inorganic growth, particularly in the steel waste recycling sector. Moreover, the company will continue to focus on R&D&I over 2011, given that this is one of the building blocks for future growth.

In the industrial waste recycling and management sector, Befesa is fully committed to energy valorization, developing new waste treatment technologies, stepping up business in the integral waste management market, prioritizing valorization/recovery over elimination/disposal, and strengthening the company's presence in those markets offering the greatest value-add.

In the water segment, Befesa intends to consolidate its presence in current geographies by strengthening relationships with the stakeholders, to up its presence in concessions in promising territories. It also plans to cement the structure and increase the visibility of the concessions division, enabling the company to develop and streamline this line of business to the fullest. Lastly, Befesa intends to continue investing in R&D&I with a view to cutting costs and developing sustainable solutions.

Befesa has built up a diversified customer portfolio, ranging from both regional and national public bodies to top-tier companies operating in important industries, such as the steel, automotive and chemical sectors. Befesa enjoys long-standing commercial relations with its main customers, thanks to the quality and regular control of its services and also its technological innovation.

Inside the Chennai desalination plant, India



2010 in Review

2010 turned out to be a busy year for Befesa. The aluminum recycling business recovered over the year, with year-on-year growth exceeding 40 % on the back of the rallying automotive industry.

Although it has yet to replicate the volume of business reported prior to the onset of the economic crisis, the steel dust recycling business experienced sharp year-on-year growth over 2010 by making use of more installed production capacity at its plants due to the greater abundance and availability of raw materials. This in turn can be put down to the rallying European steel production industry. Moreover, the high prices that zinc fetched on international markets over 2010 (the listed price on the London Metal Exchange, or LME, averaged in the region of \$2,100 per t of Zn-SHG - high grade zinc with minimum zinc content of 99.995 %) have had a positive economic impact on profits, despite being largely offset by the previously signed metal price hedge agreements.

Control center at the SAIH (Automatic Hydrologic Information System) on the Guadalquivir River, Spain



Last but not least, Befesa is a worldwide benchmark company in the field of water desalination, thanks to its chosen strategy over the last few years based on international expansion and consolidation. This has enabled the company to cement its position in the territories that offer the greatest growth potential in the water market, such as the United States, Latin America, North Africa, India and China, while affording it an unrivalled position from which to expand and improve upon its water treatment, irrigation, hydraulic construction and water management lines of business. Befesa currently has eight concessions for large-scale desalination plants. These concessions are located in Algeria (Honaine and Tenes, 200,000 m³/day, and Skikda, 100,000 m³/day), India (Chennai, 100,000 m³/day), China (Qingdao, 100,000 m³/day), Tunisia (Djerba, 50,000 m³/day), and three more in Spain (Cartagena, 65,000 m³/day, Almeria, 50,000 m³/day, and Bajo Almanzora, 60,000 m³/day).

Reverse osmosis membrane frame at the Bajo Almanzora desalination plant in Almeria, Spain



Befesa secured its presence in the Turkish steel dust recycling market at the end of September 2010 by signing a joint venture agreement with the Canadian company Silvermet Inc. to acquire a 51 % stake in the Waelz plant owned by the latter in Iskenderun (Turkey). The investment was channeled through the company Befesa Silvermet Turkey SL and required a total outlay of \$10 M, most of which will be used to develop new technologies to treat electric arc furnace steel dust, the ultimate aim being to drive forward the company's steel dust recycling business in the country. This venture has allowed Befesa to gain rapid entry into Turkey, a strategic market and one of the world's main producers of electric arc furnace steel. It is also one of the emerging markets promising the greatest potential in terms of future growth within the sector.

Befesa continued work over 2010 to fully integrate its German salt slag treatment plants, which were acquired mid-2009, into the organizational structure and to implement Befesa's joint management systems. This has enabled the company to treat an additional 240,000 t of waste, thereby returning to the industry a similar volume of secondary raw materials. Furthermore, Befesa's plant in the United Kingdom is now a fully operating waste treatment plant for the waste generated from used primary aluminum electrolytic cells (otherwise known as spent potlining, or SPL).

The prestigious international publication Global Water Intelligence (GWI) staged its annual Global Water Awards ceremony at the start of 2010 to recognize and reward excellence within the international water industry. Befesa was awarded the "Best Project of 2009" distinction for its Qingdao desalination plant, which is currently under construction in northern China. In addition to being the first desalination facility constructed through project finance and fully financed by local Chinese banks, the plant is set to become a groundbreaking project for the supply of desalinated water in the country. Investment in the plant amounts to €135 M, and encompasses the design, construction and 25-year operation of the plant. The facility will be capable of desalinating 100,000 m³/day of water, enough to supply drinking water to a population of 500,000 people. The plant will employ cutting-edge reverse osmosis technology, both for the pretreatment stage (ultrafiltration membranes) and also the centralized pumping system, all of which will result in enhanced energy efficiency.

The year 2010 also saw Befesa consolidate its international standing within the desalination sector. On the one hand, the company secured several important contracts in a number of different territories, such as the Djerba desalination plant (Tunisia) and work to expand the Brasov and Videle treatment plants (Romania), while on the other it started up commercial operations at the Skikda (Algeria) and Chennai (India) desalination plants and completed construction on the Honaine desalination plant (Algeria).

