
Sustainable Packaging

CUNY Packaging Design

November 2021



© 2020 Business for Social Responsibility

Agenda

1. Introductions
2. What is sustainable packaging?
3. Design for sustainability
4. Let's talk soap

Introductions



Jonathan Morris

Associate Director

BSR, Paris

About BSR: Global Nonprofit Business Network

We are a global non-profit organization that works with our network of more than 250 member companies and other partners to build a just and sustainable world. From our offices in Asia, Europe and North America, we develop sustainable business strategies and solutions through consulting, research and cross-sectoral collaboration.

- Copenhagen
- Guangzhou
- Hong Kong
- New York
- Paris
- San Francisco
- Shanghai
- Tokyo



What is Sustainable Packaging?

- **It's a great question!** One that is not easy to answer, concisely anyway.
- **There is no consensus definition for sustainable packaging.** The notion depends on several variables including industry and geography, material relevance and innovation, technical constraints (cost and structural integrity), and the expectations of key stakeholders such as consumer, customers or regulators.

The most widely recognized definition is provided by the Sustainable Packaging Coalition (SPC) based on a set of eight principles. SPC says sustainable packaging:

1. Is beneficial, safe & healthy for individuals and communities throughout its life cycle
2. Meets market criteria for performance and cost
3. Is sourced, manufactured, transported, and recycled using renewable energy
4. Optimizes the use of renewable or recycled source materials
5. Is manufactured using clean production technologies and best practices
6. Is made from materials healthy throughout the life cycle
7. Is physically designed to optimize materials and energy
8. Is effectively recovered and utilized in biological and/or industrial closed loop cycles

It's Increasingly Technical, Sophisticated, and Specialized

- **It's a technical topic.** There are multiple ways to make packaging more sustainable including reducing the quantity of packaging used, substituting materials, or tackling end of life concerns via recycling or circularity. Each requires a series of considerations, costs, and tradeoffs.
- **The topic is becoming increasingly specialized.** Packaging professionals *and designers* are now expected to understand complex chemical processes and longer-term effects on the ecosystem stemming from the choice and quantity of material used. The below are just a sample of specialized areas, each with detailed definitions.

Degradable Products

Single-use / Disposable Plastics

Recyclable Products

Biodegradable Products

**Microplastics /
Microbeads**

Renewable Products

Oxo-degradable Products

**Bioplastics / Bio-based / Plant-
based Products**

Reusable / Refillable Products

Photodegradable Products

Compostable Products

Circularity / Circular Economy

Why Focus on Sustainable Packaging? Consumers Demand It

According to a Global Web Index's (GWI) 2019 study, consumers in UK and U.S want information on Packaging. "Sustainable packaging is no longer a nice-to-have, it's a must-have for any brands looking to future-proof their operations against the rising tide of consumer scrutiny."

53%

Say they have reduced the amount of plastics they use in the past 12 months

42%

Say products that use recycled/sustainable materials are important in their day-to-day shopping

28%

Say they do not have sufficient information about which packaging can be recycled



Sustainable Packaging Wins Consumer Loyalty

Environmental impact is a key entry point

Consumers are moving from intention to behavior

US Consumers

73%
care about the future environment

61%
want to support companies that protect the environment

UK Consumers

82%
care about the future environment

68%
don't want to be wasteful

52%

of consumers are willing to pay more than 10% for products with sustainable packaging, and 28% willing to pay up to 30% more

61%

of consumers are likely to switch to a brand that is more environmentally friendly than their current brand

