



TemperPack

GREENCELLFOAM™



GREEN CELL FOAM AND GREEN CELL PLUS SUMMARY

# Environmental Product Declaration

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It's about  
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## Understanding the Environmental Footprint of Green Cell Foam: A Look at TemperPack's EPD

Sustainable packaging isn't just about good intentions. It's about measurable impact. That's why TemperPack completed an Environmental Product Declaration (EPD) for Green Cell Foam and Green Cell Plus. This third-party verified document provides a transparent, science-based snapshot of the environmental footprint of these products from raw material sourcing through end-of-life.

**But what exactly is an EPD, and why does it matter?**



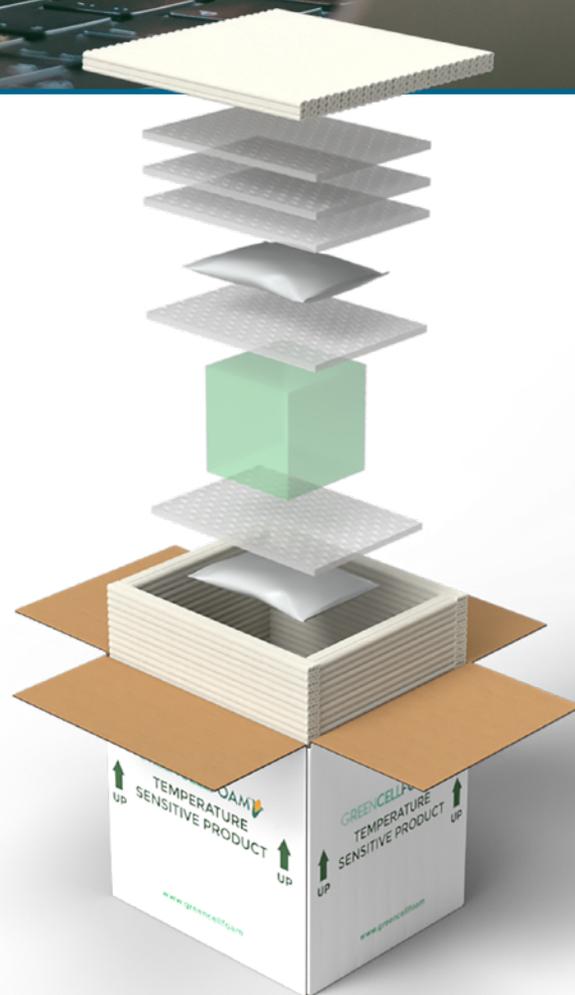
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## How Environmental Product Declarations Help Understand Impact

An Environmental Product Declaration is like a nutrition label for a product's environmental impact. Based on internationally recognized standards (like ISO 14025), an EPD details a product's life cycle assessment (LCA), quantifying how much energy it uses, how much waste it creates, and how much carbon it emits throughout its lifespan—from raw materials to disposal.

It's important to understand that an EPD is not a head-to-head comparison against other materials, like expanded polystyrene (EPS). Instead, it's a rigorous baseline that gives us the data we need to understand our own impact and to chart a course toward reducing it.





## Why Did TemperPack Create an EPD?

Green Cell Foam was designed to disrupt the dominance of EPS in cold chain and protective packaging. While it has long been praised for its compostability and renewable base materials, until now, there wasn't a fully transparent, data-backed summary of its environmental profile.

### The EPD provides us with:

- A clear baseline to measure future improvements.
- Independent verification of sustainability claims.
- The foundation for future product development and customer education.

### The EPD covers two packaging types:

- **Green Cell Foam:** A compostable insulation foam made from corn starch, cut into custom panels and designed to protect and insulate perishable shipments.
- **Green Cell Plus:** A version of the same foam encapsulated in a recyclable low-density polyethylene (LDPE) film to reduce deterioration from condensation in high-moisture environments.



The analysis was based on units produced at TemperPack's facilities during a 12-month period. WAP Sustainability Consulting guided us through the EPD process and used SimaPro modeling software to quantify the environmental analysis of the products.

