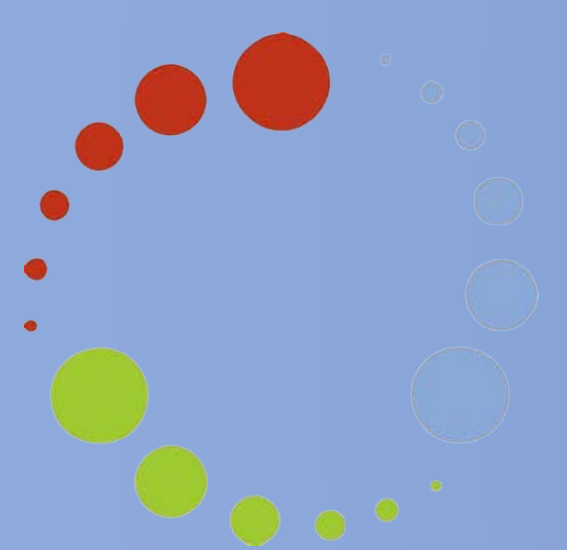




ENVIRONMENTAL LCA ON NEWLY DEVELOPED RECYCLING TECHNOLOGY OF WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT WASTE

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INTRODUCTION

Waste Electrical and Electronic Equipment (WEEE) is one the fastest growing waste streams in the EU, but it often contains undesirable contaminants that hamper recycling. PLAST2bCLEANED is focusing on developing an environmentally safe recycling process for WEEE plastics in a technically feasible and economically viable manner. The project attempts to close three material loops: **1) polymer, 2) bromine fraction and 3) antimony trioxide fraction**.

MATERIALS AND METHODS

Goal & Scope

The aim is to assess the environmental impacts of processing WEEE plastics containing brominated flame retardants (Bfr) and antimony trioxide (ATO), sorted with Raman spectroscopy, which are recycled using the PLAST2bCLEANED superheated dissolution process.

Waste perspective (gate-to-gate), and product perspective (cradle-to-grave) LCAs assessed impacts of waste treatment and using the recycled product in an application. Functional units (FU) are the following:

