

Overview	
Country	Spain
Type of organization	Multi national Company
Number of employees	65
Type of practice	Best practise
Level of investment	Big
Activity type	Processing waste
Key words	Recycling

www.befesa.com

Summary

Befesa is a leading environmental services company that focuses on recycling hazardous waste from the steel and aluminium industries. Their operations are integral to the circular economy, helping to reduce the consumption of natural resources and prevent around 2 million tonnes of residue from reaching landfills each year.



Source: www.befesa.com

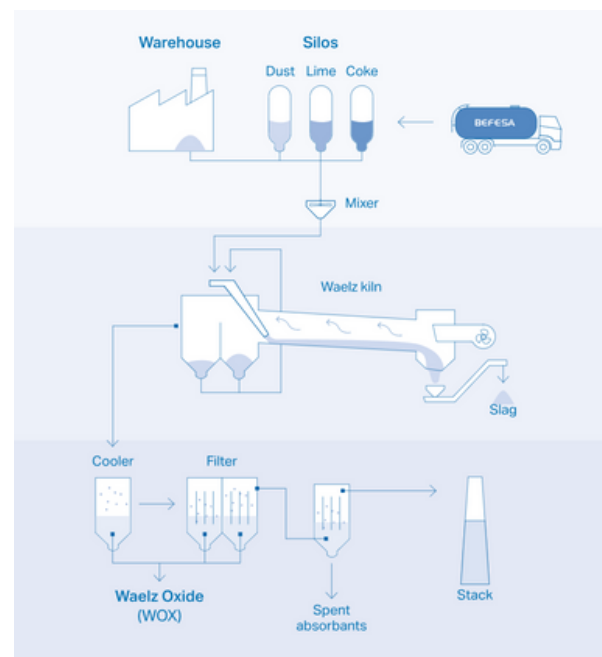
Background and origin

Befesa Zinc Aser is located near Bilbao. It is the only plant in Spain dedicated to recycling dust generated in steelworks with electric arc furnaces (EAF), recovering valuable metals like zinc and lead. The residual dust from EAF steelworks is classified as hazardous waste due to its high metal content, primarily zinc, iron, and lead. Befesa Zinc Aser's operations have significant environmental benefits:

- **Metal Recovery:** The plant recovers metals from hazardous waste, preventing pollution and reducing the need for mining natural resources. This contributes to the sustainability of metal production by providing an inexhaustible source of metals compared to traditional mining.
- **Best Available Technology:** Befesa Zinc Aser uses advanced processes like the Waelz process and the Double Leaching Waelz Oxide process, which are considered Best Available Technology (BAT) by the European Commission. These processes efficiently separate and recover metals from steelworks dust, producing non-ecotoxic inert slags as by-products.
- **Circular Economy:** By recycling hazardous residues, Befesa Zinc Aser supports the circular economy, reducing the consumption of natural resources and preventing waste from reaching landfills.

Relevance to the craft sector

Craft makers who prioritize sustainability can incorporate recycled materials into their creations, thereby promoting eco-friendly practices. By highlighting their use of materials from environmentally responsible sources, they can appeal to environmentally conscious consumers. Additionally, the circular economy supports the broader movement towards sustainability, allowing craft makers to align their practices with these principles by choosing materials that have been recycled and reintroduced into the production process.



Source: Befesa

Target groups

- Steel industry
- Industries and craftsmen using zinc oxide in their products

Material focus - type of waste material involved

- Steel industry waste Electric Arc Furnace Dust, called EAFD:
- Zinc: Often 20-35% of the dust.
- Lead Compounds: Typically 0.5-3%, depending on the source materials.
- Iron: Includes iron oxides around 25-35%.
- Other Compounds: Such as chlorides and sulphides



Stakeholders involved

- Steel industries
- Shareholders and investors

Professionals involved and their roles

- Men and women in the workforce
- Operational staff
- Environmental Scientists and engineers



Source: Befesa



Source: www.befesa.com

Connection of the practice with the project-identified needs

Knowledge of Waste Materials

Befesa employs advanced methods to recycle hazardous waste, which can be applied to plastics.

Advanced Methods: Befesa utilizes state-of-the-art technology to ensure that the recycling processes are efficient and environmentally friendly. This includes the use of high-temperature kiln to facilitate chemical reactions

Green Entrepreneurial Skills

Understanding and adhering to legal requirements is crucial for Befesa:

Legal Requirements: Befesa ensures compliance with local, national, and international regulations related to waste management. This includes proper handling, transportation, and disposal of hazardous materials.