Towards the close of 2010, the company reached an agreement to sell its water engineering, procurement and construction (EPC) business line to Abeinsa. Following completion of the deal, which took place on January 1, 2011, Befesa is now responsible for promoting, developing and operating water generation plants and for handling the associated technology and R&D+i, while Abeinsa is now charged with full EPC performance of such projects. The arrangement has enabled Befesa to focus its attention on promoting, developing and operating water generation assets, a field in which technology plays a pivotal role. The water market offers enormous growth potential, particularly in North Africa, Southeast Asia and the United States. Befesa intend to channel this line of business through the company Befesa Water, a truly international company employing close to 400 workers boasting operations on four different continents.



Inside the Honaine desalination plant under construction, Algeria

Our Activities

Steel waste recycling focuses on the treatment and recycling of waste resulting from the manufacture of common and stainless steel and of waste produced from the steel galvanization process. In order to carry out these activities, Befesa has eight production plants in Europe and a further plant it recently acquired in Turkey. These play a fundamental role in the zinc recovery cycle, avoiding the pointless loss of tons of this material by cutting down on dumping and helping reduce the need to mine zinc, nickel and chrome. Befesa is the European leader in the treatment and valorization of steel dust and the only company in Spain to offer an integral steel dust collection and treatment service for valorization.

The aluminum waste recycling division provides collection and treatment services for aluminum-containing waste, manufactures and markets aluminum alloys, and designs, builds and assembles aluminum recycling equipment. This line of business is particularly effective at reducing CO₂ emissions when compared with the primary aluminum sector. The division also recycles salt slag, a hazardous toxic waste generated from the aluminum waste recycling process, and hazardous spent potlining (SPL) waste from used electrolytic cells. Recovery of salt slag and SPL provides a viable alternative to dumping. The purpose, in the case of salt slag, is to separate the metallic aluminum, the salt and the aluminum oxide, while for SPL, the aim is to eliminate cyanides and soluble fluoride salts. All solid metals obtained from the process are reused. This enables the company to bring the recycling cycle full circle and make valuable use of all aluminum-containing waste.

View of the main Befesa Salzschlacke building in Hannover, Germany



The industrial waste management division provides integral waste management services to industrial clients. It handles all stages of the industrial waste management cycle, ranging from transportation, temporary storage, treatment and valorization, to recovery and controlled and safe final disposal, all in strict accordance with Spanish and European environmental law. It also provides a broad spectrum of high value-added industrial cleaning services to most industrial sectors. In addition, it has an area that provides effective solutions for the collection, transportation and elimination of PCB-contaminated materials, transformers and condensers, and for recycling the film used as greenhouse covering. This unit also performs desulfurization work to produce sulfuric acid from residual sulfur, while generating electricity, which is then sold and returned to the national grid. Lastly, it provides a range of fully-comprehensive soil decontamination solutions.

Business within the water generation and management division is geared towards promoting, designing, constructing and operating infrastructures to cover the entire water cycle. Befesa has become a benchmark company worldwide thanks to its impressive track record spanning more than sixty years and its continuous investment in R&D&I. The water business is divided into two mutually complementary lines of business: on the one hand, the design and construction (EPC) of hydraulic infrastructures and, on the other, concessions of large plants under various different project finance structures for timeframes between 15 and 25 years. In turn, the water division has six product lines: desalination, water treatment, industrial water, upgrading of irrigation systems, hydraulic construction and hydrologic and hydraulic infrastructure management.

The steel dust recycling business invested over €5 M in property, plant and equipment during 2010, the most significant entries being the acquisition of new industrial equipment and improvements to the efficiency of certain core operations and processes.

The aluminum and salt slag waste recycling division is currently investing heavily in the German plants in order to bring them in line with business unit standards.

Steel Waste Recycling

Befesa is the current European leader in iron and steel waste recycling. Through its steel waste recycling unit, Befesa provides high value-added environmental services to the steel industry. These involve the treatment and valorization of the residual dust generated from both common and special steel manufacturing processes, as well as other zinc-containing waste produced by the galvanization sector. The recycling of zinc-bearing waste, which constitutes the company's core business, has a dual benefit for the environment: it prevents the soil and phreatic layer contamination caused by the dumping of steel dusts (environmentally hazardous due to their toxic heavy metal content), while also ensuring an inexhaustible source of natural resources, in stark contrast to mining, thus helping to alleviate the world's shrinking reserves of metals such as zinc, nickel and chrome.

The company currently has nine production plants engaged in these important activities: Befesa Zinc Duisburg GmbH and Befesa Zinc Freiberg GmbH (Germany), Recytech SA (France), Befesa Zinc Aser SA (Spain) and, from the end of September 2010, Befesa Silvermet Turkey SL (Turkey), these being the companies that operate Befesa's electric arc and smelting furnace steel dust recycling facilities, while Befesa Valera SAS (France) and Befesa ScanDust AB in Landskrona (Sweden) recover and treat stainless steel waste. Lastly, the factories operated by Befesa Zinc Sondika SA and Befesa Zinc Amorebieta SA (Spain) recycle the zinc and zinc alloy waste generated by the galvanization, metal injection and construction industries.