### Understanding the “Declared Unit”

A key component of any EPD is the “declared unit,” which ensures a consistent basis for measuring impacts. For this study, the declared unit was an 11” x 9” x 10” cooler, consisting of 1.5” Green Cell insulation panels and a cardboard box. This makes the results practical and relatable—particularly for customers who purchase these units to ship food, vaccines, biologics, and other perishable items. The declared unit excludes gel packs and coolants, as these components vary by application.





## Where the Impact Starts and Stops: The System Boundary

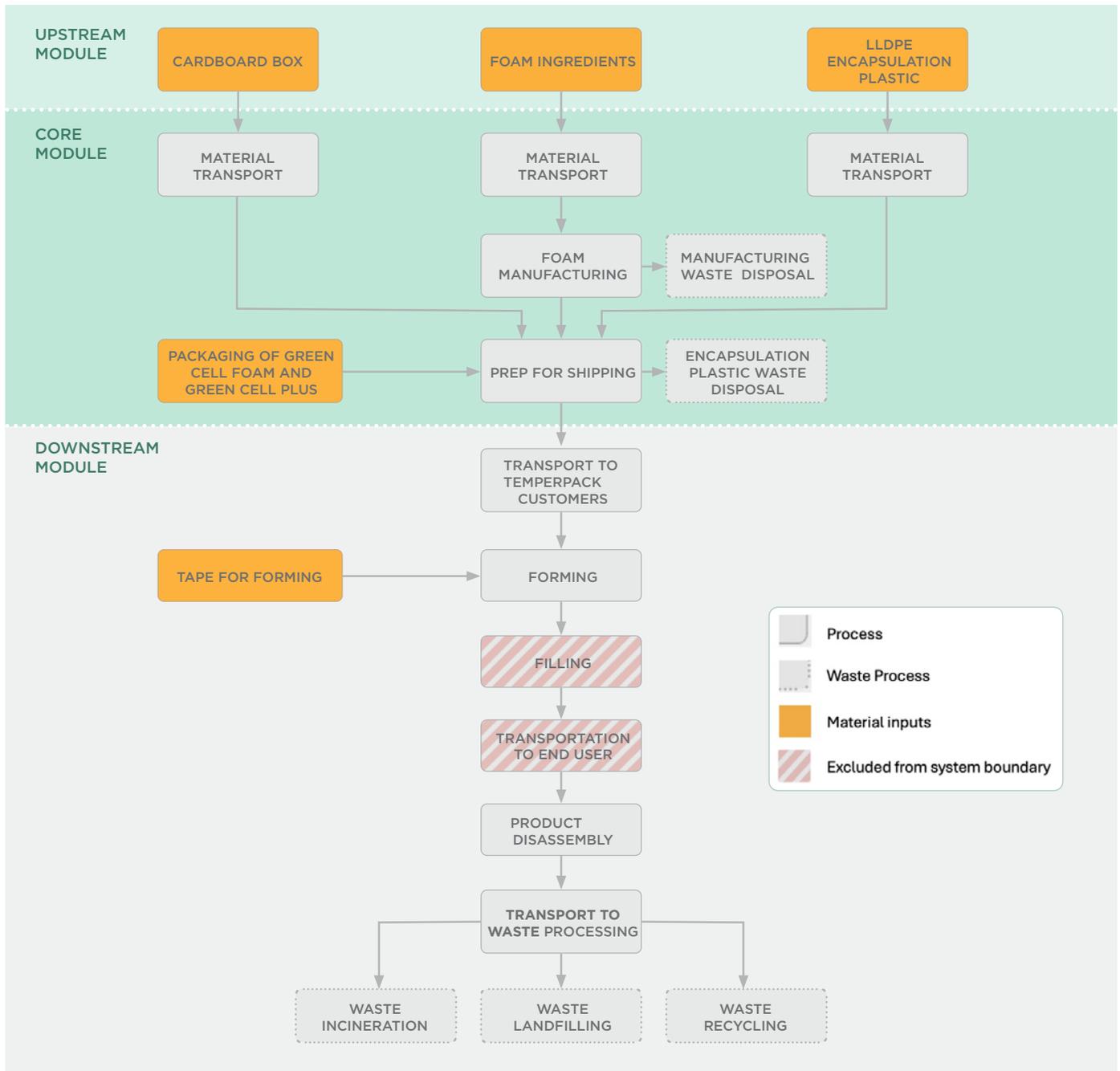
The system boundary chart below outlines which parts of the product's life cycle were incorporated in the environmental analysis. Raw material sourcing through manufacturing, packaging assembly, transportation to customers, and end-of-life disposal phases were included. It excludes what happens after the box is filled (like shipping it to the end user or reusing the packaging) since those steps vary widely depending on the customer. This approach, called "cradle-to-gate with options," gives a clear and standardized picture of the environmental impact of Green Cell Foam and Green Cell Plus up to the point where customers put them to use, allowing for meaningful, data-backed insights while setting a baseline for future improvements.

