



Pretty
Plastic

building from waste

SUSTAINABILITY
AND CIRCULARITY

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PRETTY PLASTIC

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Our Mission

Pretty Plastic's philosophy is firmly rooted in the principles of the Circular Economy, which aim to eliminate waste and pollution while promoting product and material circularity. Our commitment to these principles is resolute, and we are dedicated to eradicating the linear take-make-waste system that characterizes PVC streams. **Our objective is to offer a sustainable solution for PVC waste, preventing it from ending up in landfills and incineration facilities.**

By maintaining PVC within a circular system without compromising material quality, Pretty Plastic plays a significant role in disconnecting economic activities from the exploitation of natural resources. **Our mission is to transform waste into stunning, safe, and durable facade and roof claddings, championing a circular economy where resources flourish in a cycle of continuous renewal.** Embrace the beauty of upcycling, one tile at a time – from trash to tile, building(s) from waste.



Navigating Through the Recycled Building Material Requirements

The EU Action Plan for Circular Economy, in conjunction with the Dutch Plan for Circular Economy, has established clear sustainability and circularity objectives for building materials. For instance, the Netherlands has set ambitious targets, aiming to reduce the use of virgin resources by half by 2030 and achieve full circularity by eliminating waste entirely by 2050. **Within Pretty Plastic, PVC scraps from window frames and gutters are given new life and re-enter the economy as cladding tiles. This innovative approach prevents use of virgin resources while contributing to the creation of a PVC waste-free economy.**

In pursuit of the EU's goals, a comprehensive framework of regulations, certification schemes, and performance indicators is currently being implemented. At the same time, **norms, standards, and certifications in the built environment are continually updated to ensure that, for instance, the use of recycled products or materials does not compromise quality.** Demonstrating this may be considered time-consuming and challenging. However, **Pretty Plastic firmly believes that by adhering to these standards, they not only contribute to environmental preservation but also position themselves at the forefront of the circular economy movement.**

Our Commitment to Sustainability

At Pretty Plastic, our dedication to sustainability centers around addressing the pressing issue of plastic waste, which has become a significant concern in today's world. We exemplify this commitment by using non-virgin PVC materials to create new building products. Notably, **the production of non-virgin PVC emits only 0.2 kg of CO₂ per kilogram, a stark contrast to the 2.6 kg of CO₂ emitted during the production of virgin PVC. This results in a substantial reduction of 2.4 kg of CO₂ for every kilogram of PVC we produce.**

Our commitment to environmental responsibility goes beyond production. **We've implemented a robust return policy and designed our products for easy disassembly, ensuring that our tiles can be returned and recycled at our facilities, thus avoiding incineration.** Furthermore, considering that recycling PVC inherently avoids incineration, our total CO₂ emission savings rise to an impressive 3.9 kg.

For our tiles to generate environmental benefits we have established a solid network made of recycled PVC suppliers and other partners that share our same mission and are supporting us to assess the sustainability of our products. In addition, **we have implemented a comprehensive testing protocol to assess the safety, durability, and environmental impact of our tiles according to the latest European and Dutch norms and certification programs.**

Our Commitment to Circularity

At Pretty Plastic, our commitment to circularity is guided by a set of core principles.

Our primary objective is to **eliminate waste by avoiding the use of virgin PVC and prioritizing to work with existing waste streams of PVC scraps from window frames and gutters.** Consequently, Pretty Plastic's **tiles are designed to retain the highest value from PVC waste**, which is also reflected in our design choices for the First One. These choices aim to maximize the number of tiles per square meter while optimizing the PVC used for each tile.

