

Avoiding Greenhouse Gas Emissions The Essential Role of Chemicals



100% Bio-based Polyethylene Terephthalate (PET)

A Toray case study

TORAY

In shifting towards a low carbon and oil independent society, plastic products from non-petroleum based feedstocks are desired, while innovation in petroleum usage as energy sources has been progressing. Toray's solution is the 100% bio based polyethylene terephthalate (PET) for materials of polyester fibers, which are one of the most widely-used textiles in the world.

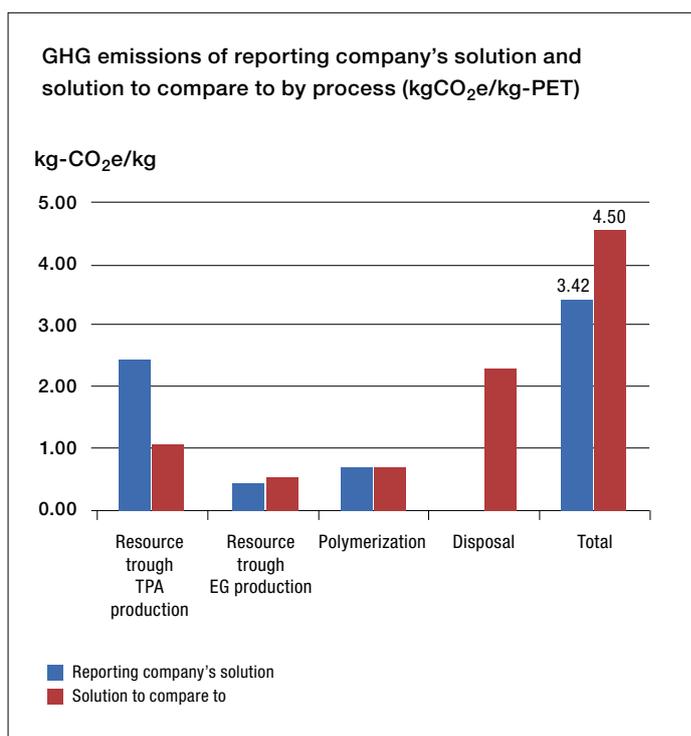
The study compares the lifecycle GHG emissions of one kilogram of two alternative kinds of PET as the material to make polyester textile products. Toray's solution is a 100% bio based PET, while the reference solution to compare to is the conventional petroleum based PET.

In the base case calculation, the feedstock for the raw materials of the reporting company's solution are: sugarcane in Brazil and India, and corn in the USA. While the raw materials of the solution to compare to are from petroleum.

The avoided emissions in the base case amount to 1.08 kgCO₂e/kg of PET. The carbon neutrality of bio based carbon in incineration of the disposal stage contributes to the reduction of emissions.

The possible impact of the land use change due to bio-based feedstocks has been estimated at 15.1 m² of cropland during a year to produce the bio based feedstock for 1kg of PET.

Full study available at: www.icca-chem.org/energy-climate



	Reporting company's solution	Solution to compare to
Resource through TPA production	2.39	1.04
Resource through EG production	0.37	0.50
Polymerization	0.67	0.67
Disposal	0	2.29
Total	3.42	4.50



This case study illustrates how the reduction of greenhouse gas (GHG) emissions can be enabled by chemical products, as part of a series of case studies brought to you by ICCA. Chemical industry members offered Life Cycle Assessment [LCA] case studies for the purpose of showing illustrative examples on how to calculate avoided greenhouse gas emissions. The avoided emission calculations were based on the guidelines developed by ICCA and WBSCD (World Business Council for Sustainable Development) - Chemical Sector, with the support of Arthur D. Little and Ecofys. Other life cycle environmental impacts such as water and land use change were outside the scope and usually not considered.