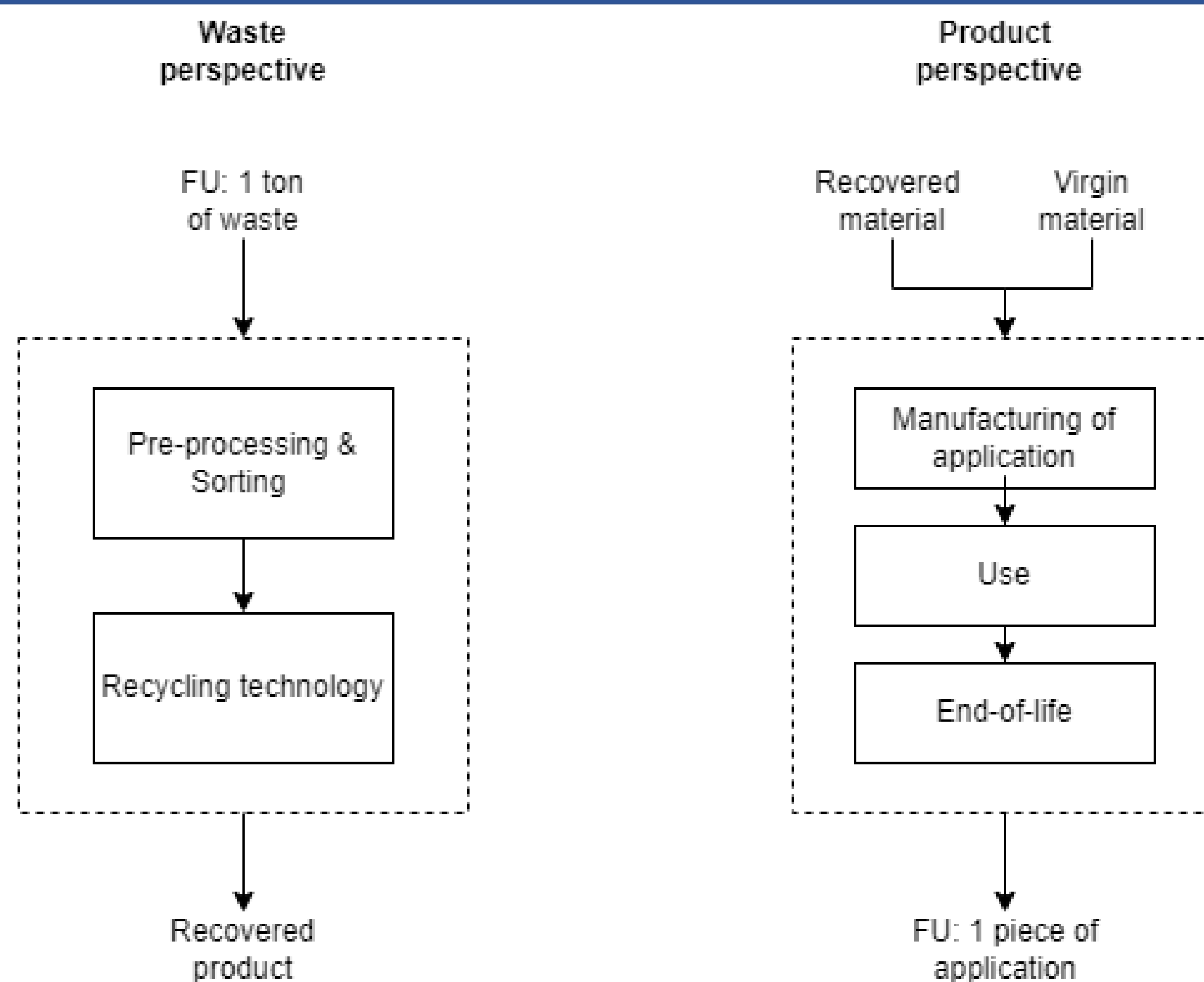
- **Waste perspective:** *End-of-Life treatment of 1 ton of WEEE plastics in a defined average composition and particle size, coming from a WEEE treatment plant*
- **Product perspective:** *1 external door frame of a washing machine with an overall running time of 220 washing cycles per year and an expected lifespan of 10 years (7000 running hours)"*

