DILLEWIJN ZWAPAK
packaging is our passion

How will Dillewijn Zwapak handle the new environmental requirements?

Many clients ask about the environmental impact of our products and processes. And the group of clients asking critical questions is getting bigger and bigger. We are pleased about that! Most of the questions are about carbon emissions, or the carbon footprint. CO^2 is the most common 'greenhouse gas' and its increase in the atmosphere significantly contributes to global warming. Furthermore, more and more questions are being asked about possible alternatives for traditional plastic (PP) packaging, recyclability and the sources of materials. It's about more than just CO^2.

LCA (Life Cycle Assessment)

Dillewijn Zwapak currently charts the so-called Eco-cost for (almost) all its products with LCA calculations. The calculation method for this Eco-cost was developed by Delft University of Technology, the Netherlands. This method uses sources that are publicly verifiable and in which the data is collected and stored via a standardised method (ISO 14040). Calculating and keeping track of the Eco-cost is quite a secure business, which we expect to work on until the end of 2019.

What exactly is *Eco-cost*?

The Eco-cost is a calculation unit for the costs that should be made to prevent the environmental effects of a product, so that we can keep our planet healthy and habitable for future generations. In doing so, we look at many different types of effects that are summed up in four dimensions:

1. **Human Health.** The direct (negative) impact on people's health, like e.g. particulate emissions.
2. **Exo-Toxicity.** The direct (negative) impact on the living environment like e.g. the acidification of agricultural land due to overfertilization.
3. **Resource Depletion.** The direct (negative) impact of resources being non-renewable and thus depletable, such as the use of fossil fuels.
4. **Greenhouse gasses / Carbon Footprint.** The impact of the total greenhouse gases on the environment, of which CO^2 is the most important.

The Eco-cost of a product is expressed in money (€). To make it easy to add up to a product's market price. This allows for the total cost (market price + eco-cost) of different products to be compared. The calculations have a final accuracy of around 80%.

Cradle-to-gate vs. Cradle-to-cradle

In the calculation that Dillewijn Zwapak makes for its products, we apply a so-called cradle-to-gate approach. That means from the source of the materials, the processing to make the product and the transport up until the point that it leaves our warehouse. Our products then have a long way to go. This route often goes via the consumer and where possible, back to the source as new materials (cradle-to-cradle). This last component is not easy to calculate, as it differs per client, region, country etc.

Indications

Though we still have a considerable challenge of charting the entire product range, we took a standard blank cover as our point of reference to get a general idea.

Starting principles: Cradle-to-gate, 1,000 sleeves, unprinted size 40x25x10 cm, reference date mid-2018, market prices are indicative:

Cost comparison in €	**Sleeve 40x25x10 cm per 1,000 pieces**				
Type of material	**PP**	**PE**	**PLA**	**Paper**	**Paper FSC®**
Market price	10.00	15.00	30.00	45.00	50.00
Human health	0.01	0.06	0.08	0.01	0.01
Exo-toxicity	0.41	0.50	1.50	0.11	0.08
Resource depletion	4.67	4.93	0.01	0.24	0.18
Carbon footprint	1.58	1.67	3.13	2.77	0.30
Total Eco-cost	**6.67**	**7.17**	**4.72**	**3.12**	**0.56**
Total cost	**16.67**	**22.17**	**34.72**	**48.12**	**50.56**

Comments on indications (cradle-to-gate):

- We see that plastics PP (Polypropylene) and PE (Polyethylene) have the lowest market price but the highest Eco-cost. The high Eco-cost is mainly due to the dimension of Resource depletion. This is because the plastics are made from non-renewable oil products.
- PLA is almost always made of plant-based starch, from e.g. corn or potatoes. PLA has about a 30% lower Eco-cost than plastics. Though PLA does score a lot better in the dimension of Resource depletion, the Eco-cost is high in the dimensions of Eco-toxicity and Carbon footprint. That is because a relatively high amount of fertiliser is used to grow the crops and because a relatively high amount of energy is required to make transparent foil out of starch.
- Paper scores the best Eco-cost. This does make for a higher market price, but it surpasses all the alternatives in the Eco-cost aspect. The difference between regular paper and FSC® paper lies in the lower CO^2 impact for FSC paper. In that system, a tree is planted before another can be chopped down for wood production, making the CO^2 effect close to zero.

Important to add to that is that almost all countries have effective collection and recycling structures in place for

paper. Thus, the gate-to-cradle route (recycling) will score very high. This is not even accounted for in the calculation.

Facts, fictions and FAQ

PLA

Here and there, PLA appears to be on the rise. Previously, we were able to see that the Eco-cost of PLA is 30% lower than for traditional plastics, but PLA is more expensive.
PLA is almost always what they call Industrial Compostable. It needs up to 12 weeks in 60°C to biodegrade. This is done in special composting plants. Regular organic waste takes only one to two weeks.

The required composting time is not met in any of the current plants, which means that the PLA comes out of the plant as plastic, thus contaminating the produced compost. PLA really needs a temperature of 60°C to biodegrade, so it cannot be composted in your backyard either.

When PLA does biodegrade, it disintegrates into CO^2 and water, meaning that it does not generate any useable biomass.

So, do we dispose of PLA along with plastic waste? Unfortunately, that is not a good idea. PLA negatively affects the recyclability among mixed plastic waste. Currently, the best option is to dispose of PLA along with your regular waste so that some energy can be reclaimed when it is burned.

So the advantage of PLA lies only in the first half of the cycle, as its (estimated) Eco-cost is even higher than for traditional plastic if it ends up in the wrong waste stream!

Also see: https://www.milieucentraal.nl/minder-afval/welk-afval-waar/bioplastic/

Materials, process and transport/distribution

Generally speaking, we can say that all our products consist of resources (materials) that are processed, e.g. printed or reshaped (process). These products are transported from point A to point B. These steps also form the foundation for the LCA calculations. We have now calculated hundreds of different products. We almost always see that the materials component is the highest component in the Eco-cost.
This component almost always accounts for 50% - 80%.

The Eco-cost of the process is usually between 10% - 40%.
The transport/distribution step rarely amounts to more than 5% and never exceeds 10%. It barely matters whether the products come from nearby or from the other side of the globe in the proportions listed above, as long as they are not transported by plane. If we were to transport our products by plane, then the Eco-cost values would be much, much higher in this step.

The moral of the story: most (quick) profit can be gained by saving on materials.

Packaging vs. end product

To indicate the share of packaging in the Eco-cost of the product to be packaged, internally we have already used limited data to take an initial look at the future.
We estimate that for e.g. a bucket with 10 bunches of roses with 10 flowers each from Africa, the packaging material (covers, buckets and transport box) accounts for about 10%. That means that 90% comes from the product itself - flowers. This does not in any way relieve us of our duty to bring down our Eco-cost.

Tips

To contribute to a lower Eco-cost, we have these rules to follow:

- Where possible, use packaging made from recycled materials.
- Use fewer materials (thinner, lighter, smaller, etc...)
- Preferably use materials for which there is a recycling infrastructure in the area where the product will be used by the consumer. Properly communicate the product's recyclability.
- Avoid combined materials, because separating the materials presents a threshold to consumers, leading to lower recyclability.
- NEAR FUTURE: Compensate the CO^2 footprint by means of one of the available compensation programmes.