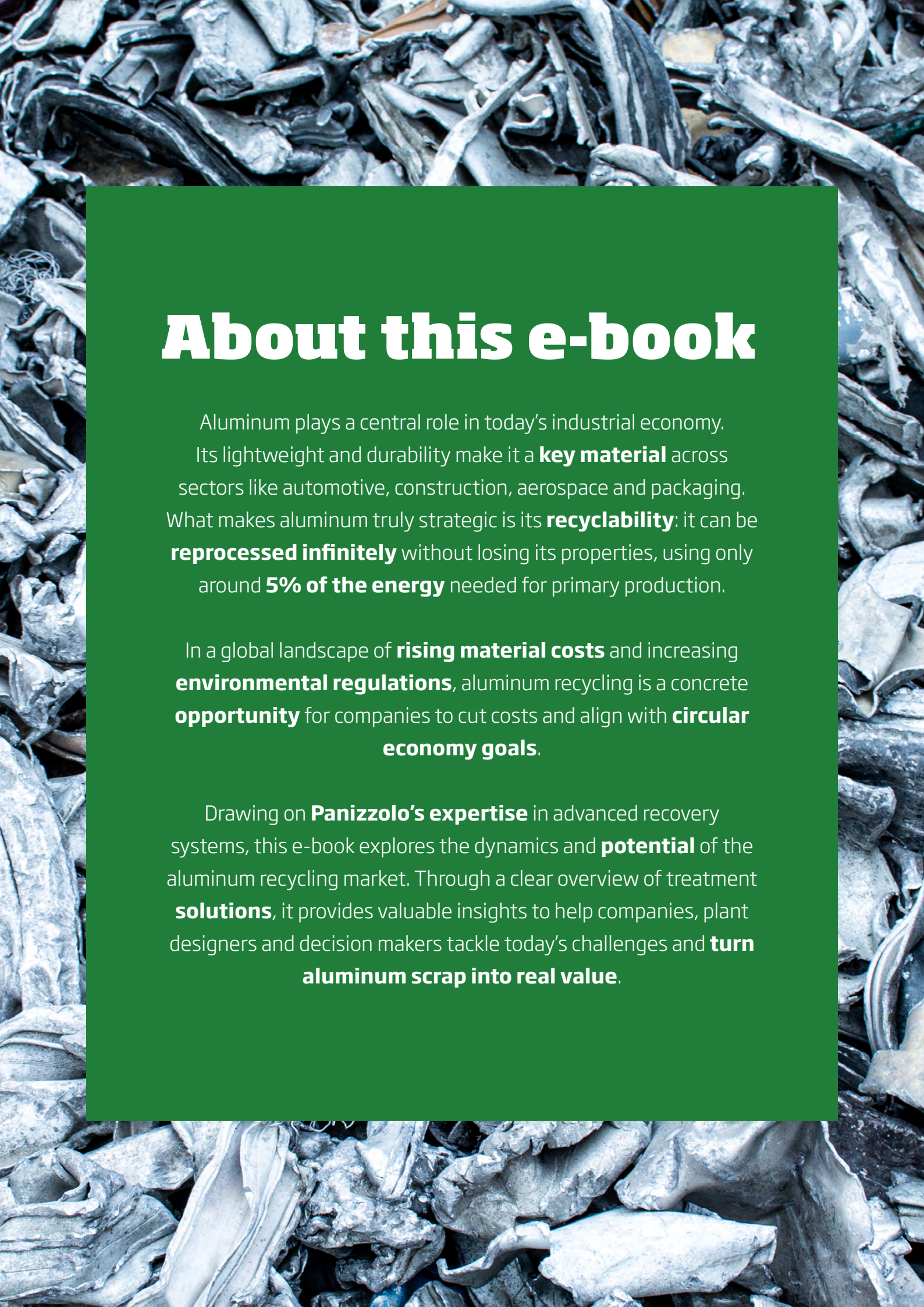
Aluminium: a valuable resource

Market insights and recycling solutions

panizzolo
recycling systems



About this e-book

Aluminum plays a central role in today's industrial economy. Its lightweight and durability make it a **key material** across sectors like automotive, construction, aerospace and packaging. What makes aluminum truly strategic is its **recyclability**: it can be **reprocessed infinitely** without losing its properties, using only around **5% of the energy** needed for primary production.

In a global landscape of **rising material costs** and increasing **environmental regulations**, aluminum recycling is a concrete **opportunity** for companies to cut costs and align with **circular economy goals**.

Drawing on **Panizzolo's expertise** in advanced recovery systems, this e-book explores the dynamics and **potential** of the aluminum recycling market. Through a clear overview of treatment **solutions**, it provides valuable insights to help companies, plant designers and decision makers tackle today's challenges and **turn aluminum scrap into real value**.

Contents

01

Data and market overview

Key data

70 million tons

Global aluminium production
in 2023

100 million tons

Annual emissions avoided thanks
to aluminum recycling

Global Recycling Input Rate (RIR)
in 2018

Aluminum still in use today
from all-time production

95%

Recycling aluminium saves up to 95% of the
energy required for the primary production

Industry challenges

- **RISING ENERGY AND LOGISTICS COSTS**
  Increasing operational expenses are putting pressure on margins, especially for plants with outdated technology.

- **COMPLEXITY OF SCRAP COMPOSITION**
  Modern scrap streams contain mixed materials and alloys, requiring more advanced separation and treatment processes.