Moreover, we've taken measures to ensure the longevity of our tiles. Their design facilitates easy disassembly, rendering them suitable for temporary applications. **Thanks to our return procedures, our tiles can be fully recycled into new ones after use.** This approach not only enhances durability but also encourages reuse and recyclability, **establishing a closed-loop system for PVC.**

Recycling PVC scraps not only enables us to create tiles of exceptional quality comparable to the original material but also adds intrinsic value through the transformation into a refined design product, exemplifying upcycling. **This recycling significantly extends the material's lifespan by more than 300 years, given that our tiles come with a lifespan of at least 40 years and can be recycled up to 8 times.**

Measuring Sustainability and Circularity

Both sustainability and circularity share the common objective of assessing environmental impacts while emphasizing waste reduction and resource efficiency. This involves optimizing the utilization of materials, energy, and water to minimize waste and enhance overall efficiency. **However, they rely on different sets of indicators.**

Sustainability takes a comprehensive approach, encompassing environmental, social, and economic factors. It addresses a wide range of considerations, from social equity to economic viability and ethical practices. Its metrics encompass a diverse array, including social impact assessments, economic viability, and biodiversity considerations. A pivotal tool in sustainability is the internationally recognized **Life Cycle Assessment (LCA)**. **This assessment method examines the environmental impact of products throughout their life cycles, enabling comparisons based on specific environmental criteria,** such as greenhouse gas emissions. Additionally, LCA results can be translated into an Environmental Product Declaration (EPD), which provides a single monetary measure known as Environmental Cost. This concise indicator offers transparent, comparable information, often in the form of an environmental label or declaration.

Circularity, while also focusing on environmentally aspects, revolves around materials and product life cycles. It emphasizes the design choices potential for refuse, reuse, remanufacturing, or recycling, and its metrics quantify circularity

aspects, including recyclability, reuse potential, and waste reduction. Presently, circularity lacks internationally standardized frameworks, although ISO norms are under development to assess product circularity. One widely recognized tool, accepted by the World Business Council for Sustainable Development, is the **Circular Transition Indicators (CTI)**. **These indicators, developed in collaboration with 26 member companies, assess a company's ability to minimize resource extraction and waste materials.** This universally applicable framework is designed by and for businesses, offering a consistent methodology suitable for diverse industries.

To provide insights for informed decision-making and environmental responsibility, the results of both an LCA and the CTI are presented below.

A comprehensive LCA has been conducted on the First One tile, and we are committed to extending this analysis to our other products in the near future. Furthermore, to enhance transparency in sharing the results, the Environmental Product Declaration (EPD) for the First One has been integrated into the Dutch National Milieu Database. **This marks a significant milestone, as it is the first facade cladding made entirely from 100% recycled PVC to receive a category 1 product card.** The results reveal a total Global Warming Potential (GWP) of 40 kg CO₂ equivalent per square meter and an Environmental Cost Indicator (ECI) of 4.54 €. These results can be compared with alternative facade cladding materials as shown in Figure 1 and 2.

GWP Scores Common Building Materials Compared to Pretty Plastic



Figure 1: Comparison of ECI scores based on LCA First One (Pretty Plastic)

GWP Scores Common Building Materials Compared to Pretty Plastic



Figure 2: Comparison of GWP scores based on LCA First One (Pretty Plastic)

The CTI was conducted on the First One tile, using a similar scope and data as applied in the LCA. This assessment yields different insights, including the material circularity score, which represents the weighted average of % circular inflow and % circular outflow at the business level selected for this assessment. **The circularity score stands at**

an impressive 98.21%, primarily attributed to the non-virgin inflow and the circular outflow, as these materials can indeed be recovered. Consequently, the percentage of 'lost potential' is minimal and only pertains to a few materials that cannot be demonstrably recovered.

