



## **SUSTAINABILITY**

Technologies and actions for recycling in a view of circular economy.

# 05



# REDRESSING THE BALANCE

Plastics packaging has been coming in for a hard time from parts of the general public in recent times. We are all now highly aware of the damage that is being done to the planet because of the irresponsible disposal of used (and sometimes unused) plastics packaging. It ends up on our streets, in our fields and rivers, and ultimately in the oceans. Microplastics, the result in part of degradation of plastics in the environment over years, are turning up literally everywhere. And a lot of the blame is being put on the plastics industry. Among justified calls for increased re-use,

recovery and recycling of plastics packaging, there are also moves to cut back on plastics packaging all together, and replace it with more traditional materials – paper, card, glass and metals. After years of the pendulum swinging in plastics’ favor, it now looks like it could start swinging the other way. That could be a big mistake. If we do turn back the clock, the planet could be the loser. Plastics in general and PET in particular, when produced and used responsibly, are most often the Number One option in consumer packaging on sustainability grounds.

## Plastics beat glass and metal in many ways

The fundamental advantages in terms of environmental impact for plastics packaging over alternatives are quite clear. For example, far less energy is required to produce units of equal size than in aluminum or glass, far less water is consumed in their production, and far less carbon dioxide is produced in the process. Much-criticized single-use plastics (SUP) packaging, such as that used for fruit and vegetables, can reduce packaging weight in transit, thus cutting fuel emissions from trucks, and then goes on to improve hygiene and reduce food waste in stores.

Studies have also shown that if plastics packaging were to be replaced by other materials, the overall packaging consumption of packaging mass, energy and greenhouse gas (GHG) emissions would increase. In a study<sup>1</sup> commissioned by Plastics Europe several years ago, researchers concluded that “plastic products used on the market today enable significant savings of energy and greenhouse gas (...) the use of plastics for thermal insulation, for food packaging or to produce renewable energy results in extraordinary ‘use’-benefits.”



## Environmental costs are much lower

Three years ago, a study<sup>2</sup> prepared for the American Chemistry Council (ACC) found that the environmental cost of using plastics packaging for consumer goods is nearly four times less than it would be if plastics were replaced with alternative materials. The study is based on natural capital accounting methods, which measure and value environmental impacts, such as consumption of natural water and emissions to air, land and water. More recently, another ACC

study<sup>3</sup> concluded that replacing plastic with alternative materials in packaging applications would cause increases in energy use, water consumption and solid waste, as well as increase greenhouse gas emissions (GHG), acidification, eutrophication and ozone depletion. The report focused on six packaging categories: caps and closures, beverage containers, stretch and shrink film, carrier bags, other rigid packaging, and other flexible packaging



## End-of-life solutions

“The findings challenge common misperceptions around plastics and underscore that plastic is a versatile efficient material that is helping to solve some of our greatest environmental challenges,” says Steve Russell, vice president of plastics, American Chemistry Council. “However, we can’t realize its full benefits if we don’t work toward better end-of-life solutions. We all want

a world without plastic pollution, but we wouldn’t want a world without plastic.” In Europe, the European PET Bottle Platform is a voluntary industry initiative that provides PET bottle design guidelines for recycling, evaluates PET bottle packaging solutions and technologies and facilitates understanding of the effects of new PET bottle innovations on recycling processes. It points out

that PET is the most recycled plastic packaging material in Europe. 1923 million tonnes of PET bottles were collected for recycling in 2017, it says, noting that the PET resin recycling rate in 2017 was nearly 58.2%. That’s pretty good, but of course it could be better. In its partnership with recycling technology specialist Erema, SIPA is working to push the numbers higher.

# Integrating recycling with preform production

All the way from flake to XTREME Renew combines, in a single integrated plant, the Vacurema system from Erema – which produces a continuous, pre-dried, decontaminated, filtered, and IV-adjusted stream of PET melt, sourced from flakes derived from used PET bottles – with SIPA's XTREME revolutionary rotary injection-compression preform molding system. SIPA has carried out a life cycle assessment on its XTREME Renew process, so it can quantitatively compare its potential environmental impact in production of preforms from 100% recycle (rPET) with a traditional process for producing PET preforms from virgin material (using a SIPA XFORM injection molding system). The results were independently verified.

The LCA considered the contribution of the production of the raw material, transport of the raw material, production of the bottles, and construction of the plant. It showed that the global warming potential of XTREME Renew is 79% less – 0.74 kg of CO<sub>2</sub> equivalent for every kg of preforms produced, compared with 3.50 kg. Comparing the XTREME Renew process with a traditional process for producing PET bottles from rPET, which uses granules produced from flake, the difference was still important, at 18%.

XTREME Renew is already being used by major food and beverage company Suntory to reduce its reliance on virgin PET. The Japanese company plans to increase its use of the technology very soon. The hope is that other companies around the world will also make use of the benefits of XTREME Renew in the near future.