- **REGULATORY PRESSURE AND COMPLIANCE**
  Tighter national and international rules on emissions, traceability and waste management affect the entire supply chain.

Emerging trends

- **SHIFT TOWARD CLOSED-LOOP RECYCLING SYSTEMS**
  Manufacturers are increasingly adopting circular models to recover and reuse aluminum within their own production.

- **INVESTMENT IN AUTOMATION AND AI**
  Advanced sorting technologies and smart systems are improving efficiency and material purity.

- **DECARBONIZATION AND GREEN DEAL**
  The rising demand for low-carbon aluminum is pushing recyclers to reduce emissions and certify their processes.

Why invest in a recycling plant

With growing demand for recycled aluminum, rising costs and increasing environmental regulations, investing in a recycling plant is more than a sustainability choice: it's a **forward-looking decision** that strengthens your position in a changing market.

LOWER OPERATING COSTS

FASTER RETURN ON INVESTMENT

INCENTIVES AND FINANCING ADVANTAGES

ACCESS TO PREMIUM MARKETS

REGULATORY AND ESG COMPLIANCE

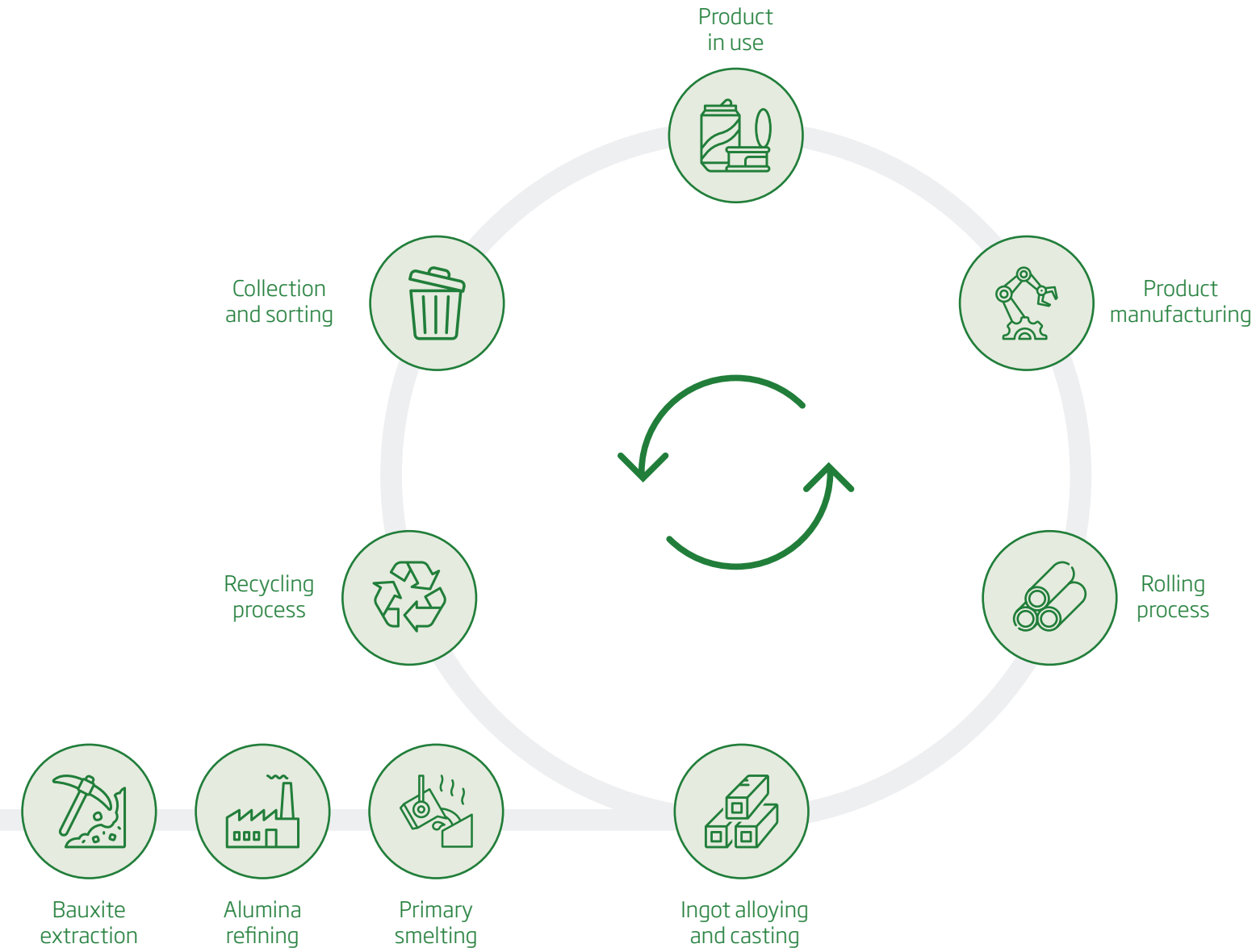
STRONGER POSITIONING AND REPUTATION

02

From scrap to value

A circular journey

Few materials offer what aluminum does: **unlimited recyclability**, high performance, and strategic efficiency. From extraction to reprocessing, aluminum travels through industries and products, constantly regaining **value**. Mastering its life cycle means gaining **economic advantage** while meeting today's **sustainability demands**.



