

# Ecospan Introduction

## **Who We Are:**

Ecospan ([www.ecospan.com](http://www.ecospan.com)) is a leading bio-material science and technology company that produces a diverse range of bioplastic solutions for the material world that are derived from plants, not oil, under the trade name BioFlow™.

## **100% “Green” Solution:**

All of Ecospan’s proprietary BioFlow™ compounds, value-added materials, and finished products are made only from raw materials that meet the Biodegradable Products Institute (“BPI”) ([www.bpiworld.org](http://www.bpiworld.org)) and ASTM D6400 Standard Specification for Compostable Plastic indicating that such materials, unlike oil-based plastics, can be industrially composted at end-of-life.

BioFlow™ is an innovative new material made from plants, not oil that looks and performs like traditional oil-based plastics. Traditional plastics are unsustainable and result in significantly more fossil-fuel use and greenhouse gas emissions than bioplastics. Ecospan’s solutions represent an important step toward a more sustainable future – until end-of-life recovery systems (e.g., industrial composting networks, bioplastic recycling, etc.) develop and mature to accommodate the recent explosive growth of bioplastics, Ecospan is working with its customers to develop “cradle-to-cradle” “closed-loop” recovery systems whereby Ecospan (i) collects its products at the end of their useful life, (ii) regrinds the material back into feedstock pellets; (iii) reuses the pellets to create new products; and (iv) shares the resulting material cost savings with its customers.

Ecospan is “base-biopolymer-neutral,” meaning that Ecospan is capable of using different base biopolymers for its value-added solutions. However, due to availability and cost advantages vs. other biopolymers, Ecospan’s proprietary BioFlow™ solutions currently are developed using Ingeo™, a base biopolymer sourced from NatureWorks LLC. Ecospan blends Ingeo™ with other renewable, sustainable and compostable materials into its value-added engineered proprietary BioFlow™ compounds that are processed in a proprietary manner using traditional plastic manufacturing equipment to produce Ecospan’s Earth-friendly products.

## **3x Carbon Footprint Advantage vs. Oil-based Plastics:**

Based on peer-reviewed studies, the production of Natureworks’ Ingeo™ plant-based biopolymer consumes 65% less fossil fuels and emits 65% less greenhouse gases than the production of traditional oil-based polymers; in other words, using biopolymer feedstock (to create bioplastics) has a 3x carbon footprint advantage compared to using oil-based feedstock (to create oil-based plastics). Further improvements are being made to Ingeo™ and other base biopolymers which will result in further greenhouse gas reductions.

When presenting the removal of carbon footprint, an Environmental Benefits Calculator has been developed based on peer-reviewed eco-profiles. We would be happy to provide you with an analysis of the positive environmental impact your company would achieve by replacing a specific amount of traditional oil-based plastic with bioplastics derived using the base Ingeo™ biopolymer.

**Ecospan’s Bioplastic Processes and Select Products:**

Ecospan can make nearly any type of bioplastic products using any traditional oil-based plastic manufacturing process, including (i) calendaring; (i) injection-molding; (iii) film-blowing; (iv) thermoforming; and (v) non-woven applications (in R&D). Select products by process include:

- (i) **Calendared Sheet Material:** Debit / credit cards; point-of-purchase displays / signage, etc.
- (ii) **Injection:** Medical, packaging, automotive, consumer products, etc.
- (iii) **Film Blowing:** High quality retail shopping bags
- (iv) **Thermoforming:** Packaging, single-use food-service disposables, etc.
- (v) **Non-woven:** Diapers, hospital gowns, etc. (still in development by Ecospan)

**Comparison of Ecospan’s Bioplastics vs. Other Alternatives:**

As outlined in the following chart, Ecospan’s bioplastic solutions offer a superior alternative for the environment compared to the existing primary oil-based “plastic” alternatives available in the market today, namely oil-based compounds blended with degrading additives, hybrid oil-bio blends, and other traditional plastics.

Metric	Ecospan BioFlow™ (100% Bio)	"Bio-PVC", PETG (degrading additives)	Hybrids (Oil-Bio)	PVC, HDPE, PP, & PE (100% Oil)
<b>Sustainable</b>	Yes	No	Partial	No
<b>Renewable</b>	Yes	No	Partial	No
<b>Carbon Footprint Reduction</b>	65% less than oil-based plastics	Minor	Minor	None
<b>100% ASTM D6400 Materials</b>	Yes	No	No	No
<b>Dioxin Emissions *</b>	No	Yes	Yes	Yes
<b>Harmful Residue</b>	No	Yes	Yes	Yes
<b>Industrial Compostability</b>	Yes	No	No	No
<b>Biodegradable</b>	Yes	Partial	Partial	No

\* Dioxins are highly toxic even at low doses and are produced when plastics are manufactured and incinerated. While dioxin levels in the U.S. environment have been declining the last 30 years, they break down so slowly that some dioxins from past releases remain in environment for many years. EPA has concluded that dioxins have potential to produce an array of adverse health effects in humans, and estimates that the average American's risk of contracting cancer from dioxins is 1 in 1,000 representing a 1000x increase above government's current "acceptable" standard of 1 in one million.

As our “Ecospan” brand and tagline – “*Bridge to a Greener Future*” – indicate, we are committed to a better, more sustainable future, and welcome further discussions on how we can partner to realize our collective vision. Please contact us at [info@ecospan.com](mailto:info@ecospan.com) or (415) 925-6700 with any comments or questions.