

Global Approaches to Sustainable Food Packaging

Food and packaging waste are increasingly being assessed against common sustainability metrics and the value of a circular economy is being realized. Common sustainability metrics address the environmental cost of packaging to reduce food and nutrient waste. The advancing promise of a more circular economy is the result of new packaging legislation as well as initiatives by corporations, consortiums, and municipalities. The future looks bright for sustainable food packaging as governments, corporations, and people work together to reduce the impact of packaging on the environment.

A Circular Economy

It has been established that recycling conserves natural resources since scrap materials are substituted for virgin feedstock. However, the economics of recycling packaging materials have

stymied recycling efforts. The circular economy strives to address this by profitably keeping resources in use longer, extracting higher value from them, and then recovering and regenerating more from them than in the take-make-dispose industrial model. This circular economy is in use in many industries and has emerged as a means to achieve more sustainable food packaging. Life cycle analysis (LCA) and sustainable materials management consider the use of resources from cradle to cradle in sustainability assessments. These considerations are critical because in a circular economy, past unbalanced costs and benefits in the packaging value chain are better balanced with source reduction and recycling. Infrastructure for recycling, energy recovery, composting, and biodegradation are increasing globally at varying rates. Material science, distribution efficiencies, and manufacturing processes are also

advancing. Worldwide, extended producer responsibility (EPR) levies fuel the circular economy so that the environmental impacts of packaging are factored into the cost and value of packaging. This enables a more consistent supply of sustainable materials and expands the value of packaging. For example, in Japan, polyethylene terephthalate (PET)-based anticorrosion liners for Toya Seikan aluminum cans and recycled PET bottles are possible because of the high purification of PET-related compounds in the recycling process. Strategic legislation and initiatives by major corporations, consortiums, and nongovernment organizations focus on EPR as a means to achieve a more circular economy.

Global Legislation

In more than 50 countries, legislation now exists to foster more sustainable package choices while meshing with

Committed to reducing the type and amount of materials that fill landfills, some countries are increasing the number of recycling options for packaging materials.

Photo © drogatnev/iStock/Thinkstock



national and regional cultures. This has been achieved by balancing corporate and consumer responsibility. Such legislation mandates that manufacturers pay fees based on the cost to collect, sort, and dispose (recycling, reuse, landfill, incineration, biodegradation). The cost is often passed along to consumers who purchase packaged products. This EPR approach has been applied to packaging, electronics, and automobiles (including tires and batteries). Two elements of EPR have increased in popularity since the 1990s: 1) shifting responsibility upstream from municipalities to producers and 2) incentivizing producers to consider environmental factors in the design of packaging. The rapid increase in EPR-based legislation has facilitated an economical supply of recycled polymers for corporations and provided consistent package-material selection guidelines as well as the means to capitalize on the global circular economy. A circular economy has formed around the value post-consumer package. Around the world, the burden of EPR compliance is being reduced through harmony and clarity.

Europe. The European Union's Packaging and Packaging Waste Directive has been the main impetus for member states to pass national packaging and environmental laws since 1994. Decisions made by brand owners are now linked to the final economic and environmental cost of package disposal. This has fueled industries in the circular economy and strengthened the European-based research to develop and design more sustainable packaging. Standards focus on packaging use, source reduction, reuse, recycling, energy, composting, and biodegradation. This provides consistent guidance to make packaging decisions and clear direction on material development and design. For example, the Green Dot symbol, which originated in Germany in the early 1990s, funded a national system for proper package disposal. More than 170,000 food manufacturers and packaging converters are aligned to foster a system to handle 460 billion packages annually. In Italy, CONAI manages package recycling and recovery in a similar manner.

Japan. After World War II, Japan

experienced rapid industrialization; combined with a culture predisposed to a high degree of sustainability, this resulted in an advanced circular economy. Legislation was enacted in the early 1990s to reduce the amount of landfill waste and promote recycling. Manufacturers pay the costs of collecting, sorting, and recycling packaging. Consumers bear the responsibility of separating packaging components into at least 12 bins based on material type and package structure. The specific consumer guidelines are reinforced with strict penalties for noncompliance. Sustainability is at the forefront of Japanese society and culture with PET recycling rates exceeding 90%.

Russia. The Russian Packaging and Environmental Coalition and the Russian government designed the EcoFee system, which requires manufacturers to pay a fee based on the method of package disposal (recycling, landfill, or reuse). Other initiatives such as the Environmental Policy Plan Through 2030 and amendments to a federal law are designed to increase the profitability of recycling and the number of recycling drop-off locations for consumers. This represents a concerted effort to fuel a circular economy in Russia.