Types of aluminium scrap

The aluminum recycling market includes a **wide range of scrap** categories, each with different characteristics and **recovery** potential. These categories can vary from country to country, depending on local industry, regulations and collection practices. Knowing the most common types is essential to designing efficient and **adaptable** treatment systems.

MIXED ALUMINIUM PROFILES

MIXED HEAVY ALUMINIUM

MIXED ALUMINIUM

ALUMINIUM SHEETS

ALUMINIUM CANS

ALUMINIUM CARTER

INDUSTRIAL SCRAP

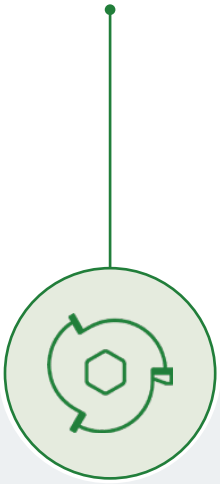
ALUMINIUM BALES

The aluminium treatment process

1

VOLUMETRIC REDUCTION

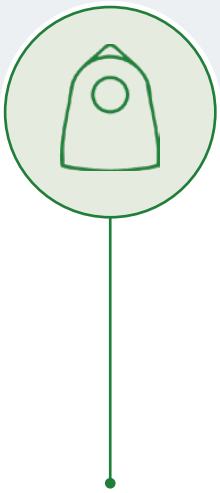
The scrap is pre-shredded for better process flow.



2

GRINDING

The material is ground into uniform and optimal sizes.



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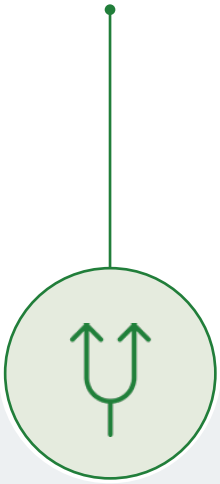
SEPARATION

Aluminum is separated from other metals and residues.



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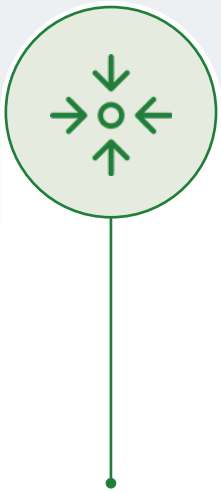
CONCENTRATION

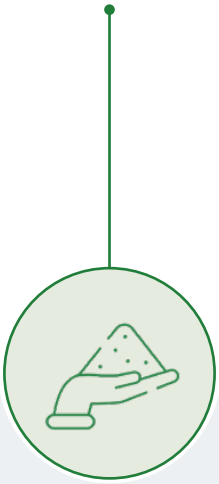
The aluminum fraction is further refined to increase purity.



5

REFINING

Final treatment ensures furnace-ready output.



Key factors in choosing a recycling system

LOGISTICS OPTIMIZATION

The layout must ensure a smooth workflow and **minimize downtime**. Well-designed logistics enhance daily productivity, allowing every step to perform at its **full potential**.

ENERGY EFFICIENCY

An efficient plant **optimizes energy** use at every stage of the process. This leads to **lower operating costs** and a more **sustainable** production cycle.

FLEXIBLE DESIGN

A flexible plant is built to **grow with the company**. Modular design and **upgrade** options make it easy to adapt as **needs and operations** evolve over time.

RELIABLE QUALITY

Quality goes beyond durable components: it delivers consistent **performance** and market-ready **output**. A reliable system ensures **long-term value**, far beyond initial cost.