View of the galvanization waste recycling furnace at Befesa Zinc Amorebieta, Spain



Befesa is currently Europe's leading recycler of steel waste, with a market share far above that of its competitors within the sector. The strategic positioning of its plants enables it to be close to customers and suppliers alike, affording it its key competitive edge. Other characteristics that set Befesa apart from the competition include its extensive knowledge of recycling processes and the technology it employs, and also the fact that its commercial relations with customers are based on long-term collaboration agreements.

The patented and proprietary Waelz-SDHL and lixiviation processes in use at its facilities are the product of the continuous innovations that Befesa has made to the traditional Waelz process, leading to hugely significant energy savings, increased capacity and improved performance in zinc recovery, and placing the company at the technological forefront of its sector. The European Commission itself has recognized the technical, economic and environmental efficiency of the pyro and hydrometallurgical steel dust recycling processes in place at Befesa facilities by classifying them as Best Available Technology (BAT) in the benchmark BREF document applicable to the non-ferrous metal industry.

Over 2010, the production units integrated into the steel waste recycling division treated a combined total of 562,308 t (dry) of zinc-bearing steel and iron dust, 11.9 % up on figures for 2009. Of these, 470,685 t, marking a 15.5 % year-on-year increase, came from large factories involved in the production of common steel, and also from various smelting facilities operating within the European Union, while the remaining 91,623 t were collected from the leading stainless steel production facilities in the EU.

This input volume has enabled the company to obtain 170,280 t dried of Waelz Oxide, representing a year-on-year increase of 14.6 %. The volume of treated Waelz Oxide (D-L.W.O.®) was similar to that reported for 2009, standing at 104,684 t. The stainless steel dust recycling plants also produced 42,811 t of nickel alloy and other metal alloys capable of fetching a high market price, and 51,715 MWh of electrical power were self-produced at the production facility in Sweden.

View of the Waelz furnace
at Befesa Zinc Aser facilities
in Erandio, Spain



The company Befesa Zinc Comercial is responsible for marketing and selling the end product obtained from the plants operated by this division. Thanks to the sterling work conducted in 2009 to penetrate new territories and diversify its Waelz Oxide customer portfolio, the company managed to sell a grand total of 170,939 t of this product in 2010, 13.3 % up on figures for 2009. A further 30,822 t of alloys rich in nickel and other metals were also sold through Befesa Steel Services in 2010, representing growth of 26.5 %.

By the close of 2010, the Sondika and Amorebieta plants in the Spanish region of Biscay, which treat the zinc waste and zinc alloys generated by the galvanization, metal injection and construction sectors, had recycled a combined total of 15,100 t of waste, including in particular zinc dross and gross zinc ash from Spain and other European countries, marking a 29.1 % increase in the volume treated at these two plants.

In 2010, Befesa Zinc remained an active member of its working group in the European IZA (International Zinc Association), with head offices in Brussels, which was created in order to make REACH regulations accessible and help members implement them, in accordance with Regulation (EC) No. 1907/2006 of the European Parliament and of the Council, of 18 December 2006, concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH), which entered into force on June 1, 2007. The purpose of these regulations is simply to increase existing protection for human health and the environment by duly identifying and controlling the intrinsic properties of chemicals consumed within the European Union.

According to this EU Regulation, Befesa Zinc must register all the products and sub-products obtained from its eight production plants in the European Union prior to November 30, 2010, the deadline in this particular case. After having duly pre-registered its products in November 2008, the company presented the requisite dossier at the start of September 2010, which included the corresponding application to register the manufactured products of Befesa Zinc Duisburg under the names Waelz Oxide and Waelz Slag. Following on from this, it intends to do the same with the products of the other companies as soon as the European Chemical Agency (ECHA) grants its approval.

Lastly, and as mentioned above, Befesa burst onto the Turkish steel dust recycling market towards the end of September 2010 as part of its growth strategy based on geographic business expansion. This venture has allowed the company to gain rapid entry into Turkey, a strategic market and one of the world's main producers of electric arc furnace steel. It is also one of the emerging markets promising the greatest potential in terms of future growth within the sector.



Aerial shot of the Befesa Zinc Duisburg plant, Germany

Waelz furnace at Befesa
Zinc Freiburg facilities,
Germany



Aluminum Waste Recycling

Befesa is currently the European leader in aluminum waste and salt slag recycling. Similarly, Befesa operates a unique model geared towards integrating both sides of the aluminum waste recycling process.

Befesa's current growth strategy in this area encompasses organic growth in the aluminum recycling business in Central Europe, coupled with international expansion in the salt slag business, thus helping to promote the company from its current status as European leader to a position of worldwide dominance.

The main competitive edges underpinning Befesa's goal of continued sustainable growth include in-depth knowledge of the processes and technologies involved in aluminum waste recycling, a broad range of products derived from secondary aluminum and excellent commercial relations with customers and suppliers of raw materials.

Aluminum Waste Recycling

The aluminum waste recycling business unit recovers aluminum contained in various different types of waste. Befesa does this by collecting and transporting waste and aluminum scrap metal, carrying out its integral recovery and producing and marketing secondary aluminum alloys. Recycled aluminum waste is primarily used to produce alloys, which are then sold to the construction and automotive industries and turned into components. It is worth noting that this line of business is particularly effective at reducing CO₂ emissions. Befesa carries out these activities at three plants - Biscay, Valladolid and Barcelona (Spain).