2 in 3

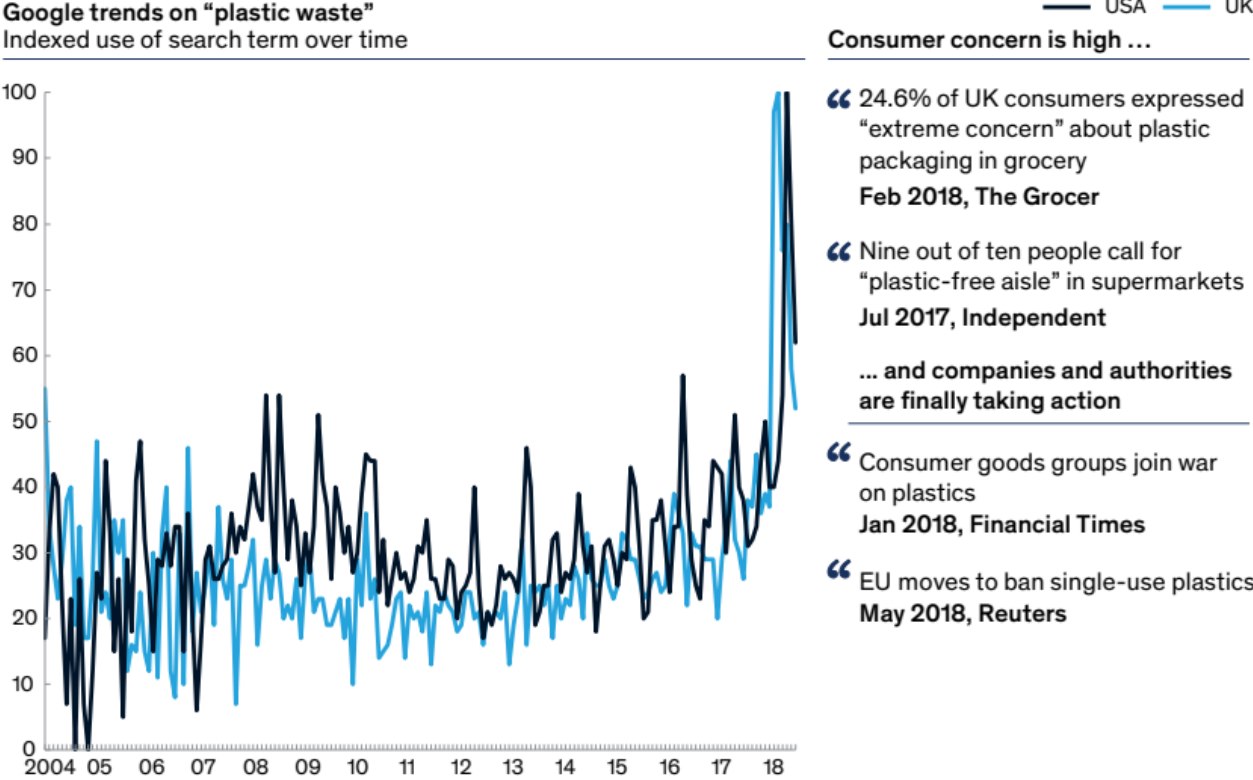
consumers believe that brands which make public promises to be sustainable are more trustworthy



Consumers Are Notably Concerned About Plastics

Public awareness of plastics leakage into environment has increased significantly over the past 12 - 15 months to an all-time high

Google trends on "plastic waste"
Indexed use of search term over time



SOURCE: Google trends; press search

1

Fast moving consumer goods (FMCG) manufacturers and retailers are experiencing severe pressure concerning their plastic packaging. Images of ocean plastics have stirred up consumer sentiment around the world, and regulators have started to respond.

2

Most consumers claim to be highly concerned about the environment, with the highest rates registered in emerging economies.

3

Governments have started responding to public outcry and are acting to increase recycling and put in place selective regulations to reduce plastic use.

Material Choice Matters – it's all about tradeoffs

PLASTIC



ubiquitous
inexpensive
versatile



carbon intensive production
questionable recycling
non-renewable

PAPER



renewable
inexpensive
versatile



higher mass
limited applications
laminates limit recyclability

GLASS



production footprint
highly recyclable
relatively inexpensive



wear and tear
transport footprint
deco impacts end of life

METAL (aluminum)



infinitely recyclable
versatile
durable



carbon intensive production
limited applications
non-renewable

Emerging Alternative Materials – Edible Materials

The idea of edible packaging has been around for a while, and it's growing quickly specifically in the food industry. Though eating a food's wrapper raises hygiene concerns, it would still be hyper-degradable, disappearing much faster than single-use plastics or even compostable bioplastics.