03

Panizzolo solutions

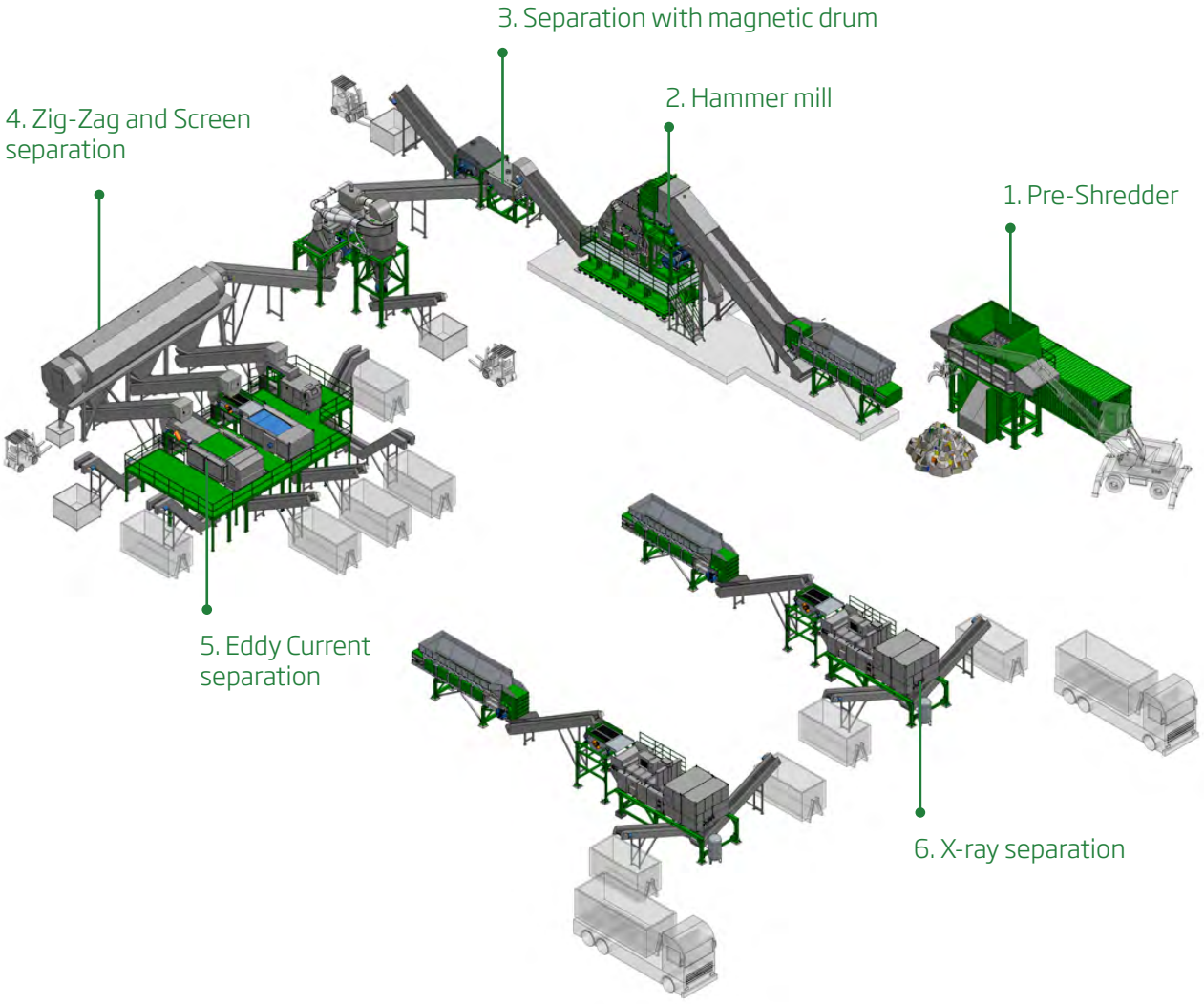
Metal scrap experts since 1946

We've been working in the metal industry since 1946, turning our **experience** into advanced solutions for **scrap recovery**. Over the years, we've designed complete plants and stand-alone machines combining know-how with a strong **focus on innovation**.

Our systems are built to deliver **performance**, long-term reliability and operational **flexibility**. Every project is guided by a **Quality Policy** that reflects our commitment to the highest standards in design, production and service.

With Panizzolo, you invest in proven technology that **evolves with your business** and drives future growth.

Our aluminium plant overview



SCRAP INPUT

- Aluminium profile and mixed profile
- Aluminium crankcase and car crankcase
- Aluminium sheet and mixed sheet
- Aluminium parcels
- Mixed aluminium

