



RYB - PROJECT RESULTS



Project Background

Each year, around **3 million ski boots are produced**, with most sales occurring in Europe. After about 150 days of use, these boots contribute to **10,000 tons of waste**, half of which is plastic, typically ending up in landfills or incineration. This disposal generates environmental impacts, including approximately **3 kg of CO₂** per pair. Recognizing the waste, Tecnica Group, a leading ski boot manufacturer, launched the Recycle Your Boots project (RYB) in 2021. This initiative aims to create a circular system to recycle and repurpose boot materials for new products, especially in winter sports.

Recycling Preparation Phase

Recycling ski boots is challenging due to their complex structure of around **120 materials**, including plastics, metals, and fabrics, often glued or fixed together. Each boot has unique components like **Velcro, foam, and rubber** that are difficult to recycle. This complexity, combined with variations across brands and models, requires customized recycling protocols for each type. Recycling depends heavily on precise sorting to remove non-recyclable materials, ensuring purer reusable thermoplastics. **FECAM and Tecnica Group** have developed a database of separation protocols to guide these recycling processes.

Generating Secondary Raw Materials

Process: Shredding & Sorting by Laprima Plastics to separate ferrous and non-ferrous metals, polypropylene (PP), and thermoplastic polyurethane (TPU).

Recycled Material Usage: PP and TPU are reused in:

- New ski boots (Tecnica and Nordica brands)
- Ski components (Nordica, Blizzard)
- 100% recycled heel-counters in Moon Boot shoes

Eco-Design Balance: Recycled plastic content ranges from 30% to 100% depending on product type.

Recycling of Metals & Inner Liners

Metals like iron and aluminum, after being separated from plastic, are subjected to an innovative process based on pyrolysis and are remelted to be used in other new products. The liner, made from difficult-to-reuse materials, is ground and reformed into a **30cm soft layer**. Partnering with LISKI and REMAT, the liner foam is repurposed into **protective ski slope mattresses**, which have tested better than new foam. This product is now used in ski World Cup events, proving its market viability. Further applications for recycled liner materials are being explored in retail and construction.

Project Performance (2021-2024)



28 000
pairs

Boots Recycled

In the first 3 years of the Recycle Your Boots project (2021-2024), over 28,000 pairs of ski boots were collected and recycled.



85%

Material Recovery Rate

On average, 85% of the materials of a boot were recovered, i.e. approximately 2kg of plastics, 0.5kg of metals and 0.85kg of the inner shoe.



15kg

CO₂ Saved Per Pair Recycled

Recycling ski boots and repurposing their materials saves about 15kg of CO₂ equivalent per pair, based on a Life Cycle Analysis by the University of Padua. This figure accounts for the environmental costs of both transport and recycling processes.



330
tons

Total CO₂ Over Three Years

Given the complexity of handling a product that is composite, multi-material, and multi-brand, the recycling performance has been exceptional. Over the first three years, the project has achieved an overall environmental impact equivalent to approximately 330 tons of carbon dioxide saved.

Technological Transfer

The Recycle Your Boots project shared its knowledge with other producers in the Montebelluna Sportssystem district to explore recycling projects for items like motorcycle boots and helmets. The **Sportssystem Foundation** led these collaborative innovation efforts. At the European level, the **Federation of the European Sporting Goods Industry (FESI)** facilitated discussions with other ski industry producers to share the recycling system.

Recycling Digital Passport

When scanned, the QR code provides recyclers with specific data on the plastics used.

This system increases material purity, enables new applications, and boosts the use of recycled plastic over virgin material, benefiting both the economy and environment.



Each new boot from Nordica and Tecnica brands includes a QR code on the cuff.

The passport classifies plastics into 10 categories to optimize recycling.

Social Dimension of the Project

About **10% of collected boots are suitable for resale** on the second-hand market. Extending a product's life cycle through reuse, before recycling, is highly effective for the environment and aligns with the European Commission's Waste Directive hierarchy. Tecnica Group has partnered with Cooperativa Sociale Insieme to resell boots, with proceeds supporting **social inclusion projects with vulnerable people**. Additionally, Cooperativa Sociale il Cengio collaborates with Laprima Plastics to prepare boots for recycling. This initiative promotes both environmental sustainability and social impact.

What's next

The European Green Deal encourages companies to integrate circularity into their production processes. Future work focuses on designing products as "fit for disassembly, made for recycling." New sorting technologies are essential for improving material reuse and upcycling, boosting recycling efficiency and reducing CO2 emissions. Extended Producer Responsibility schemes being developed in Europe should learn from eco-innovation projects like Recycle Your Boots. The sports industry's biggest challenge will be **aggregating producers and establishing transnational recycling facilities** due to the high volume of end-of-life products.