Edible cups made of oats and grains

Source: [Good EDI](#)



A six-pack ring made from the wheat and barley remains from beer brewing and could be eaten by animals if it ends up as debris.

Source: E6PR



Edible plastic film made from the milk protein casein

Source: [Headline Science/American Chemical Society](#)



Scoby packaging

Source: [MakeGrowLab](#)

Emerging Alternative Materials – Natural Materials

Natural materials like bamboo, woods, plant leaves and husks, as well as seaweed, are getting in the way due to their fast growth rate, better recyclability and degradability.



Dell's bamboo packaging

Source: [Bamboo — Nature's Eco-friendly Packaging Solution](#)



Leaf packaging bento

Source: [Sushi packaging](#)



Bamboo packaging for cosmetics

Source: [Gidea Pac](#)

Design for Sustainability

“80% of the ecological impacts of a product are locked in at the design phase.” – European Union

TREND 1: LESS IS MORE



TREND 4: INNOVATIVE MATERIAL CHOICES



TREND 2: DESIGNING THE BEST GARBAGE



TREND 5: REUSE, REFILL OR SHARE?



TREND 3: ONE MAN'S TRASH IS ANOTHER MAN'S LUXE RUM BOTTLE



Let's Talk Soap

Soap is an excellent use case to consider for more sustainable packaging – notably since the consumer tends to throw the packaging away immediately before use.

How, then, can you as a designer contribute to sustainability?



Some considerations:

- What packaging options does creative brief allow?
- How much packaging is necessary at minimum?
- Are you free to suggest alternative materials?
- What design choices might affect end of life?
- Where can you get more information?

All this to say – it's not easy. Designing sustainable packaging means exiting your comfort zone and think about the tradeoffs linked to manufacturing footprint, decoration impacts, disposal, and more, in addition to aesthetics and cost.

Any Questions?

Thanks!

Jonathan Morris

jmorris@bsr.org



© 2020 Business for Social Responsibility

Appendix:

Paper

Paper is frequently suggested as a substitute for plastic packaging (for example, paper cups and bags). However, [studies](#) suggests that paper packaging generally requires several times more mass to fulfill the same function as its plastic counterpart. As a result, the overall environmental impact tends to be higher for paper, except in its carbon footprint.

Recyclability

- Approximately [62.5 million tons](#) of paper and paperboard were recycled in 2019 in China, achieving a [65% recycling rate](#) with a 4% average annual growth rate, which was lagging behind that of US, EU and many southeast Asian countries, however it's already among the highest compared to other materials in municipal solid waste in China.
- In the EU, [the European Paper Recycling Council \(EPRC\)](#) was set up as an industry self-initiative in November 2000 to monitor progress towards meeting higher paper recycling targets. The current target for paper recycling is set to 85% by 2030.
- There are paper products in the markets that come with plastic/PLA laminate. This laminate needs to be considered as it may hinder recyclability of the paper product.

Certifications

- Most common used certifications for paper are the FSC, PEFC and SFI.



FSC-certified paper is typically composed of virgin tree fibres. FSC has developed a standard that paper products must meet in order to prove truly environmentally and socially responsible.



PEFC is a non-profit umbrella brand incorporating different national certification schemes.



The SFI standard is based on principles that promote sustainable forest management. It requires unique fiber sourcing requirements to promote responsible forest management in North America. SFI Certification is also extended to all wood-based products

Glass

Glass could be considered another substitute for plastics, however there is debate on whether glass or plastics is the most sustainable option for packaging.

The Debate

- A typical debate for example:
 - A 500mL glass bottle weighs about 400g, but a comparable 500mL PET bottle, carton or aluminium weighs about 10g. The 40 to 1 weight ratio is a challenge for manufacturers and distributors. It means more wear and tear on packaging machinery, less efficient shipping and distribution, and, as a result, higher fuel costs and emission responsibility.
 - However, a PET container versus a glass jar uses twice as much minerals and fossil fuel to produce, and 17 times more water, and produces five times the greenhouse gas emissions.