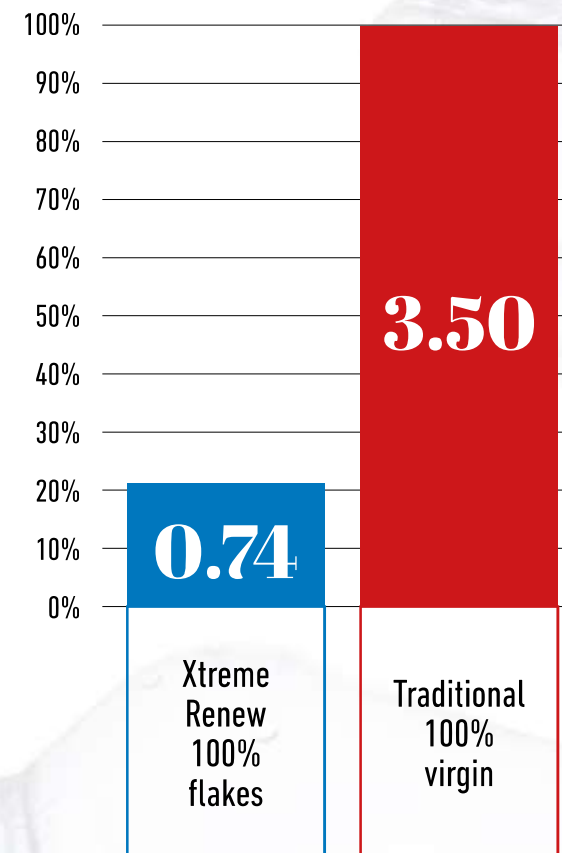
1. The impact of plastic packaging on life cycle energy consumption and greenhouse gas emissions in Europe; Bernd Brandt and Harald Pilz
2. Plastics and Sustainability: A Valuation of Environmental Benefits, Costs, and Opportunities for Continuous Improvement
3. Life Cycle Impacts of Plastic Packaging Compared to Substitutes in the United States and Canada: Theoretical Substitution Analysis

## COMPARISON 1

- Xtreme Renew, 100% rPET flakes
- Traditional preform injection system, 100% PET virgin PET granules

**-79%**

Xtreme Renew, 100% flakes  
Traditional injection 100% virgin



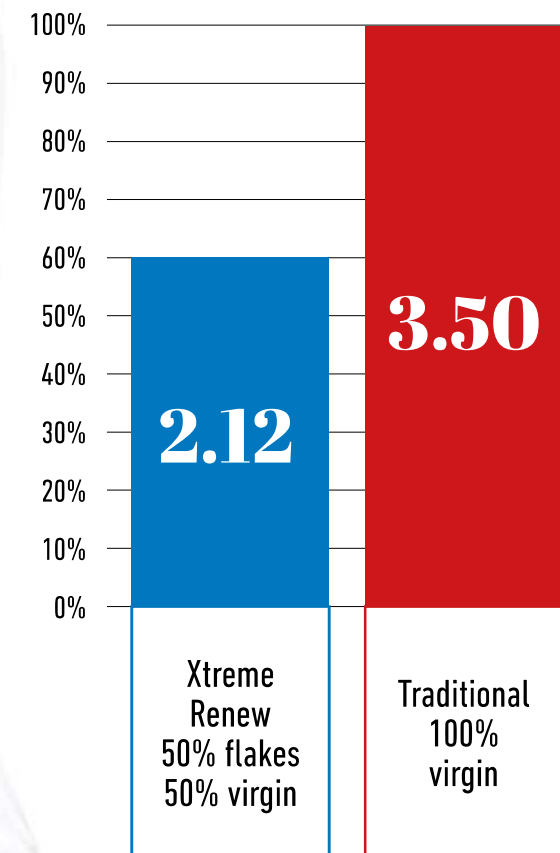
# XTREME RENEW

## COMPARISON 2

- Xtreme Renew, 50% rPET flakes + 50% PET virgin granules
- Traditional preform injection system, 100% PET virgin granules

**-40%**

Xtreme Renew, 50% flakes  
Traditional injection 100% virgin

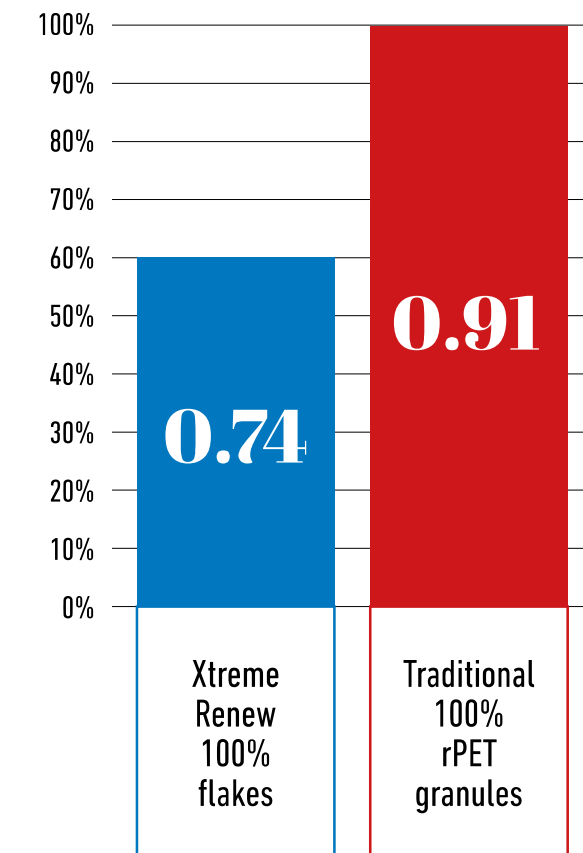


## COMPARISON 3

- Xtreme Renew, 50% rPET flakes + 50% PET virgin granules
- Traditional preform injection system, 100% PET virgin granules

**-18%**

Xtreme Renew, 100% flakes  
Traditional injection 100% rPET granules





# XTREME RENEW: THE NEW ERA OF THE CIRCULAR ECONOMY IS NOW A REALITY

**Simplification  
VS traditional R-PET  
production**