Upstream		Core			Downstream					
Product Stage			Forming Stage		Use Stage			End of Life Stage		
A1	A2	A3	A4	A5	B1	B2	B3	C1	C2	C3
Raw Material Supply	Transport	Manufacturing	Transport to forming or filling	Forming	Filling operation	Distribution of filled packaging	Transport to Reconditioning	Deconstruction	Transport	Waste Processing
X	X	X	X	X	ND	ND	ND	X	X	X



# From Raw Materials to Disposal: Mapping the Life of Green Cell Foam

This process system diagram helps make the full life cycle more transparent, showing not just where environmental impacts are measured, but how each part of the process is interconnected. It also clarifies the paths taken by different materials (like foam, cardboard, and plastic film), from creation to end-of-life. We used primary data from our manufacturing sites to model energy consumption and emissions in the core manufacturing module.





## Key Findings: What the EPD Told Us About Green Cell Foam's Impact

**Green Cell Foam and Green Cell Plus performed well in several environmental categories, particularly around fossil fuel use and carbon emissions. Some highlights:**

- **Lower Total Carbon Footprint:** Green Cell Foam's total climate change impact came in at 0.306 kg CO<sub>2</sub>e per unit, while Green Cell Plus was slightly at 0.45 kg CO<sub>2</sub>e. The encapsulation of Green Cell Plus increases its total footprint.
- **Biogenic carbon.** The amount of carbon that is sequestered by the corn as it is growing nearly offsets the emissions of the product.
- **End-of-Life Matters:** Disposal methods make a difference. Industrial/municipal composting reduced CO<sub>2</sub>e by 9% compared to landfill. Dissolving the foam with water at home resulted in a 21% reduction compared to landfilling.
- **Water and Waste:** Each unit of Green Cell Foam required around 1.86 m<sup>3</sup> of water and produced approximately 0.49 kg of non-hazardous waste. These metrics provide TemperPack with a way to monitor and reduce impact over time.
- **Zero Toxic Additives:** Green Cell Foam contains no heavy metals, ozone-depleting substances, or food allergens. It is compliant with RoHS and California Prop 65.





## What We Learned

**This study wasn't just a checkbox—it was an educational process that revealed key areas for growth and innovation. Here are three insights we took away:**

- **Disposal Drives Impact:** The end-of-life phase was a major contributor to the total carbon footprint, especially for Green Cell Plus. Home dissolution eliminates the transportation required for municipal composting, resulting in a 9% CO<sub>2</sub>e reduction through composting and a 21% reduction through water dissolution, both compared to landfilling.
- **Material Choices Matter:** The addition of even a small amount of plastic (as in Green Cell Plus) significantly increases fossil fuel use and carbon emissions. This insight supports continued investment in plastic-free solutions wherever feasible.
- **Data Leads to Action:** Having a clear, verified environmental baseline gives us the ability to track improvement over time, guide R&D decisions, and communicate credibly with partners.

## Looking Ahead

**Sustainability is not a static destination—it's a journey.** With this EPD, we have taken a meaningful step toward making that journey more transparent, measurable, and accountable. As customers across life sciences, food, pet, and others seek to reduce their environmental impact, packaging is often the first and most visible opportunity to act.

Green Cell Foam continues to lead the way in offering a solution that's renewable, compostable, and now scientifically validated through end-of-life.