1.5 liter (50 oz)	Glass bottle (single use)	Glass bottle (refilled 30x)	Single use plastic	Carton (e.g. Tetrapak)	Aluminium can (4x 355ml)
High	503g	-	633g	60g	1604g
Medium	323g	24g	250g	32g	488g
Low	265g	-	44g	18g	259g

Sources: What is the carbon footprint of bottled water and Tetra Pak.

Recyclability

- Glass bottles and jars are 100% recyclable and can be recycled endlessly without any loss in purity or quality.
- It is commonly recycled and multiple regions/countries have glass recycling schemes in place:
 - Glass recycling is [stable at 74%](#) in the **EU**, while the glass packaging industry recently announced a program to boot EU recyclability rate to [90%](#) by 2030.
 - [In 2015](#), only 26% of all glass and nearly 42% of beer and soft drink bottles were recycled in the **US**.
 - **Singapore**'s National Recycling Program (NRP) introduced a collection system in which multiple recyclables are deposited into the same blue recycling bin for collection. However, only [19%](#) of glass is currently being recycled.
 - In **China**, it was estimated that only [13% of glass](#) was being recycled.

Metal

Aluminium is also substitute for plastics. Aluminium has a wide range of packaging applications, from beverage cans to food containers, aerosols and tubes. Aluminium 's ability to form any shape and its protective qualities have made it the most versatile packaging material in the world. In addition, a key benefit is that aluminium foil, aluminium cans and other aluminum packaging materials can be fully recycled and reused an infinite number of times.

Aluminum as a plastics substitute

- The global recycling rate for aluminium beverage cans stands [at 69%](#), making them the world's most recycled beverage container. But there are significant regional variations.
- If aluminium cans are made of 100% recycled material the carbon footprint will be 96% less and thus similar to refilled glass bottles or cartoon.
- However, as only 50% of cans are recovered (in the US) the real carbon footprint is much higher. In countries such as Germany and Sweden with deposit schemes the recovery rate is much easier higher and therefore aluminium is an environmentally sound choice.

Recyclability

- More than [half](#) of the aluminium in existence today will be recycled.
- Aluminium is recycled through a variety of programs. The most commonly recognized consumer programs are curbside and municipal.
 - The recycling rate of aluminium cans in **China** is approximately [85%](#), about 160-200 thousand tons of aluminium cans are recycled every year.
 - The aluminium packaging recycling rate in **UK** rose to a record high of [56% in 2019](#).
 - Aluminium beverage can recycling in Europe hits record 76.1% in 2018. Germany had the highest recycling rate at [99%](#).

Emerging Alternative Materials – Edible Materials

The idea of edible packaging has been around for a while, and it's growing quickly specifically in the food industry. Though eating a food's wrapper raises hygiene concerns, it would still be hyper-degradable, disappearing much faster than single-use plastics or even compostable bioplastics.

Sources and Applications

- Recent applications are coffee cups made of natural grain cereal (“cupffee”). Some companies and academic researchers are [trying](#) edible packaging such as **carbohydrates** from seaweed, starches from potatoes, for instance, to make cupcake holders, transparent films, and food bags.
- Other groups are working with **proteins** to make edible packaging. For example, an edible plastic film made from the milk protein casein could replace the disposable plastic used to wrap cheese while providing added nutrition.
- **Scoby** is created through a [process](#) of fermentation. It is a membrane that forms at the surface of the liquid. The process results in a packaging alternative that is edible and without flavor, 100% compostable and renewable. The contents of any package made of Scoby can be cooked or digested without requiring the removal of the membrane, eliminating post-consumer waste.



Edible cups made of oats and grains
Source: [Good EDI](#)



A six-pack ring made from the wheat and barley remains from beer brewing and could be eaten by animals if it ends up as debris. Source: E6PR



Edible plastic film made from the milk protein casein
Source: Headline Science/American Chemical Society



Scoby packaging
Source: [MakeGrowLab](#)

Emerging Alternative Materials – Natural Materials

Natural materials like bamboo, woods, plant leaves and husks, as well as seaweed, are getting in the way due to their fast growth rate, better recyclability and degradability.