Canada. A balanced approach has EPR and Canadian municipalities sharing the cost of package disposal. In Ontario, the 2016 Waste-Free Ontario Act differs from other EPR initiatives in that direct liability is assigned to producers. Blue Box collection is used by 97% of Ontario households and recycling rates (65%) are the highest in North America. For example, the level of coffee-cup recycling has increased by ensuring a valuable commodity from the recycled coffee cups; this led to financially viable expanded curbside collection and refined sorting systems. Canada's efficient recycling process through retailers and the Blue



Global Approaches to Sustainable Food Packaging continued...

Box Program has allowed companies to commit to the use of recycled polymers.

Australia. A five-year strategic plan focuses on more sustainable package design, labeling to guide consumers in the proper packaging disposal, and improved performance of sustainable packaging. Australia's Packaging Covenant and regional governing bodies have addressed reducing the environmental impact of packaging since 1999. By 2022, 90% of engaged companies will have actively participated in closed-loop collaboration, 85% of packaging will provide labeling of proper disposal, and there will be a plan to remove 50% of current problematic packaging materials from the waste stream. In New South Wales, a deposit fee for bottle containers reduces littering and provides increased income for waste pickers.

Initiatives and Partnerships

In food packaging, the focus on sustainability has been centered on source reduction and the increased use of recycled polymers. This is largely because 1) compostable and biodegradable polymers do not provide sufficient barriers needed for most food packaging, 2) systems for composting/biodegradation are often not eco-

nomical, and 3) composting and biodegradation result in a lack of economic value of the packaging. Corporate initiatives to use recycled polymers have been problematic due to the poor supply of recycled polymers. Recycled packaging material can be more expensive because

It has been established that recycling conserves natural resources since scrap materials are substituted for virgin feedstock.

of low energy prices and low collection/sorting efficiencies. Corporate, consortium, and nongovernment-organization initiatives are heavily focused on increasing the economic viability of recycling packaging materials to enable a profitable circular economy for packaging.

Corporate-based initiatives focus on decreasing the bad perception of packaging through anti-litter campaigns and increased investment to expand the value of packaging via recycling. Coca-Cola did not meet its pledge to achieve 25% recycled plastic content by 2015 because of scarce supply and the high cost of recycled polymers. A new target in the United Kingdom is to have bottles with 40% recycled content by 2020. Both goals are impressive due to the global nature of recycled polymer sourcing and since not all beverage companies have use of recycled plastic as part of their goals. Walmart's initiative to use 3 billion pounds of recycled polymers in packaging and products by 2030 may also be difficult due to lack of supply. These goals along with consumer interest in purchasing products in recycled packaging have led to initiatives to increase global recycling rates to ensure a more consistent supply. Coca-Cola and other companies now support a bottle deposit in the United Kingdom to reduce littering as well as investment in bottle recycling facilities designed to increase recycling. Corporations are increasingly acting in unison to increase the supply of recycled polymers. In the United States, corporations support the \$100 million Closed Loop Fund, which provides low-interest loans to cities and recycling companies to upgrade or start recycling efforts. Projections suggest that the recycling sector will grow by approximately 6% annually, thereby reducing the

estimated \$11.4 billion dollars of recyclable containers sent to landfills in the United States. Corporations are heavily invested in the concerted efforts of consortiums and local initiatives including the following:

- The European Organization for

Packaging and the Environment is focused on LCA thinking, free flow of packaging in Europe, and clarity and harmonization of packaging waste regulation.

- The Sustainable Packaging Coalition (SPC) has provided valuable guidance on how to develop more sustainable packaging primarily for packaging decision makers in the United States and Canada. To further recycling efforts in North America, the SPC generated the How2Recycle label. It provides clear consumer direction on how to recycle and has been adopted by manufacturers in an effort to increase recycling rates.

- The World Wildlife Foundation developed Cascading Materials Vision, which focuses on enabling profitable sourcing of recycled materials, material innovation, and package design while protecting natural resources. The guiding principles developed by leading brands, policymaker, materials, management solution providers, and environmental nonprofits include a science focus, shared value, an integrated systems approach, an effective policy, adaptability, and inclusive diverse solutions.

- PAC's PAC NEXT initiative provides a platform to address industry problems. Initiatives underway include reports on solutions to packaging challenges in recycling and options for the recycling and recovery of laminated flexible films.

- The American Institute for Packaging and the Environment promotes the value of packaging to improve overall sustainability by balancing more sustainable packaging and food shelf life. **FT**



Blue Mountain Plastics supplies resin for Ice River Springs to bottle water in 100% recycled polyethylene terephthalate bottles. Photo courtesy of Ice River Springs



Claire Koelsch Sand, PhD, Contributing Editor
 • President, Packaging Technology and Research
 • Adjunct Professor, Michigan State Univ.
 • claire@packagingtechnologyandresearch.com