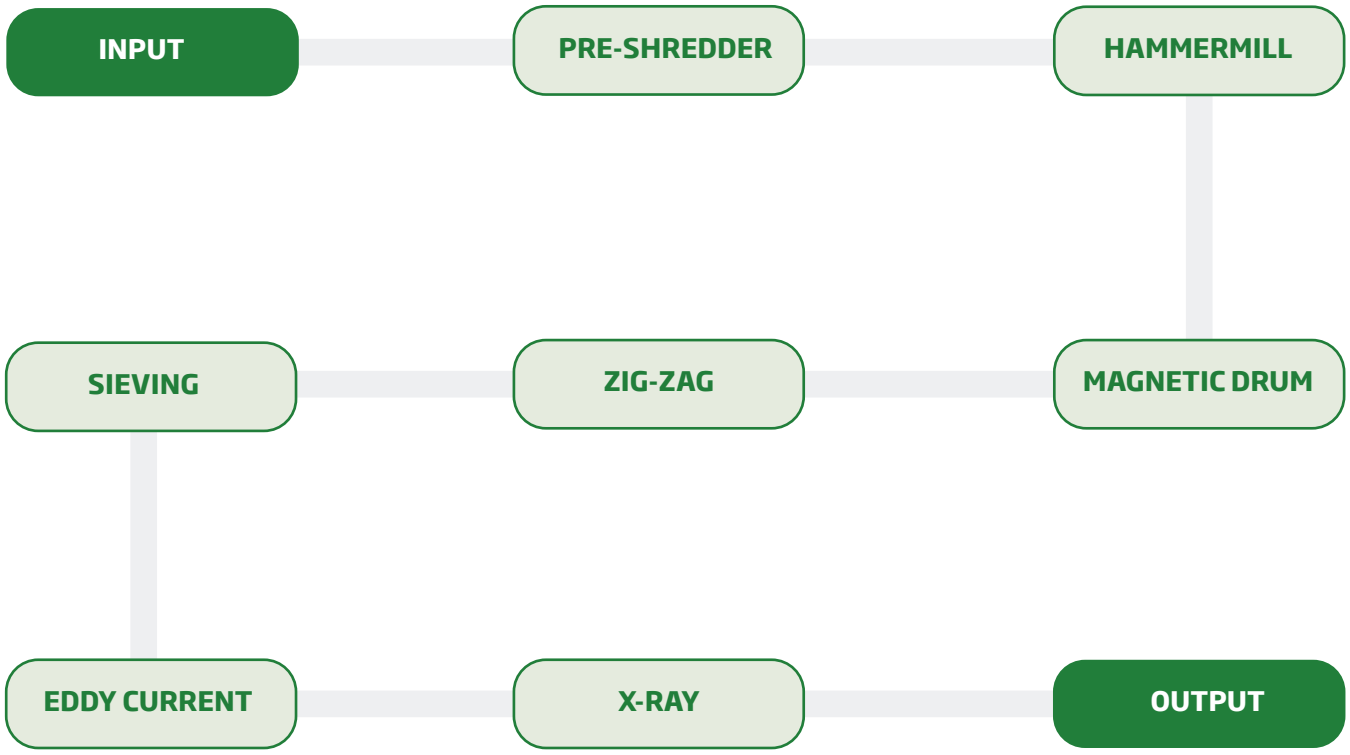
PRODUCTIVITY

From **2,5 ton/h**
to **30 ton/h**

Our aluminium plant flow layout

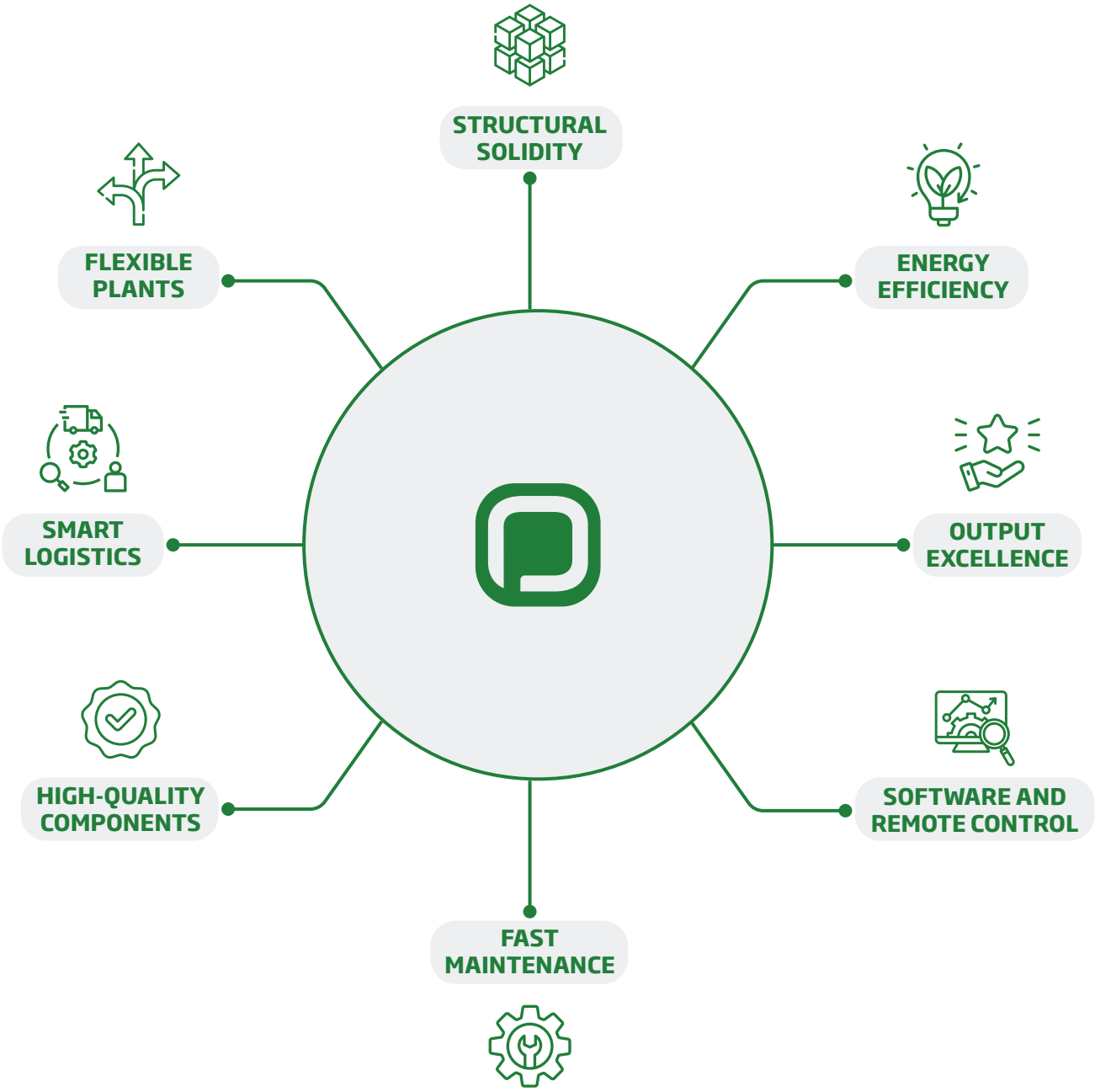
Aluminum plays a growing role in global manufacturing and foundries are becoming increasingly selective, preferring **high-quality raw material** from recycling.
This makes **grinding and separation** quality a key differentiator in today's market.

Panizzolo plants are designed to meet this demand. Our systems recover aluminum scrap with high **output purity**, free from contaminants and inert materials, transforming scrap into **value** and contributing to a more sustainable, **circular industrial model**.