Sources and Applications

- **Seaweed/algae:** An environmentally-friendly medium, seaweed biodegrades in four to six weeks, compared to the 700 years certain plastic takes to decompose. It is considered to be cost-effective, readily available and quickly harvested, requiring significantly less carbon dioxide and energy to produce than a PET plastic equivalent.
- **Bamboo:** Because of its fast growth rate (up to 24 inches a day), bamboo can be harvested faster than hardwoods, making the source extremely renewable. Its strength is enduring, and the material's flexibility makes it a versatile solution for a wide range of packaging needs. Dell has been using bamboo packaging since 2009.



Dell's bamboo packaging

Source: [Bamboo — Nature's Eco-friendly Packaging Solution](#)



Bamboo packaging for cosmetics

Source: [Gidea Pac](#)



Leaf packaging bento

Source: [Sushi packaging](#)

Emerging Alternative Materials – Other Materials

Bagasse

- Bagasse is the waste from sugar cane plants left over after the sugar has been extracted.
- Originally used as a biofuel, the value of this material for the packaging industry has since been well explored. Bagasse is used to make a variety of food packaging items which include but is not limited to takeaway containers, plates and bowls. Bagasse also serves as a substitute for wood in some countries to produce pulp, paper and board.



Starch Blends

- Starch based plastics are complex blends of starch with compostable plastics such as PLA, PBAT, PBS, PCL and PHAs. Blending of starch with plastics improves water resistance, processing properties and mechanical properties.
- Starch based trays are not transparent. Other applications include loose fill foams for transport packaging, cups, plates and cutlery in service ware.
- Biodegradable films, with starch as a matrix, were developed and reinforced with wheat and corn hulls.



What are the Key Considerations for Companies?

- **Make it your own!** Remember, there is no one size fits all approach to sustainable packaging.
- **Approach the topic with company context in mind:** regions/countries of operation, types of materials concerned, stakeholder requirements and expectations.
- **Start with principles.** Discuss and agree on what matters to your company, where you draw the line on what's acceptable and what's not. Pay attention to materials / chemicals of concerns lists and regulation to set the baseline.
- **Outline the company's sustainable packaging guidelines** including a definition of sustainable packaging itself and how your company approaches the complexities of the topic. Socialize the guidelines and gain senior level sign-off. Share these guidelines externally.
- **Engage in external initiatives** to continue learning from others and sharing your own experience.
- **Consider setting packaging targets** to drive your ambition and track performance.
- **Continually revise the approach.**



OBJECTIVE:

This document outlines REI's sustainable packaging guidelines. Packaging is necessary to protect products while in transit. Packaging may also enhance the customer experience by communicating key information or displaying products in a compelling manner. REI's goal is to minimize the environmental footprint of packaging while ensuring the packaging is effective in serving its purpose. We have adopted high standards for REI brand products, and we encourage our wholesale brand partners to do the same. These guidelines serve as a resource to those ends. Contact ProductSustainability@rei.com with any questions about this document.

DIAGEO

Sustainable Packaging Guidelines

"We will drive year on year improvements to deliver sustainable packaging with the smallest environmental footprint by 2015."

Andy Fennell, Chief Marketing Officer, and David Gosnell, President Global Supply and Procurement.

Walmart 



100% of private brand packaging is recyclable, reusable or industrially compostable by 2025

55%



Where to Look for Information and Partnership

An increasing number of organizations and collaborations exist to help individual companies and entire industries enhance the sustainability of their packaging. Below are just a handful. Getting involved in one or two could help your company in its reflection and help to stay current with expectations.



Regulatory Note: APAC Focuses on Recycling

The Asia-Pacific region is a significant contributor to the global challenge of plastic waste—the top five countries contributing to marine plastic debris worldwide, China, Indonesia, the Philippines, Thailand, and Vietnam, are in Asia—and is therefore a key intervention point for addressing the issue.