The sector rallied over the course of 2010, which also witnessed sharp growth in sales and prices. Against this backdrop, Befesa remained a market leader and key player not only in Spain, where its leadership is unquestionable, but also in Europe.

Work continued in 2010 to integrate the three production plants in Erandio, Valladolid and Granollers, which has enabled the company to continue streamlining overheads and improving administrative management. All actions and initiatives undertaken during the year were intended to increase the productivity of the various plants, reduce energy costs and improve the end service provided to customers.

In 2010, Befesa recycled roughly 175,000 t of various types of aluminum waste, leading to 105,000 t of alloy production and sales and avoiding the equivalent of 1 Mt of direct CO₂ emissions.

Salt Slag Recycling

Befesa's aluminum waste recycling system involves the recovery and integral valorization of all the waste generated by the aluminum industry and also the goods produced from aluminum at the end of its life cycle. It is precisely the salt slag recycling business that brings this process round full circle and makes it a meaningful venture.

As is also the case with the manufacture of parts and other products, oxides and other impurities are incorporated along the aluminum production value chain. The valorization of these is more costly, both because of the technical difficulties involved in the industrial process and because of the lower financial value of the products that can be recovered. Befesa has developed its own technology, thereby helping to ensure the sustainability of the aluminum industry. Due to its physical and chemical properties and in particular its lightness, aluminum plays a crucial role in helping to curb greenhouse gases within the transportation sector.

Salt slag valorization plants are also able to recover other types of waste from the aluminum industry, such as gas filtering dust from smelting furnaces and the dust obtained from milling and grinding aluminum dross.

The company has also been treating the waste produced by primary aluminum electrolysis (SPL) since 2009. This hazardous waste, which contains cyanides and soluble fluoride salts, is generated during the process of obtaining primary aluminum from minerals. Due to the significant volume of waste generated, 22 kg per ton of primary aluminum to be precise, the need to recycle SPL has become one of the industry's most pressing environmental challenges. To date, there have only been partial treatments of the waste and most ends up being dumped at authorized sites. Befesa, on the other hand, offers fully-comprehensive management with integral waste recovery to provide leading waste producers with a definitive solution.

Ingot piles at Befesa Aluminio facilities in Las Franquesas del Valles, Spain



Evaporators at the Befesa Salzschlacke salt slag plant in Lünen, Germany

In 2009, Befesa acquired three salt recovery plants in Germany, making it Europe's leading salt slag management company. In addition, its technological know-how will enable it to expand towards other geographical markets, such as the United States and Eastern Europe.

Befesa is thus contributing to sustainable development through five plants specifically designed to treat this type of waste. The plants in question are located in Valladolid (Spain), Whitchurch (United Kingdom) and Lünen, Hannover and Töging (Germany) and have a combined capacity of 630,000 t. The company also manages smaller amounts of other waste from the primary and secondary aluminum industries. Befesa treated 375,000 t of waste over 2010, marking a year-on-year leap of 57 %. All this waste is fully converted into raw materials that can be used by industry (aluminum, molten salts and aluminum oxide). The company's salt slag recycling activity has eliminated the need to mine 267,100 t of non-renewable raw materials (mineral oxides and salts) and to dump 224,200 t of hazardous waste.

Befesa's strategic goals and business processes mirror the commitments assumed by the aluminum industry: to eliminate, in the mid-term, the dumping of solid waste directly and indirectly generated by industry. The company is working tirelessly to incorporate innovative treatment technologies for valorizing other types of waste, thereby helping the industry to move forward in a sustainable manner.

Sales of Machinery and Technology

The machinery and technology sales division provides technical support to the aluminum waste recycling plants, and is engaged in the design, construction, assembly and start-up of installations for the aluminum and zinc industries. It boasts an extensive portfolio of more than 100 installations in 40 different countries. Its main products include automated lines for producing 5-25 kg aluminum ingots, casting wheels, rotary ovens and sludge cooling and treatment facilities.

Of the many projects undertaken in 2010, highlights include the start-up of two casting lines for the company Emal (United Arab Emirates); the launch of three molding lines for Qatalum (Qatar); the manufacture and assembly of four molding lines with trailer loader system for Vedanta (India); and the start-up of a casting line for Rusal (Liberia). Despite the difficulties stemming from the widespread slump in investment, this business unit has completed all its projects and its order intake effectively guarantees work for the next twelve months.



Aluminum swarf dryer at
Befesa Aluminio facilities in
Las Franquesas del
Valles, Spain

Industrial Waste Management

Befesa is the leading company in Spain when it comes to managing industrial waste (measured in terms of treated volume). It is also a prominent figure in the Latin American countries in which it operates (Argentina, Chile, Mexico and Peru).

Befesa's main competitive edge is the fact that it operates across the integral industrial waste management cycle and is therefore able to harness significant synergies between the various links in the chain.

Through its centers and offices located across Spain, Befesa aims to provide its customers with an integral waste management service, while minimizing or reducing the potential environmental impact through proper management.

Befesa's growth strategy in the area of industrial waste management is based on achieving organic growth in the management of non-hazardous waste in the countries in which it operates and on penetrating new territories offering high potential.