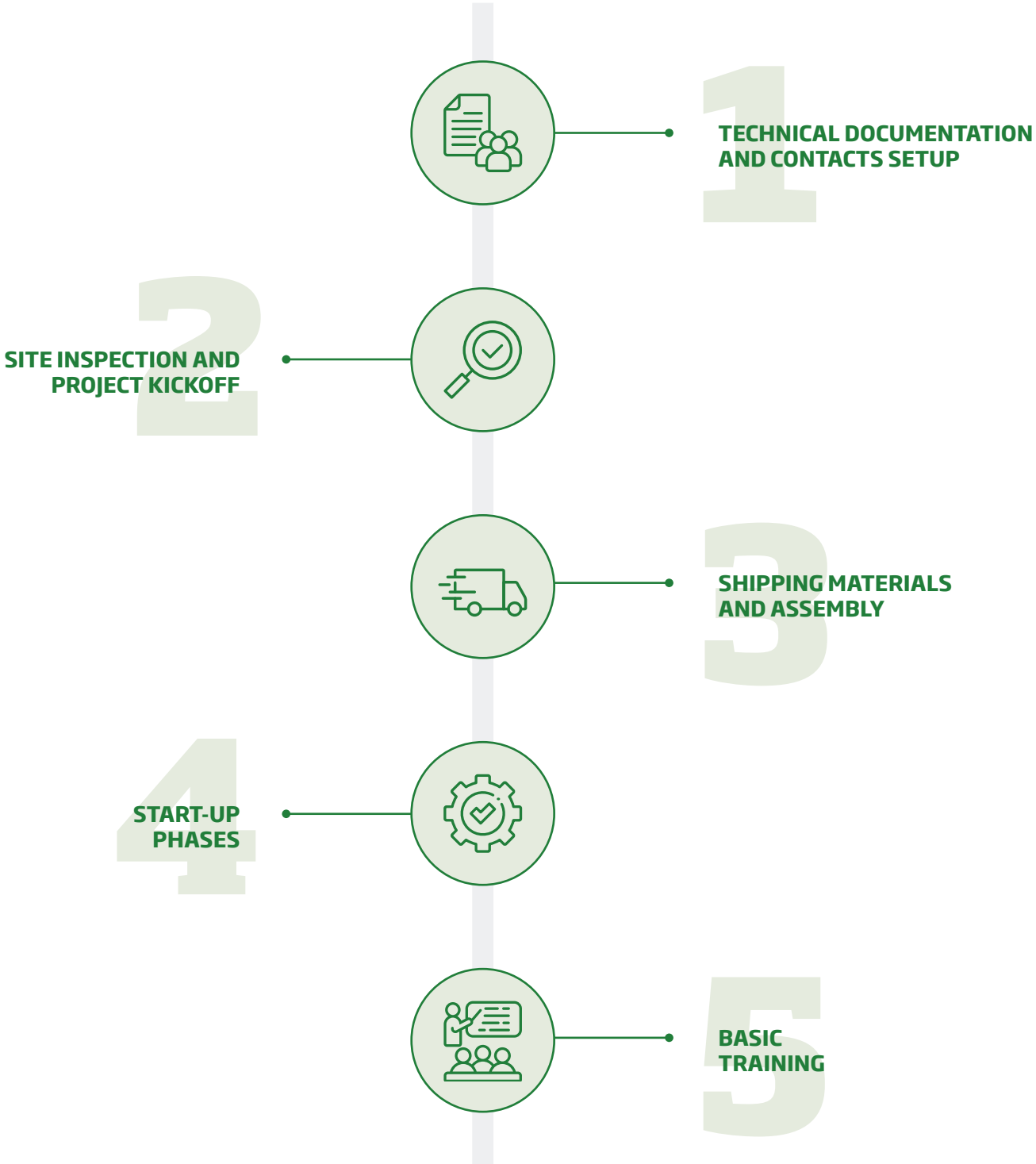
Why choose our solutions

Our solutions are more than machines, they're **strategic** tools designed to generate **value**. From energy savings to output quality, every element is engineered to reduce operational costs, maximize scrap recovery and keep your business **competitive** in a rapidly evolving market.



The supply structure

We approach every project with transparency, structure and a strong focus on **service quality**. Every step of the process reflects our commitment to precision and **reliability**.



04

Case studies

Deral

LOCATION

ITALY

INPUT SCRAP

ALUMINIUM PROFILE

OUTPUT

FURNACE-READY
ALUMINIUM max 120 mm

THE CHALLENGE

Deral is an Italian **aluminum foundry** founded in 1986 that produces high quality billets for the national and international market. As the company expanded its input range, it faced a clear goal: increasing **productivity** while maintaining high output **quality**.

THE SOLUTION

Deral installed a Panizzolo Flex 1000 Mobile Drum plant with integrated Eddy Current separation. The system was later enhanced with a Mega 1100 hammer mill and an X-ray sorting unit.

> "I immediately liked the idea: more compact mills with a more than adequate investment and management cost."