Product Certifications: Obtaining certifications for recycled materials to meet industry standards and consumer expectations. This helps in building trust and credibility in the market.

Creativity and Innovative Solutions

N/A



Source: Befesa

Methodological approach to implement the practice

Process description - step by step instructions for implementing the practice

The Waelz process is a method used to recover zinc and other metals from metallurgical waste, such as electric arc furnace (EAF) dust.

The kiln is feeded with a mixture of Lime, coke and EAFD dust. Due to the high temperatures, some chemical processes occur inside the kiln and the produced Zinc Oxide is recovered in the filters. The slag coming out of the kiln is also recovered.

Related Resources that have been developed

N/A

End product

Zinc Oxide and Slag are the final products of the Waelz process. Zinc Oxide is widely used in various industries, including rubber manufacturing, ceramics, and pharmaceuticals. Slag, on the other hand, is utilized in construction materials, road building, and as a raw material for cement production. Both of these by-products have numerous applications, making the Waelz process highly valuable in recycling and resource recovery."



Source: Befesa

Sources of funding for this intervention

Befesa is entirely financed through private funding sources.

Innovation, novel methods or technologies used

There are numerous techniques for recovering zinc oxide, each with its own advantages and specific applications. One of the most notable is the Waelz process, used by this company. This method involves the use of a rotary kiln, where materials are subjected to high temperatures to facilitate the separation of zinc oxide. Additionally, specialized filters are employed to capture and purify the recovered zinc oxide, ensuring a high-quality product. This process is not only efficient but also contributes to sustainability by allowing the reuse of materials that would otherwise be discarded. At the same time, the company uses the Double Leaching Waelz Oxide process to purify the recovered zinc oxide.



Source: Befesa

Obstacles and challenges faced

Continuous and vigilant monitoring of the system is essential, requiring attention 24 hours a day, 7 days a week. This constant oversight ensures that any issues can be promptly identified and addressed, maintaining optimal performance and preventing potential disruptions. By dedicating round-the-clock supervision, the reliability and efficiency of the system are significantly enhanced.

Steps further and plans for the future

N/A

Key impacts - environmental, economic & social

Befesa plays a crucial role in environmental sustainability by recovering steelworks dust, thereby reducing the need to mine natural resources. This innovative process not only conserves valuable materials but also prevents Electric Arc Furnace Dust from contaminating landfills. By effectively managing and repurposing industrial waste, Befesa contributes to a cleaner environment and promotes the responsible use of resources.

Qualities and criteria's to consider the practice effective, efficient, sustainable, transferable

Qualities	
Effectiveness: How well does the practice achieve its goals?	The waelz proccess gives a big value addition to the EAFD when it is converted to Zinc Oxide. This product is very versatile and may be used for lots of different purposes
Efficiency: Does the practice minimize resources while maximizing outputs?	The Waelz and the Double Leaching Waelz Oxide processes are included in the BAT (Best available technology) by the EU
Sustainability: Does the pratcice contribute to environmental protection, social equality and long-term viability?	Due to this circular economy process the mining works of Spain are reduced, at the same time the disposal of EAFD is also reduced. This company is viable in case it receives big amounts of EAFD
Transferability: Are the methods transferable in different contexts?	This is a complex process that needs to be carefully adapted to other settings and requests a lot of engineering work

Required Competences for the best practice implementation

Activities-to-competences mapping

Associated competences	
Knowledge	Environmental policies and regulations shall be filled. The kiln shall be operated properly to enhance the chemical reactions
Skills	Technical skills to manage and build a plant and digital skills to manage the plant
Attitudes	N/A

Training needs required for successful implementation

It is a highly intricate system, presenting significant challenges for replication due to both technical and economic factors. The complexity arises from the advanced technology and specialized knowledge required to operate and maintain the system effectively. Additionally, the substantial financial investment needed to develop and sustain such a system further complicates efforts to duplicate it.

Lessons learned

Befesa leads in environmental services by recycling hazardous waste from the steel industries. Their efforts are vital to the circular economy, preventing big quantity of waste from reaching landfills each year.

References / links

- <https://www.befesa.com/es/>

Source: Befesa

