Bio-based plastics
Case study
Novamont S.p.A.

Novamont S.p.A. is an Italian company specialized in developing materials and biochemicals through the integration of chemistry and agriculture, by starting up third-generation biorefineries. Novamont produce bio-based plastic resins under the trademark of Mater-Bi® based on renewable starch resources and biorefinery products. Novamont has decided to use the LCA to go tool in order to assess the environmental advantages associated to the improvement of organic waste collection system: once a week with dedicated (specifically designed for waste collection) and non-dedicated bags (re-used Mater-Bi ® bags for fruit and vegetables) vs collection twice a week with a dedicated bag (base scenario). The scenario "once a week" is achievable thanks to the use of an aerated system (i.e. bin with fissures plus a thin biodegradable bin liner) that allows to water vapour to go out. In this way less bad smells and less H_2O percolation occurred and the collection frequency can be reduced by 2 times per week up to once per week.

Because of their interest on such analysis, Novamont decided to join the training and case study programme of LCA to go with the support of ITENE. The main driver to join this training was basically their interest on further learning on the behaviour of Mater-Bi® bio-based bags for waste collection uses, as a part of the product development & improvement strategy. The LCA to go tool was used in order to estimate the impacts of such bags when thinner Mater-Bi® bags are used while, the collection frequency is reduced from twice a week to once a week. Thinner Mater-Bi® bags along with a bin with fissures, allowed more aeration of the waste, so up to 10% wt. of organic waste is reduced as a result of the aeration. This allow a minimization of odours and percolation (liquid residue) of organic waste. The systems analysed are summarized in the table below.

	Base scenario	Improved scenario 1	Improved scenario 2 (at 50% allocation)
Type of bag	Dedicated	Dedicated	Non-dedicated
Organic waste system storage	Non-aerated	Aerated	Aerated
Collection type	Door-to-door	Door-to-door	Door-to-door
Collection frequency	Twice a week	Once a week	Once a week

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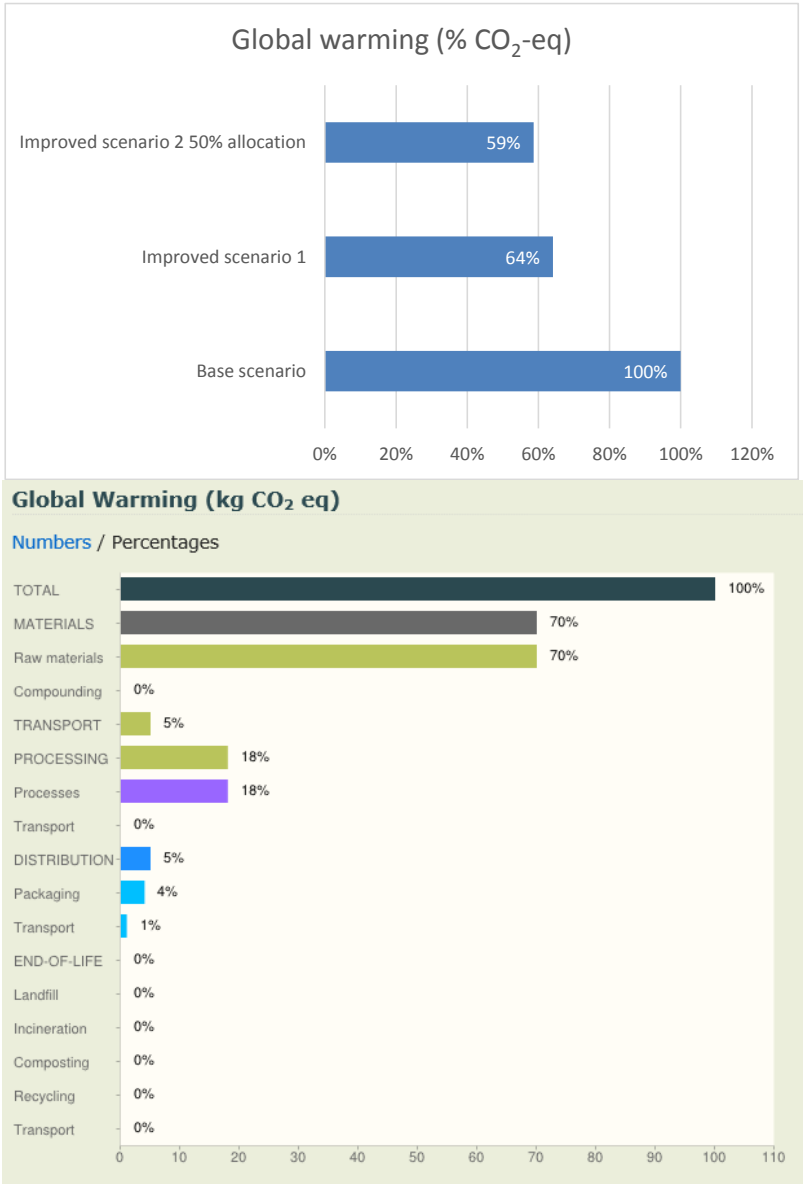

Figure 1 Environmental profile of the bag production of thinner Mater-Bi ® bags. Results shown per 500 units of bags

Based on the analyses carried out with the bio-based plastics LCA to go tool, it was estimated that the overall impact of the bags and transport for waste collection can be diminished from 36% up to 41% with the alternative of aerated scenarios with collection once a week in terms of Global Warming. In case of Cumulative Energy Demand (CED) such reduction is in the range from 34% to 45%. Results shows that changes in the thickness of the bags definitely allows to minimize the impacts of waste collection, when combined with changes in the collection frequency.

The re-use of a non-dedicated biodegradable bag (e.g. fruit and vegetables biodegradable bags distributed in some GDOs), further improves the efficiency of the organic waste collection since less raw materials are used).

Francesco Razza, Environmental Sustainability Manager at Novamont said: *"LCA to go is a powerful way to estimate quickly and easily different product alternatives. We think that this can be integrated in our corporate product development procedures for the improvement of bio-based products."*

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