Life cycle inventory

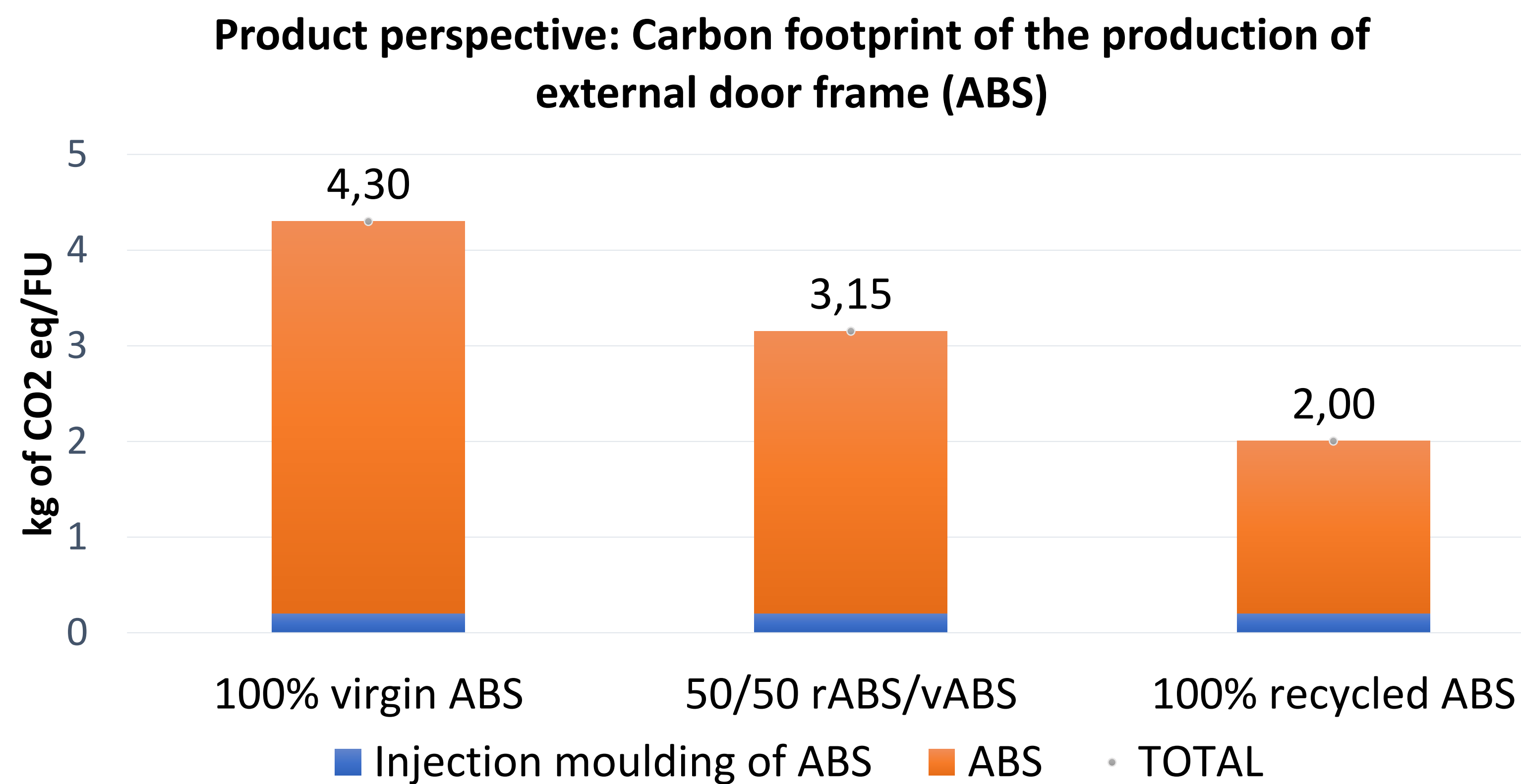
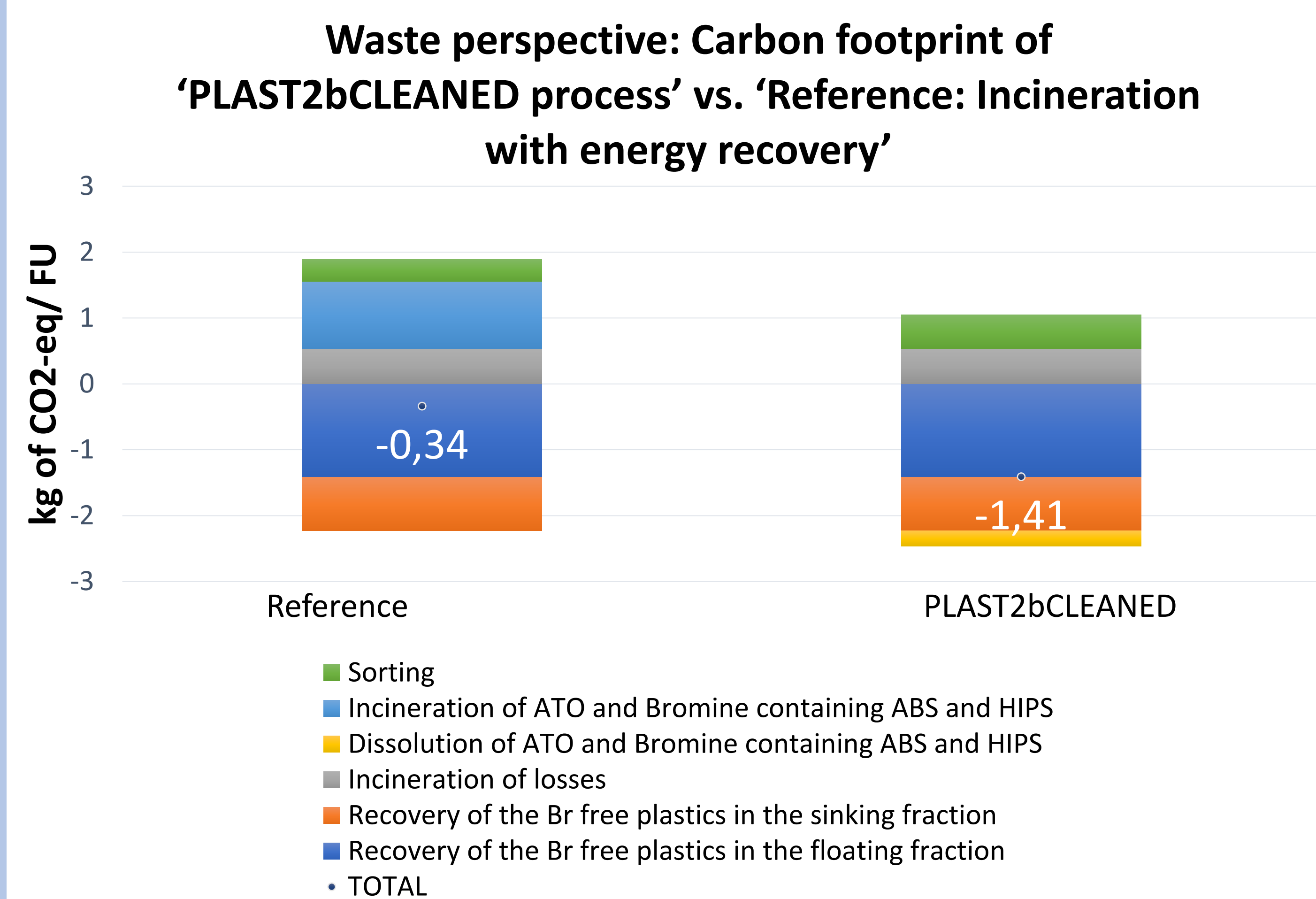
Primary inventory data was collected from project partners. For the background data Ecoinvent database was used.

Life cycle assessment software and method

The system was modelled with SimaPro v9.5 using the Recipe method.



RESULTS AND CONCLUSIONS



The carbon footprint of treatment of 1 ton of WEEE through PLAST2bCLEANED (dissolution) is **reduced by 317%** compared to the current incineration treatment of WEEE with energy recovery, caused by additional recycling of about 7% WEEE waste. Bromine and Antimony Trioxide are not recovered.

Recycled ABS recovered from the PLAST2bCLEANED process and used in the external door frame of the washing machine results in **53% better** environmental performance than the use of virgin ABS. When 50%/50% mixture of recycled and virgin ABS is applied the carbon footprint is **reduced by 27%** compared to using virgin ABS. The polymer itself has the largest contribution to the environmental impact of the production of the door frame, 87-93% of global warming impact is caused by virgin polymer production.

LCA ALIGNMENT BETWEEN EU PROJECTS

LCA methodology alignment discussions are taking place between PLAST2bCLEANED, NON-TOX, and CREAToR, all HORIZON 2020 projects concerned with developing new technologies for WEEE waste recycling. Aligning the LCA approaches between studies allows a fair comparison of technologies and brings additional value to the projects. The findings will be published in a white paper.



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<https://plast2bcleaned.eu/>

