



**Cascades Specialty Products Group**  
Consumer product packaging

## **LIFE CYCLE ANALYSIS OF VARIOUS FOOD TRAYS**

**From perception to reality, the scientific approach!**



**Recycled. Compostable. Renewable. Re-useable.  
Energy efficient. Recyclable. Biodegradable.  
Environmentally responsible. Lighter. CFC-free.  
Eco-designed. Natural...**

**The proliferation of environmental options and associated claims are as numerous as they are unclear.**

## **LCA: It's A Must!**

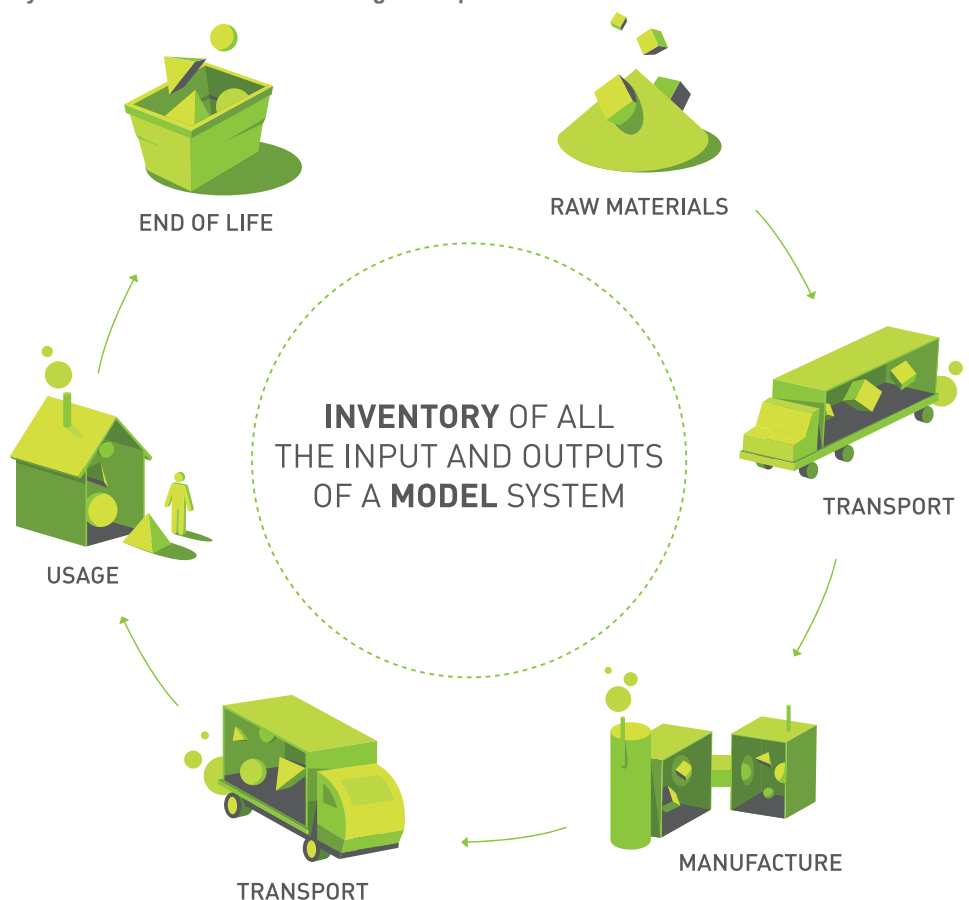
We are entitled to wonder whether these fashionable characteristics really reduce the environmental impacts of our packaging. Cascades is well positioned to answer this question, since we offer a wide range of packaging options, each with their own pros and cons.

Of all the products that we offer, which really are the best choices for the environment? Our corn-based plastic, which is both renewable and compostable, but could contaminate the recycling streams? Our moulded pulp, which is recycled and recyclable, but requires a lot of energy to make? Our polystyrene foam, which is CFC-free and light as air, but not recycled? It is a difficult question that we have decided to tackle using a Life Cycle Analysis (LCA) and for which we have contracted the CIRAIG, a university centre specialized in this matter.

The LCA is the ideal tool to quantify the environmental footprint of products, fulfilling the same function. It considers their impact in different damage categories, such as human health and climate changes.

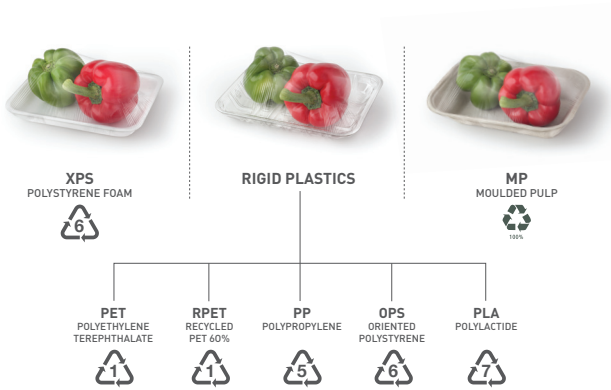
## **From raw material extraction to the end of life**

A products life cycle is summarised in the following six steps



# The analyzed products - Unbiased

Our factories use seven different materials to manufacture food packaging, for food processors and grocers. The analysed products are standard size food containers, used for packing vegetables. As we use all these materials, we have no bias for one option or another.