The industrial waste recycling market will continue to grow, spurred on by increasingly heavy legislative and environmental pressure not only on production companies but also with regard to the treatments required.

Demand for Befesa's industrial waste management services flows in from small and medium-sized companies with a strong local component, and also from the environmental divisions of large industrial corporations generally associated with the construction trade.

The prevailing economic crisis plaguing the automotive, steel, chemical, petrochemical and construction industries has led to a significant drop in waste generation. This is due to low levels of industrial activity, which have had a negative impact on the company's business.

Industrial Waste

Befesa manages, recycles, valorizes and reuses waste through cutting-edge technology under the 3R rule: "Reduce, Reuse and Recycle", based on the premise that the best waste is no waste. This way, materials that can be put to subsequent use are recovered, thus helping to reduce our reliance on new raw materials. The company accomplishes this not only through its 15-plus network of centers distributed throughout Spain, which treat waste to reduce the associated contamination, but also through its transfer centers, at which waste is separated, classified and sent off for recovery, recycling and/or valorization, helping to reduce the consumption of natural resources. Lastly, it has a safety landfill site for the controlled disposal of waste that cannot undergo any further form of treatment.

Befesa maintained its leading status within the sector by managing 641,665 t of industrial waste in 2010, 28 % of which was classified as hazardous industrial waste. Work also continued during the year to remodel the physicochemical treatment plant so as to enable it to treat third-party industrial waters, thereby extending the range of management services offered to customers. The rainwater, potentially contaminated water and clean rainwater network at the Nerva center was also remodeled.

Industrial Cleaning

The Industrial Cleaning division's activities contribute to the sustainable development of the industries it serves, combining the goals of minimizing waste production, maximizing waste recovery, reusing raw materials and developing more efficient equipment, leading in turn to lower energy consumption. Its wide range of services includes mechanical and high pressure hydrodynamic cleaning processes, ultra-pressure hydrodemolition and hydrocutting; chemical cleaning and steam blowing; air through circuits and boilers; changes of catalyst beds; cleaning

of refinery tanks and oil installations, both manually and with automated systems; on-site waste treatment through mobile and fixed plants, and cleaning of interchangers.

In 2010, the division attempted to consolidate its standing in the pre-operational chemical cleaning market for thermal power and solar thermal plants by securing and performing work on Abengoa's Solnova 4 parabolic trough solar power plant in Sanlucar la Mayor (Spain), and the ISCC Hassi R'Mel plant (Algeria). The company has continued to expand outside Spain, where it has been carrying out automatic cleanings of tanks, catalysts and heat exchangers in France, Portugal, Switzerland and Italy, and submitting bids for work to be carried out in 2011. It also made its first commercial contacts in the Near East, where the construction of large petrochemical installations will provide the company with opportunities for further work, mainly in tank and catalyst cleaning.

Soil Decontamination

This division provides integral technical solutions to the problem of soil contamination. Over 2010, the company pressed on with contaminated soil investigation and diagnostic projects for top-tier customers within the petrochemical, steel, real estate construction, energy and chemical industries, among others, and was similarly involved in a host of other soil decontamination activities, such as bioremediation treatments, on-site treatments, and soil excavation and management.

Over the year, the soil management and decontamination department continued to cement Befesa's standing as a benchmark company when it comes to investigating and restoring contaminated soil in Spain. Given the slumping levels of business seen in the real estate market, Befesa has focused on the industrial sector, primarily the oil sector, where the company has conducted numerous investigations into contaminated sites across the Iberian Peninsula.

Other highlights include the on-site restoration work being performed on the Canary Islands and Ceuta, both emerging markets where Befesa has already set up operations, along with the decontamination work on the land previously occupied by the Tussam bus depots in Seville, which has converted the land to residential use.

Plastics

Befesa Plásticos manufactures special low density polyethylene pellets by recycling the film used as greenhouse covering. The pellets are then sold and used for a variety of applications, such as manufacturing sheeting for the construction industry (waterproofing and protection), sacks and bags, irrigation piping and electrical and telecommunications ducts. They can also be injected to create pots or otherwise used to obtain modified asphalts. As the only Spanish company capable of carrying out the complete recycling cycle from collection to product manufacturing, Befesa is the European leader in this particular field.

Over 2010, Befesa recycled 14,625 t of film and used irrigation pipes, and likewise produced 11,200 t of polyethylene pellets, thus maintaining its position as market leader in the low density polyethylene recycling business, a field in which it operates in all the major regions of cultivation under plastic in Spain: Alicante, Murcia, Andalusia and Extremadura.

Befesa has also constructed a new fiberglass waste recycling facility. This will afford the company a more diversified product range and synergies between both facilities, which will make the company less vulnerable, seeing as though to date it has been solely dependent on just one product/kind of waste, namely polyethylene and greenhouse film. The main advantage of this is the production system: internal mixer capable of mixing various types of materials and reinforcements, followed by an extrusion machine, the sole purpose of which is to manufacture pellets from the mix. This allows the company to mix different materials in order to produce completely different commercial products for different sectors, all employing waste to strengthen plastics.



Raw material and end product storage facility at the new Befesa Plásticos plant, Spain

PCB

Befesa Gestión de PCB operates out of Cartagena (Spain) and specializes in providing effective solutions for the collection, transportation and elimination of transformers, condensers and materials contaminated with PCB (polychlorinated biphenyls). Using cutting-edge technology, the company recovers all reusable materials while eliminating all contaminated materials for good.

