



# Creating Sustainable Plastics

## Without Sacrificing Quality or Cost



Consumers want to feel good about the products they purchase. Part of that is sustainability—simply, they want to buy something green because it makes them feel like they are doing something good for the Earth. Over 70% of consumers have shown that they deeply care about whether a product they buy is sustainable. This paper aims to show how product designers and manufacturers can best meet the growing demand for more sustainable products without sacrificing quality or cost.

There are many ways to make plastic more sustainable –from using more renewable content and reclaiming and recycling material, to reducing energy needed for manufacturing and returning material to nature at the end of its life. Moreover, it is possible to make more sustainable plastics with unique physical performance and aesthetic qualities. In this piece, we will clearly communicate some of the ways companies can make more sustainable plastic products that are not just greener, but also perform better.



## Part 1: The Move Toward Sustainability

Green is the new mainstream. Though the scientific cause and effect of many environmental issues remains debated by some, what is undeniable is a growing consumer interest in environmentally friendly businesses and products. The demand for sustainable products is growing, and companies are capitalizing on the rising demand for environmentally friendly products. In 2012, the Accenture consulting agency conducted a survey of 250 senior executives in the U.K., U.S., Japan, Germany, France, China, Brazil, and India.<sup>1</sup> They found that the vast majority said sustainability was vital to future growth of their companies. Of those surveyed, 62% said their investments were motivated by customer expectation for sustainable products and were viewed as an opportunity to drive growth. “The good news is that companies now systematically see sustainability as being vital to their future growth and core to their business,” said Bruno Berthon, managing director of sustainability services at Accenture. “Sustainability has broken free from the realm of regulatory pressure and reputation management, and is now rising into a virtuous circle of commercial opportunity and investment growth.” More than one third of the study’s respondents said that they could not keep up with consumer demand for sustainable products.

A 2013 study conducted by the Association for Enterprise Opportunity titled, “The Big Green Opportunity,”<sup>2</sup> surveyed over 1,300 small businesses in the U.S. and found that according to respondents, the greener a product, the more likely its sales will increase, with 75% reporting an increase in green business from 2008-2011 even at a 19% price premium compared to traditional goods. 79% of the small businesses surveyed said that offering green products or services gave their business a competitive advantage. That competitive advantage is being fueled by the growth in consumer demand for more sustainable products. According to the author of the study, Denise Hamsler, “green segments today are growing far faster than their overall industries.”

## Part 2: How Consumers Understand Sustainability

The movement behind sustainability is consumer-driven. Consumers want to buy something “green.” Consumers want to know about the materials used in a product, how and where it is made, how far it travels and how it is packaged, but they may have varying criteria for what makes a product more sustainable. Successful companies are differentiating their products by clearly stating the environmental benefits of their product, whether it be using more renewable materials, using reclaimed or recycled materials, or materials that can be returned to nature when their useful life has ended.

There are a growing variety of more sustainable plastics. As demand continues to rise, so will the utilization of these materials in products and packaging. Sustainable feedstocks such as plant fibers, wood, and starches are increasingly being used in plastics; these alternative feedstocks are readily available and affordable and, with responsibility, can be accessed indefinitely. These sources can be used to replace petroleum-based feedstocks. In fact, many of these bioplastics possess benefits that traditional plastics do not (more on this in Part 3).

No single definition for sustainability exists. There are a number of characteristics that a product can possess—both independent of one another and together—that will determine a product’s sustainability.

To make things a bit simpler, we’re including some definitions here for you to keep in mind as you evaluate your own company sustainability goals.

**Bioplastics** are a family of materials with differing properties and applications. A material is defined as a bioplastic if it is either biobased, biodegradable or features both properties.

**Biobased** materials are made from organic (carbon based) materials that contain in whole or part biogenic (biological) carbon – replacing petrol/fossil

carbon with bio/renewable carbon.

In the United States the USDA Biopreferred Program certifies materials as biobased. Products made with certified biobased materials can receive preferential purchasing from Federal procurement agencies. The percentage of renewable material necessary to meet this requirement varies according to the product.

**Biocomposite** materials combine biomaterials like wood, starch, flax, jute, hemp, and other similar materials with traditional plastics. These materials are used to enhance physical characteristics while reducing the amount of non-renewable petroleum-based plastic.

**Biodegradable** is the ability of a material to undergo biodegradation, a chemical process during which micro-organisms that are available in the environment convert materials into natural substances such as water, carbon dioxide, and compost. The process of biodegradation depends on the surrounding environmental conditions.

**Compostable** products are defined by ASTM International standards 6400 and 6868. These standards require that the material biodegrades in a certain period of time and leaves no toxic residue in the soil.

The ASTM compostability standards are generally intended to apply to packaging, not durable products. It's important to note that using ASTM tested compostable materials may not mean that your product will meet these standards. This will depend on the size, volume and thickness of the product.

**Plastic recycling** is the process of recovering scrap or waste plastic and reprocessing the material into useful products, sometimes completely different from their original state. For instance, this could mean melting down soft drink bottles and then molding them as plastic chairs and tables. It is also important to note the difference between post-industrial and post-

consumer recycling. Post-industrial recycled material comes from scrap from the manufacturer. Post-consumer recycled material comes from the collection of used products or packaging.

**The carbon footprint** of products describes the sum of greenhouse gas emissions accumulated during the full life cycle of a product in a specified application. Greenhouse gases trap heat in the atmosphere and are considered to be a significant cause of global climate change.