- With the exception of recycling policy intervention success stories like [Japan](#) and [Taiwan](#), **governments in Asia Pacific generally do not heavily regulate the industry** using mechanisms like regulations on the composition of packaging and containers, waste collection fees, mandatory source segregation, and plastic taxes.
- **Plastic recycling has also traditionally not been a priority for governments in the Asia-Pacific region.** This, as well as a lack of clear responsibility and accountability for transboundary marine plastic waste, has impeded the establishment of robust international and national legislation regulating the production, distribution, and management of plastic products.
- **In several cases, regulation exists but it is poorly enforced at the municipal level** due to insufficient budget or capacity.
- **Lack of government support or subsidies in costly operating environments like Hong Kong and Singapore also disincentivizes entrepreneurs** to establish recycling operations. In some cases, food safety and hygiene regulations can impede efforts to recycle or reduce plastic waste by making it hard for retailers and venues to provide reusable containers. These regulations can also make it challenging for food and beverage companies to use recycled plastic material in food containers and packaging.



LOOKING FORWARD

China will aim to hit peak emissions before 2030 and for carbon neutrality by 2060. Its 14th national Five-year Plan includes details of leading a circular and eco-friendly society.

Regulatory Note: Europe Targets Single-Use / Reduction

Through the EU's [Directive on single-use plastics](#), different measures are being applied to different products. These measures are proportionate and tailored to get the most effective results, and also take into account if more sustainable alternatives are available.

- Where sustainable alternatives are easily available and affordable, **single-use plastic products will be banned from 3 July 2021**. This ban will apply to cotton bud sticks, cutlery, plates, straws, stirrers, and sticks for balloons. It will also apply to cups, food and beverage containers made of expanded polystyrene, and on all products made of oxo-degradable plastic.
- **For other single-use plastic products, the EU is focusing on limiting their use** through:
 - reducing consumption through awareness-raising measures
 - introducing design requirements, such as a requirements to connect caps to bottles
 - introducing labelling requirements, to inform consumers about the plastic content of products, disposal options that are to be avoided, and harm done to nature if the products are littered in the environment
 - introducing waste management and clean-up obligations for producers, including Extended Producer Responsibility (EPR) schemes
- Specific targets include:
 - A 77% separate collection target for plastic bottles by 2025 – increasing to 90% by 2029;
 - Incorporating 25% of recycled plastic in PET beverage bottles from 2025, and 30% in all plastic beverage bottles from 2030.



LOOKING FORWARD

The UK government has [stated](#) that leaving the EU has not changed its ambitions on the environment, and is committed to moving towards a more circular economy.

A Note on LCAs – a tool to compare material impacts

- The [life cycle assessment \(LCA\)](#) methodology is considered the **most widespread technique for evaluating the environmental impacts** associated with material products, such as packaging.
- It is a **cradle-to-grave assessment of a product or service that analyses its impact over a lifetime** from the extraction of raw materials to the waste disposal of the various components. LCA is focused on studying the whole product system, as it is not only studying one single process but also the complete chain of production and lifetime.
- LCA is a **relative tool intended for comparison and not absolute evaluation**, thereby helping decision makers compare all major environmental impacts when choosing between alternative courses of action.
- However, though the **LCA can be a good indicator for comparing materials**, it also has limited utility due to its specificity to one single product or process.
- **Leading LCA organizations** looking at sustainable packaging include:

SCSglobal
SERVICES



thinkstep

LCA: From Cradle to Grave



Pros and Cons of LCA's

Lifecycle Assessments are effective tools to compare material impacts, but their utility is limited. Companies can use the below chart when considering whether an LCA is the right tool to use in measuring the sustainability of its packaging.

Pros	Cons
Directly accounts for environmental impacts including scarcity and toxicity	Requires extensive detailed knowledge to conduct and interpret
Allows for detailed and flexible metrics	Requires value judgment on environmental priorities
Provides a complete picture of a product, process or service	Pulling together data can be time consuming and costly; expensive
Raises environmental awareness in companies and helps identifying environment priorities	Extremely specific to a package type and often cannot be transposed across to similar operations
Allows comparison between related products over time considering a common indicator (e.g. land-use)	Difficult to adapt the LCA tool for the analysis of complex products

Thank You

BSR™ is a global nonprofit organization that works with its network of more than 250 member companies and other partners to build a just and sustainable world. From its offices in Asia, Europe, and North America, BSR™ develops sustainable business strategies and solutions through consulting, research, and cross-sector collaboration.

www.bsr.org



© 2020 Business for Social Responsibility