More than 3,600 t of PCB-contaminated devices and materials were treated by the company during 2010, confirming its market leadership in Spain. This makes Befesa Gestión de PCB the company of reference for PCB treatment in the electricity sector.

Desulfurization

Befesa Desulfuración produces sulfuric acid and oleum (a compound rich in SO_3) by using the residual sulfur recovered from petrochemical plants. It owns a plant that provides viable solutions to the environmental problems associated with oil plants by applying the cleanest and safest processes.

During 2010, 261,100 t of equivalent acid were produced, with an associated electricity generation of 49,900 MWh. After deducting self-consumption, this resulted in sales of 24,000 MWh of surplus electricity.

It is worth noting that in May 2008 the land on which the desulfurization plant is located was sold pursuant to the town of Baracaldo's (Biscay) Sefanitro Special Interior Reform Plan ("Plan Especial de Reforma Interior Sefanitro"). The plant is currently operating and the land will be handed over within an appropriate timeframe to ensure that the business can be transferred to the new location.

Water

Befesa's water generation and management division designs, constructs and operates infrastructures to cover the entire water cycle. Befesa Agua has become leading company worldwide thanks to its impressive track record of more than sixty years and its continuous investment in R&D&I. The water division focuses on two complementary segments of business:

- Design and construction of hydraulic infrastructures (EPC).
- Concessions of large plants under various different project finance structures, with contracts running from 15 to 25 years.

This activity can, in turn, be broken down further into six product lines:

- Desalination. Seawater and brackish water desalination. Befesa has sufficient installed capacity to produce over 1.3 M m³/day of desalinated water at its various facilities around the world.
- Water treatment. Water potabilization, treatment and reuse. Befesa facilities are able to supply or treat water for more than 8,000,000 people.
- Industrial water. Treatment of process water, service water and wastewater, sludge treatment and water reuse and recycling. Over 200 major projects.
- Upgrading of irrigation systems. More than 500,000 ha irrigated. The company's facilities are capable of regenerating and reusing over 100,000 m³/day of wastewater.
- Hydraulic works. Supply, treatment, pressurized pipelines, hydroelectric power plants. Over 200 projects.
- Hydrologic and hydraulic infrastructure management. SAIH (Automatic Hydrologic Information System), SAICA (Automatic Water Quality Information System), dynamic regulation of canals, control of irrigation areas, water supply and treatment control systems.

Inside the Plaza de España
water treatment plant in
Seville, Spain

Some of the most significant milestones of 2010 by territory are described below.



Spain and Europe

- Contract awarded to upgrade the Brasov and Videle treatment plants (Romania). The state-owned companies Apa Brasov and Apa Serv Alexandria awarded the contracts, which total over €20 M, with the aim of increasing their treatment capacity to 116,000 m³/day. The plants feature compact pretreatment utilizing fine screens, primary sedimentation, biological treatment and secondary sedimentation. Biological treatment in both cases is based on a process of half-load activated sludge and aeration in two reactors of the same size, with the possibility of nitrification and denitrification and with anaerobic chambers to eliminate phosphorus through biological processes.
- Contract worth more than €10 M awarded for the hydro power plant at the head of the Navarra Channel ("Canal de Navarra") in Spain. Canasa awarded Befesa, operating as a temporary joint venture with Iberinco, the rights to harness the hydro power resulting from the Itoiz dam. The plant will be constructed at the exit of the dam headrace tunnel. The plant will be able to process up to 400 hm³/year through two vertical axis Francis turbines with a total water flow rate of 45 m³/s attached to two synchronous generators. Total installed power will stand at 20 MW, with annual production amounting to 30 GWh.
- Contract awarded for the Amés y Brión potable water treatment plant in A Coruña (Spain). The public corporation Empresa Pública de Obras y Servicios Hidráulicos attached to the Regional Government of Galicia awarded Befesa, operating as a temporary joint venture with Puentes y Calzadas, a contract worth over €5 M to construct a potable water treatment plant capable of treating 175 L/s, which can be doubled during stage two. The plant will include a water line with coagulation-flocculation, lamellar settler, filtration and final disinfection, as well as a sludge line to thicken and dewater sludge.
- Contract awarded for the La Codosera treatment plant in Badajoz (Spain). The Department of Development of the Regional Government of Extremadura awarded Befesa, operating as a temporary joint venture with the company Padilla y Zazo, a contract worth close to €3 M to construct an activated sludge wastewater treatment plant (WWTP) with nitrogen elimination in the municipality of La Codosera, a compacting plant in El Marco and another in La Rabaza, both the latter utilizing oxidation through blower-induced air insufflation. The WWTP will be able to treat 800 m³/day of water.
- Work was completed on the Baix Llobregat desalination plant in Barcelona (Spain). This particular plant will reuse the effluent produced by the Baix Llobregat treatment plant in Barcelona. The €13 M-plus project for Depurbaix was performed by Befesa operating as a temporary joint venture with the company Acsa. This desalination plant produces over 57,000 m³/day of water through reverse electrodialysis (RED) technology. The plant is one of the largest wastewater reuse facilities of its kind in the world and the second largest RED plant capable of functioning with any kind of water.