**Toxicity** should also be considered in this discussion. Chemicals like bisphenol A and phthalates, key ingredients in some petroleum-based plastics, have been shown to disrupt the endocrine system, leading to developmental problems. Numerous studies have shown these toxins are becoming increasingly pervasive in our bodies and the environment. Increasing numbers of consumers are seeking plastic materials that are free from these chemicals.

The complex matrix of factors contributing to sustainability makes it important to define your sustainability objectives. Is your goal to make a product with more renewable materials? Is it to use more reclaimed and recycled materials? Is it to be able to return these materials back to nature? Or are you seeking a combination of environmental benefits? As you can see, the concept of sustainability is more complex than you may have thought. For this reason, it's important to define the sustainability goals for your product and choose a bioplastics partner that can provide materials to meet your specific needs.

Clearly stating what your product is made from, how and where it's made, and why it's better will help differentiate your product. When customers know why a product is more sustainable, they'll get behind it and feel good about their choice.

## Part 3: The Benefits of Sustainable Plastics

While 78% percent of consumers say they want to buy more sustainable products, only 43% will pay more. Consumers don't want to sacrifice quality or price for the items they buy. Imagine a consumer product made from the "perfect plastic," one that meets almost every sustainability criterion. The drawback, however, is that this perfect plastic product costs twice that of its traditional plastic counterpart. Consumers are far less likely to buy this perfect plastic product, simply because of the price. If a product does not appeal to consumers the environmental benefits will never be realized.

Take an electric car, for example. While electric cars can have a significant impact on emissions, most consumers choose not to pay the premium price. However, the higher fuel efficiency standards of modern gas powered autos have a far more significant impact on the environment. When millions of gas-powered cars run more efficiently and produce fewer emissions, the aggregated incremental improvement has a far greater positive impact on the environment. Similarly, improving the sustainability of the plastics products that we use everyday can have a significant environmental impact.

Replacing petroleum-based plastics with renewable, reclaimed or recycled materials can be the simplest way to lighten the environmental footprint of products. These materials can reduce the amount of non-renewable feedstocks while increasing the physical and aesthetic attributes of a product.

Biocomposites made from industrial byproducts like reclaimed wood fibers and recycled plastic can encourage manufacturers to reduce landfill waste. Using natural fibers and agricultural byproducts can increase crop values for farmers without competing with food crops. Using compostable materials can encourage consumers to return these products to nature when their useful life has ended, further reducing landfill waste, and in some cases, reduce the cost of disposing these materials.

Numerous physical benefits result from the inclusion of biomaterials in plastics as well, such as increased strength, stiffness and durability. Additionally, products made from biobased materials simply look and feel more natural. Using starch-based plastic can enhance products with a softer touch. These products can also be easily scented to provide further product differentiation. Wood and natural fibers can provide a natural look that is more aesthetically pleasing.



## Part 4: Meeting Your Sustainability Goals by Choosing the Right Bioplastics Partner

Choosing the best material for your product can be a difficult task. That's why working with the right bioplastics company is important. Many bioplastics companies can only offer one type of material that may or may not meet your needs. A company with a wide range of biocomposites, biobased, and compostable materials can provide you with options best matched to your sustainability goals.

The capacity to customize the formulations of these materials to meet your specific project requirement is also an important factor. Your bioplastics partner should have the resources and know-how to quickly develop these materials to meet the physical requirements of your product.

It's important to work with plastics professionals that have a deep understanding of how plastic products are made. Your bioplastics partner should have resources and technical expertise in plastic processing to provide assistance in tool making and manufacturing. This expertise can be particularly helpful in finding toolmakers and manufacturing partners to produce your project.

Choosing a bioplastics company that is committed to serving you throughout product development and manufacturing is crucial to the success of your project. Green Dot can meet these specific needs while remaining true to its mission of sustainability and environmentally-conscious products and practices.

## Part 5: The Future of Sustainable Plastics

Today bioplastics are less than 2% of the entire plastics market but consumers and retailers are already demanding more sustainable materials and this demand will only continue to increase. According to recent studies, demand for bioplastics is predicted to quadruple by 2018<sup>3</sup>. If manufacturers intend to stay competitive and meet this demand, they will need to make more sustainable products that don't sacrifice cost or quality.

We are at the dawn of a new era of plastics, one in which plastic products are made with a wide range of renewable, reclaimed or compostable materials. In our lifetime we may view traditional petroleum-based plastics as a dinosaur, akin to the steam locomotive, or using coal furnaces to heat our homes. Future generations may laugh at the idea of using precious non-renewable feedstocks to create disposable everyday products.

By introducing new innovative materials to manufacturers and consumers we can offer better choices for the products they need and use everyday. These materials will outperform traditional petroleum-based plastic. These incremental improvements will not solve all of our environmental challenges, but they can have a significant positive impact.

The right bioplastics partner can help you meet the growing demand for more sustainable plastic products, providing materials that are not only greener, but are also safer, perform better and last longer. Helping companies make products that allow consumers to contribute to a more sustainable world is what we do at Green Dot.

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<sup>1</sup>["Long-Term Growth, Short-Term Differentiation and Profits from Sustainable Products and Services – A global survey of business executives" Accenture 2012](#)

<sup>2</sup>["The Big Green Opportunity For Small Business in the U.S." Green America, Association for Enterprise Opportunity 2013](#)

<sup>3</sup>[http://www.plasteurope.com/news/BIOPLASTICS\\_t229991](http://www.plasteurope.com/news/BIOPLASTICS_t229991)



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