Pietro Giulio Vincoli, CEO

Fondi-Metal

LOCATION

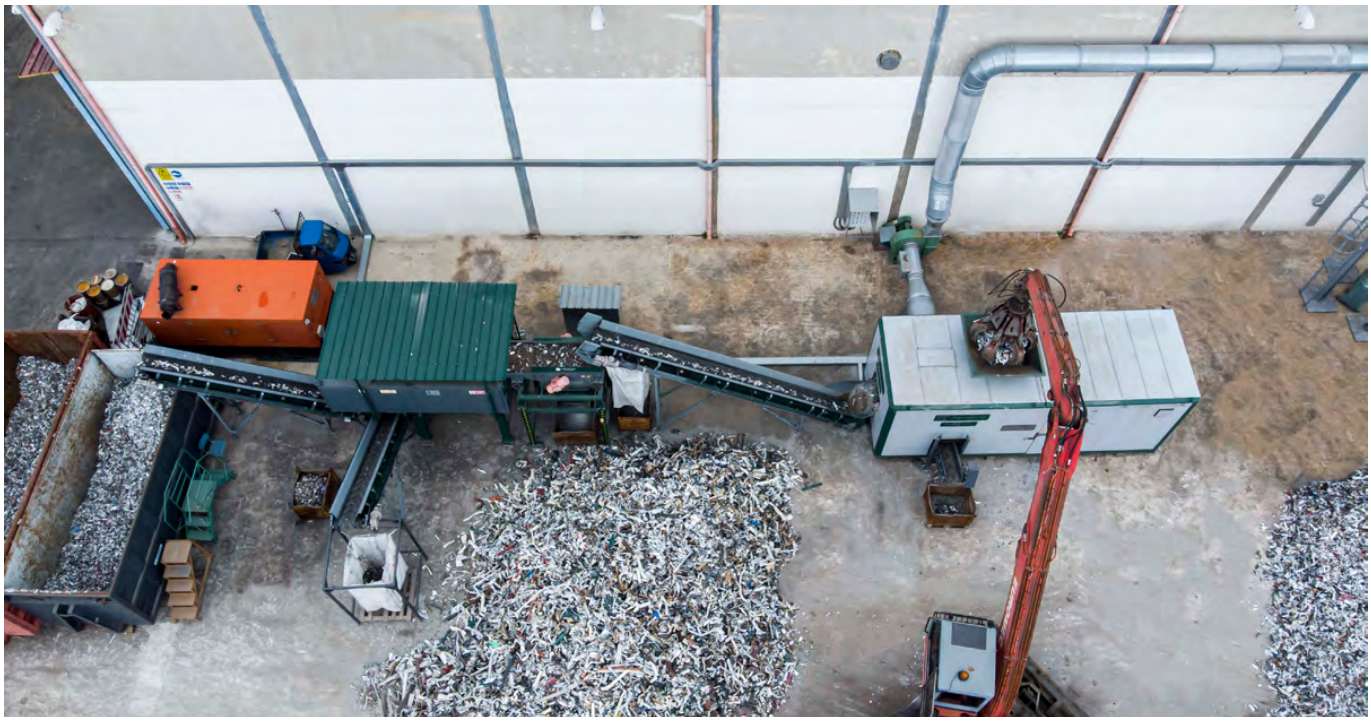
ITALY

INPUT SCRAP

ALUMINIUM PROFILE

OUTPUT

SECONDARY RAW MATERIAL



THE CHALLENGE

Fondi-Metal is an Italian **scrap dealer** founded in 1993. Its goal was to obtain a refined material suitable for direct sale to foundries across Central and Northern Italy, meeting the market's demand for **furnace-ready** scrap.

THE SOLUTION

The Fondi-Metal plant features a Flex 500 Mobile hammer mill with integrated Eddy Current separation.

> "A key advantage is the low energy consumption per hour, which lets us significantly increase aluminum profitability compared to traditional scrap trading."
>
> Paolo Baldassarre, owner

Schuster

LOCATION

GERMANY

INPUT SCRAP

ALUMINIUM PROFILE
MIXED SCRAP

OUTPUT

SECONDARY RAW MATERIAL
CLEAN SHREDDED STEEL

THE CHALLENGE

Schuster Metall-Recycling is a German **scrap dealer** with over 50 years of experience, specialized in metal waste processing. The company needed a flexible system to produce secondary raw material that meets the **highest quality standards**.

THE SOLUTION

Schuster installed a Panizzolo Flex 1000 Mobile Drum plant. The line was later upgraded with a Mega 1100 hammer mil to improve process capacity.

> I really appreciate the entire construction logic. It's immediately clear that the design comes from years of direct experience in the field.

Klaus Schuster, owner

Rottami Padana

LOCATION

ITALY

INPUT SCRAP

ALUMINIUM PROFILE
BRASS

OUTPUT

SECONDARY RAW MATERIAL

THE CHALLENGE

Founded in 1980, Rottami Padana is an Italian company specialised in the **collection and trading** of ferrous and non-ferrous scrap. The company's goal was to obtain a high-quality output suitable for **direct use in foundries and steel mills**.

THE SOLUTION

Rottami Padana installed an aluminium process plant including a Mega 735 X hammer mill with a dedicated downstream that integrates magnetic separation, Zig-Zag, Eddy Current and X-ray sorting.

PIP

LOCATION

GERMANY

INPUT SCRAP

ALUMINIUM CAPS

OUTPUT

GRANULE

THE CHALLENGE

Founded in 2009, PIP is a German company that produces secondary raw materials **from plastic and aluminum caps**. Its goal is to maximise material recovery while contributing to environmental sustainability.

THE SOLUTION

To improve the treatment, PIP chose Panizzolo's refining plant. The system ensures high metal purity and efficient separation, turning complex waste into valuable material.

> The customisation of the control software settings offers great flexibility and fast adaptation, perfect for the type of input waste we handle.