Aerial shot of the Meco treatment plant, Spain

- Opening of the Fonsanta pumping station in Barcelona (Spain). Fonsanta pumping station and section of piping to connect it to the Trinitat distribution station. The work was completed by Befesa under a temporary joint venture with Acsa and Six Constructores for Aguas del Ter de Llobregat, with the corresponding contract amounting to more than €20 M. This project uses two-way piping to connect the two networks currently supplying Barcelona and all the municipalities within the metropolitan area, namely the Llobregat system and the Ter system.
- Opening of the Arcas del Villar and Villar de Olalla treatment plant in Cuenca (Spain). Contract worth over €2 M awarded by the Regional Government of Castilla La Mancha to construct a water treatment plant in the municipal district of Villar de Olalla. The plant will treat the wastewater of this municipality and that of Arcas del Villar. With a treatment capacity of 1,000 m³/day, the facility employs active sludge technology and features a biological reactor-settler followed by sludge dewatering. Over 10 km of collectors have also been implemented to channel wastewater from the two municipalities into the plant.
- Opening ceremony to mark the start of the tertiary treatment work at the Blanca treatment plant in Murcia (Spain). The work to be carried out by Befesa for the Regional Department of Agriculture and Water of Murcia amounts to over €1.2 M and will involve the construction of the treatment equipment to reuse water from the treatment plant for agricultural purposes. This treatment system, with a capacity of over 208 m³/h, will feature flocculation, open filtration and ultraviolet disinfection. The project will allow the region to reuse 500,000 m³/year of water.

United States

- Contract awarded for the Donna desalination plant (Texas). The North Alamo Water Supply Corporation (NAWSC) entrusted Befesa WaterBuild and NRS Consulting Engineers with the design and construction of a desalination plant to treat the water from a saline aquifer. The plant will be sited close to the existing water treatment plant in Donna. The facility, which requires a €5 M investment, is the company's first water supply desalination facility in Texas to include the design and construction of the facilities. The new plant will employ reverse osmosis technology and will generate more than 7,500 m³/day at the outset.

China

- Construction of the Qingdao desalination plant. In addition to being the first desalination facility constructed through project finance and fully financed by local Chinese banks, the plant is also set to become a groundbreaking project for the supply of desalinated water in the country. The contract, which entails total investment of €135 M, encompasses the design, construction and 25-year operation of the seawater desalination plant. The facility will be able to desalinate 100,000 m³/day of water, enough to supply drinking water to a population of 500,000 people. The chosen technology is state-of-the-art reverse osmosis, both for the pretreatment stage (ultrafiltration membranes) and also the centralized pumping system, all of which will result in enhanced energy efficiency. This particular project was awarded the "Best Project of 2009" accolade by Global Water Intelligence (GWI).

India

- Opening and start-up of the Chennai desalination plant. The €80 M contract to start up commercial operations was awarded by the Chennai Metropolitan Water Supply and Sewerage Board to a consortium comprising Befesa and the local construction firm Infrastructures & Projects. The plant is able to desalinate 100,000 m³/day of water and is India's largest reverse osmosis desalination facility and the first in the country to operate under the DBOOT (design, build, own, operate and transfer) system. The contract includes operation of the plant for a 25-year term.



Membrane frame and other equipment at the Chennai desalination plant, India

Sri Lanka

- Contract signed to supply water to Ratnapura (Sri Lanka). The National Water Supply and Drainage Board of the Democratic Socialist Republic of Sri Lanka awarded Befesa a contract worth nearly €26 M to design and construct stage one of the Ratnapura water supply system, essentially involving a 13,000 m³/day potable water treatment plant, which will include pretreatment, prechlorination, coagulation, flocculation, sedimentation, filtration and post-chlorination. It also includes the capture systems to bring water from the Kalu Ganga river, a 2,500 m³ storage tank and close to 20 km of piping to distribute the drinking water.

North Africa

- Desalination plant awarded in Djerba (Tunisia). The Société Nationale d'Exploitation et de Distribution des Eaux (SONEDE) and the Tunisian Ministry of Agriculture and Water Resources awarded Befesa and Princesse Groupe a contract worth €70 M to design, construct and operate, for a 20-year term, a seawater desalination plant on the island of Djerba in the Gulf of Gabes. The plant will be able to produce 50,000 m³/day of desalinated water, enough to supply over 250,000 people. The facility, which will utilize reverse osmosis technology, is set to become Tunisia's largest desalination plant.
- Start-up of operations at the Skikda desalination plant (Algeria). The Algerian Energy Company awarded this \$110 M contract to a consortium comprising Befesa and Sadyt under a 25-year concession. Capable of producing 100,000 m³/day of drinking water through reverse osmosis technology, the plant at full load will be able to supply a population of 500,000 people. The Skikda desalination plant, which falls within the first Algerian desalination program, is the first plant to have been actually delivered and commissioned.
- Completion of work on the Honaine seawater desalination plant (Algeria). Start of the commissioning stage for the desalination facility awarded to Befesa as part of the Geida consortium. The plant boasts a water production capacity of 200,000 m³/day through reverse osmosis technology, and the contract includes operation of the plant for a 25-year term. The facility has entailed an investment of roughly €165 M.