We studied the impact of these trays on the six following categories:

- Human Health  
Increased illnesses and reduced quality of life
- Ecosystems  
Loss of biodiversity and land use
- Climate Change  
Emissions of greenhouse gases and global warming
- Non-renewable Resources Depletion  
Mineral extraction and use of non-renewable energy
- Aquatic Acidification  
Acid rain impacts on aquatic flora and fauna
- Aquatic Eutrophication  
Proliferation of marine algae

## The Results

### Let's be Wise: Reduce!

The results of this analysis demonstrate that the manufacturing part of our containers (raw materials and forming trays) has much more impact than their end of life (disposal, recycling, composting, etc.). Therefore, the trays that use less resources for their manufacturing are generally the most environmentally friendly. It is therefore more environmental to reduce our use of resources, than to simply stake everything on an alternative end of life than landfilling.

The environmental impact of manufacturing also varies, depending on the type of energy supply. For example, renewable energy such as hydropower has significantly less impact on our environment than energy based on coal.

So the place of production of raw materials and finished products have a significant incidence on the environmental impacts and more specifically on climate change.

The following table summarizes the relative impacts of the analysed products in the six damage categories.

	XPS POLYSTYRENE FOAM	OPS ORIENTED POLYSTYRENE	PET POLYETHYLENE TEREPHTHALATE	RPET RECYCLED PET	PLA POLYLACTIDE	PP POLYPROPYLENE	MP MOULDED PULP
<b>HUMAN HEALTH</b>	13 %	32 %	85 %	48 %	100 %	62 %	7 %
<b>ECOSYSTEMS</b>	5 %	15 %	26 %	20 %	100 %	29 %	10 %
<b>CLIMATE CHANGE</b>	26 %	72 %	85 %	65 %	100 %	88 %	34 %
<b>RESOURCE DEPLETION</b>	33 %	82 %	100 %	72 %	87 %	84 %	27 %
<b>AQUATIC ACIDIFICATION</b>	19 %	44 %	52 %	39 %	100 %	90 %	10 %
<b>AQUATIC EUTROPHICATION</b>	18 %	23 %	59 %	36 %	100 %	71 %	26 %

LEGEND

- BEST
- MIDDLE
- WORST

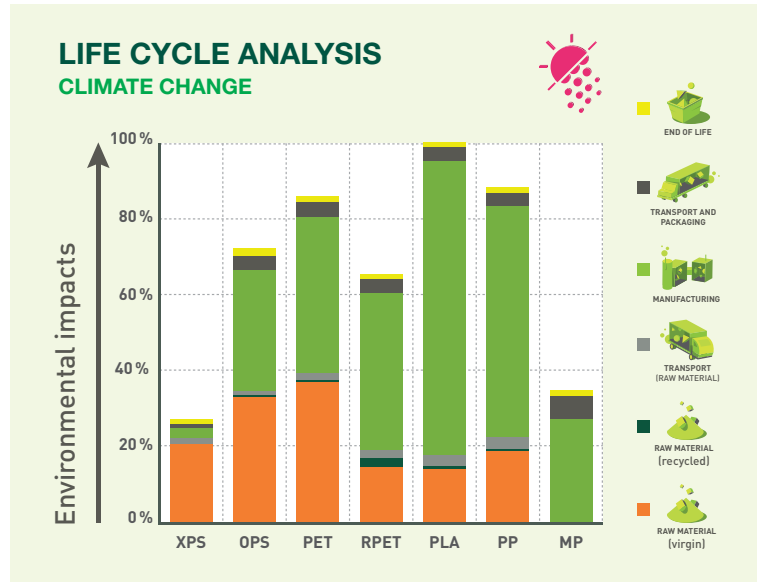
## So, then what?

Reduce the use of raw materials! Increase the use of recycled materials! Optimize the production process! These are the avenues we must pursue, so to reduce our energy consumption, in order to diminish significantly the environmental impacts of our packaging. The end of life, as defined by the boundaries of a LCA, has a relatively very little impact on the product's total life cycle.

Consequently, Polystyrene Foam, comprised of more than 90% of air, offers an undeniable ecological advantage, despite the fact that it is somewhat recycled.

Thanks to the use of recycled raw materials in RPET and moulded pulp trays, enable environmental benefits, by reducing the impact caused by the extraction of new raw materials.

Surprisingly, within the frame work of this study, the containers made from PLA, a compostable plastic made from industrial corn, turn out to be the least favourable environmental choice. Indeed, when the entire life cycle is taken in consideration.



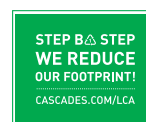
## Packaging: the Nasty One, really? Did you know that...

- A round trip Montreal - Miami by plane for a family of 3 generates as much CO<sub>2</sub> equivalent than all the polystyrene trays used by the family in 80 years?
- A 500g Quebec pork cut, packed in a polystyrene tray produces 40 times more CO<sub>2</sub> equivalent than the tray itself?
- To drive 50 km by car emits more CO<sub>2</sub> equivalent than all the polystyrene trays that you will use in a year?
- Using a BBQ for a minute produces more CO<sub>2</sub> equivalent than a polystyrene tray?

In light of these examples, it is clear that packaging made of polystyrene foam is far from being the "Nasty One" portrayed by popular belief.

## And Now?

Since this analysis was performed, we have improved our manufacturing process by integrating upstream with an RPET extrusion line at our Cascades Inopak plant in Drummondville, Quebec, Canada. We also work continuously to enhance the recycled content of our RPET. Preliminary results indicate that the environmental impacts of RPET with a high degree of recycled content could be compared to those of Expanded Polystyrene Foam and moulded pulp.



**THE END  
OF MYTH!**  
CASCADDES.COM/LCA



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