Richard Groß, General Manager

Myne

LOCATION

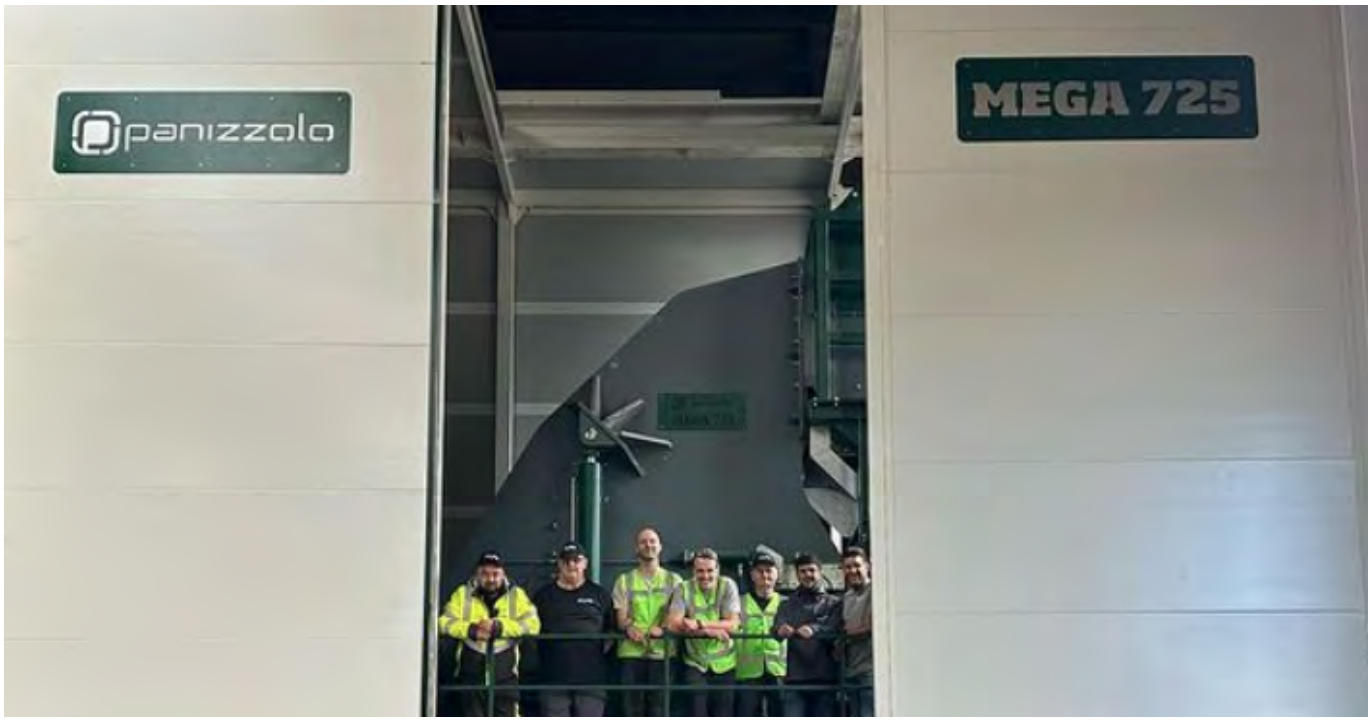
NETHERLANDS

INPUT SCRAP

ALUMINIUM
METAL SLAG
BRASS

OUTPUT

SECONDARY RAW MATERIAL



THE CHALLENGE

Founded in 1917, Myne is a Dutch **recycling company** that recently rebranded to focus on technological innovation and circular treatment cycles. Their mission is to recover valuable materials and reintroduce them into the European market for **high-quality applications**, following a clear ecological vision.

THE SOLUTION

Myne integrated two Panizzolo hammer mills into its treatment line to process aluminum scrap before separation.

Exlabesa

LOCATION

SPAIN

INPUT SCRAP

ALUMINIUM PROFILE

OUTPUT

FURNACE-READY ALUMINIUM

THE CHALLENGE

Founded in Spain in 1966, Exlabesa is one of Europe's **leading aluminium extrusion companies**. With a strong focus on innovation and sustainability, the company's goal is to recover aluminium scrap while ensuring **high quality standards**, driving the industry toward a cleaner, more efficient future.

THE SOLUTION

Exlabesa's treatment line features a Mega 735 hammer mill, supported by a dedicated downstream that integrates magnetic separation, Zig-Zag separator, Eddy Current and X-ray sorting.

EGA

LOCATION

UNITED ARAB EMIRATES

INPUT SCRAP

ALUMINIUM PROFILE

OUTPUT

FURNACE-READY ALUMINIUM

THE CHALLENGE

Founded in 1975, Emirates Global Aluminium is the world's **largest premium aluminium producer**. The new treatment line is part of the UAE's future largest aluminium recycling facility, designed to process 170,000 tons per year and deliver high-quality aluminium with lower carbon emissions.

THE SOLUTION

EGA's aluminium plant is a complete system, from pre-shredding to X-ray sorting, designed to ensure maximum recovery efficiency and quality.

> Recycling is a major growth opportunity for EGA. With this new facility, we expand our low-carbon metal offering for customers in the UAE and worldwide.

Abdulnasser Bin Kalban, CEO

05

Conclusion

Your next step starts here

Let's connect and shape the future of aluminum recycling together.

Contact us

panizzolo.com
info@panizzolo.com

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Sources

- https://www.aluminum.org/aluminum-statistics-portal
- https://international-aluminium.org/wp-content/uploads/2024/03/wa_factsheet_final.pdf
- https://www.aluminum.org/Recycling
- https://alustory.international-aluminium.org/recycling/

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