% circularity 98.21%

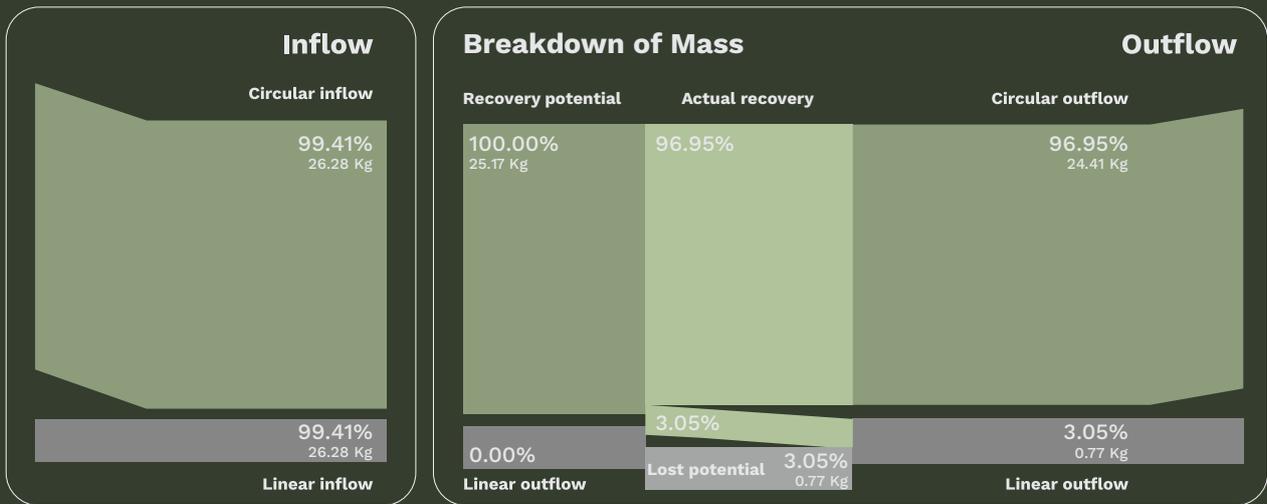


Figure 3: CTI result First One (Pretty Plastic)

Our Perspective on Sustainability and Circularity

Understanding the differences between sustainability and circularity is essential for Pretty Plastic's mission. Combining both perspectives is challenging but vital for creating eco-friendly solutions. **However, the indicators used for sustainability and circularity have limitations, requiring multiple indicators for a complete assessment.**

For example, **the LCA focuses on short-term benefits, instead of long-term environmental impacts. LCA doesn't always determine which product or process performs best, and it may not fully represent their circularity.** The Environmental Cost from the Environmental Product Declaration (EPD) helps compare products but doesn't detail various environmental impacts. **The CTI optimizes resource use but doesn't assess environmental and social impacts** In some cases these two indicators may conflict.

Pretty Plastic's circular efforts aim to maximize PVC recycling but may not align with LCA and EPD. These indicators can't fully consider the benefits of recycling PVC, limiting their assessment of long-term material recovery benefits. LCA and EPD results highlight areas for improvement in our production process, guiding our journey towards greater circularity and sustainability. **Our approach is aimed at reducing waste, and therefore maximizing material utilization within each tile. However, it's worth noting that the LCA primarily emphasizes minimizing material usage, which is one of the reasons why our product received a less favorable rating in this particular aspect of the LCA.**

LCA can be interpreted in light of the trade-offs between indicators for sustainability and circularity. Pretty Plastic's circularity efforts are evident in our ambition to maximize PVC recycling to prevent disposal in landfills or incineration, potentially resulting in high CTI scores that demonstrate our commitment to circularity. On the other hand, efforts to maximize material recovery and reduce waste through specific design choices may lead to non-optimal LCA and EPD scores, as these indicators may not fully account for the benefits of recycling PVC compared to landfills or incineration, particularly concerning long-term benefits of material recovery.

Therefore, LCA and EPD results do not provide a complete characterization of our tiles; instead, they highlight areas for improvement in our production process, enabling us to become more circular and sustainable. Our commitment to continually seeking ways to enhance our products and achieve optimal environmental performance is reflected in our Second High and Basic Third Tiles, designed to significantly reduce the number of tiles per square meter compared to the First One while maintaining full material recovery.