View of the Honaine desalination plant under construction, Algeria

Latin America

Befesa Argentina

Befesa Argentina operates in the handling, analysis, transportation, recycling, recovery, treatment, incineration and final disposal, through secure waste landfills, of non-hazardous industrial waste and special or hazardous waste. It also provides a range of other services, such as crushing and compacting of waste and contaminated materials in order to reduce its volume and prepare loads for processing or recycling. These environmental management services are carried out using state-of-the-art technology under strict international environmental standards, combining experience, technology and responsible handling of resources. The company thus contributes to sustainable industrial development by providing suitable treatments for each type of waste. The company has two plants to accomplish this goal: Campana, which provides inertization and final disposal services, and Pacheco, which operates as an incineration plant.

The former has been fitted with cutting-edge technology and has likewise benefited from numerous other structural enhancements to bring the company to the forefront of the aerosol treatment market, while maintenance and upgrade work has been carried out on the furnace at the latter plant with a view to improving management.

Befesa, acting through its subsidiary Befesa Servicios, is involved in industrial cleaning, physical and chemical cleaning of aqueous waste, recovery and distillation of stainless steel solvents, sludge centrifugation, oil and derivative product tank cleaning, and the production of an alternative fuel for cement furnaces. Thanks to an intensive sales campaign, actual order intake and performance for 2010 outstripped expectations. Improvements were also made to the process of producing alternative liquid fuels from waste. On a final note, the company successfully completed the three-year process of extracting all the liquid and semi-solid waste from Tank 263 at the YPF La Plata refinery, which measures 50 m in diameter, has a floating

roof and an interior slop volume of over 30,000 m³. The same tank will be hydrocleaned and sanded in 2011 to leave it ready for repair work.

Befesa Chile

Befesa Chile, through its company Soluciones Ambientales del Norte, operates in the integral management of solid hazardous and non-hazardous industrial waste. It achieves this through temporary storage and final disposal systems and treatments aimed at valorizing the waste and minimizing the hazard posed by it, recycling wherever possible. The waste, which is mainly produced by mining and industry, is managed safely and responsibly, contributing to the country's sustainable development.

The company's Sierra Gorda plant, located in the Atacama desert, 120 km inland from the city of Antofagasta and 1,600 km from the capital city of Santiago, takes up a 40 ha plot of land and has been operating since May 2008. The facility managed over 22,500 t of waste in 2010, and moreover Befesa Chile has been busy making investments, such as the acquisition of four trucks, primarily intended to serve major mining clients from regions I to III. Work was also completed towards the end of November on the second hazardous waste landfill site, which will be able to store 80,000 m³ of the material.

The company also continued to work on various contracts signed with important companies from the mining industry, such as Minero Escondida (BHP Billiton), Cia., Minera Quebrada Blanca (Teck), Cía., Minera Lomas Bayas (Xstrata), Soc., Minera Química, Compañía Minera Ines de Collahuasi (Angloamerican) and Electroandina (Endesa). In light of this, the company has tightened its safety and mining standards, inviting its competitors to follow suit.



Befesa Perú truck

Befesa Perú

Befesa Perú specializes in providing the industry with integral environmental services, including the collection, transportation, treatment and final disposal of industrial and hazardous waste, environmental management of industrial installations, recycling of metallic containers and PCB exports. All this is accomplished through tried and tested techniques pursuant to national and international standards that effectively guarantee environment protection. This way, the company employs the best available technology to help protect both the environment and public health, ensuring that waste is kept in strict isolation and permanently removing any semblance of risk by monitoring it during operations and following sealing of the waste.

Befesa Perú also started up its industrial cleaning service in 2010, meaning that the company has had to invest in resources and assets such as tank trucks for sludge suction and industrial cleaning, a double-chamber static incinerator for the existing facility in Chilca (60 km south of Lima), and work was also started on the new Trujillo hazardous waste landfill (563 km north of Lima). The Chilca facilities also enjoyed a number of improvements, including extensions to the laboratory and administrative office area, construction of a truck washing area, extension of the fire protection system to cover all treatment and operating areas, construction of three lixiviate treatment tanks, roofing for the temporary waste storage platform and start-up of the industrial effluent treatment plant. The year 2010 also saw Befesa Perú start up the country's first commercial incinerator, which is capable of treating 1,800 t/year of inflammable and hospital waste.

Befesa is the first company in Peru to be authorized by the Ministry of Health's Directorate-General for Environmental Health (DIGESA) to carry out the treatment and final disposal of hazardous industrial waste. It has also secured the approval of the Environmental Impact Study ("Estudio de Impacto Ambiental"). The company successfully managed over 14,400 t of waste over the year.

Waste analysis laboratory



Befesa México

Befesa Mexico and its subsidiary, Sistemas de Desarrollo Sustentable (SDS), are involved in the management of hazardous waste for industry and the public sector. These activities foster sustainable development by offering a responsible alternative to the management of hazardous waste, which might otherwise lead to significant environmental contamination.

In 2010, Befesa México continued to expand its business of managing waste ultimately intended for third-party facilities. Whereas previously specializing almost exclusively in hazardous waste confinement, the company is now experiencing demand for cement furnaces, confinement of non-hazardous waste and incineration. The company also opened a waste transfer center in Tultitlán, State of Mexico, in 2010.