

In 1987, the United Nations World Commission on Environment and Development released a report, “Our Common Future,” which formally introduced the concept of sustainable development as a matter of global significance. The authors defined the concept as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

Today, the idea of business sustainability is giving way to a sophisticated new approach to environmental management and value creation

known as the circular economy. According to work done by McKinsey & Co. for the Ellen MacArthur Foundation, “A circular economy is one that is restorative and regenerative by design and aims to keep products, components and materials at their highest utility and value at all times.”

In other words, rather than viewing the production of goods as a linear process from raw material extraction to disposal, a circular economy is a closed system that operates best when waste is reused and energy consumption is responsibly managed. Industrial packaging must be considered a key component of this effort.

Defining Circular Economy

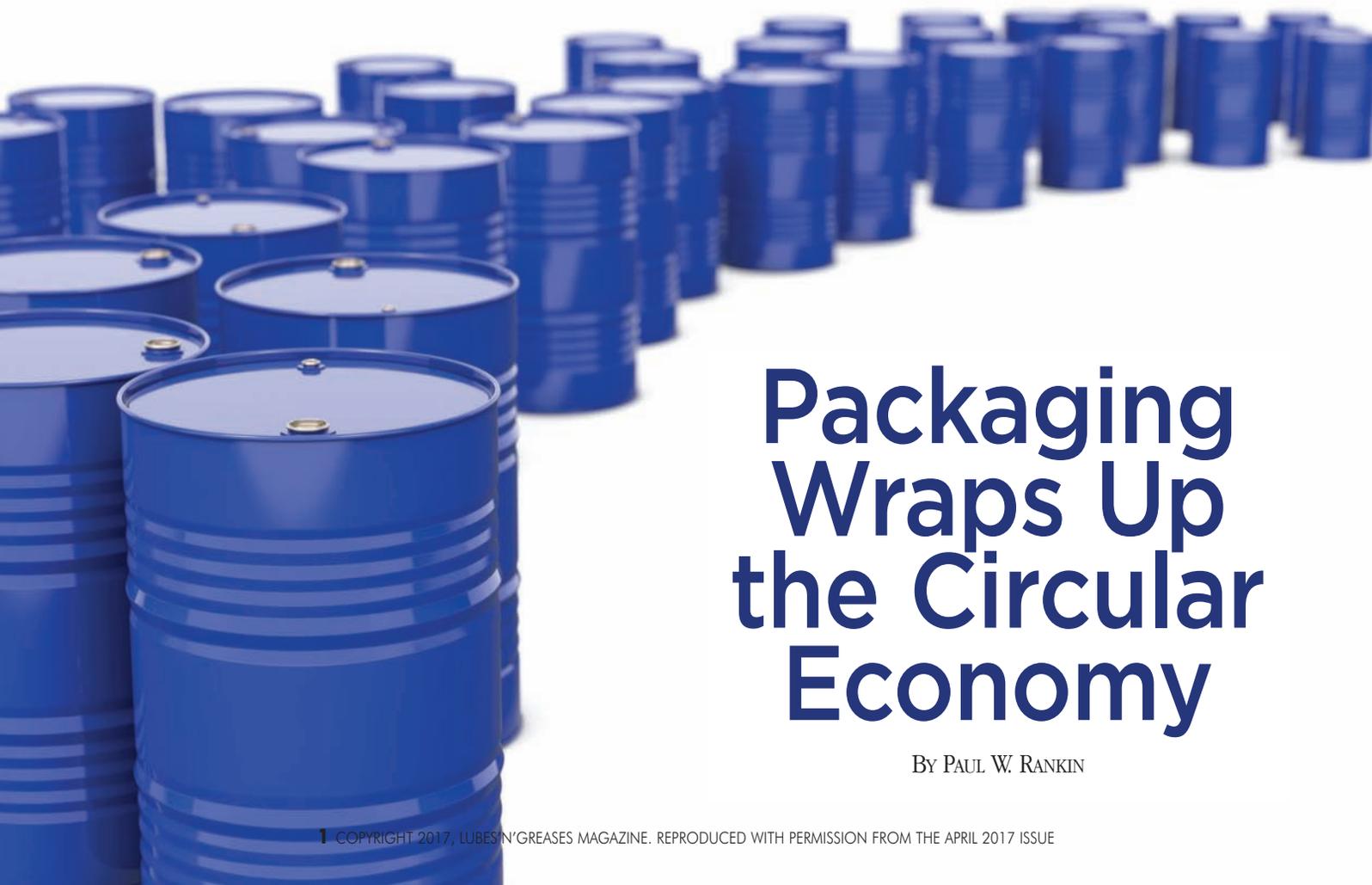
Circular economy theory encompasses many of the traditional elements of sustainability, but its primary focus is on business activities and needs. Its proponents take great care to account for profitability as a key metric in every aspect of planning and implementation.

According to the World Economic Forum, a new development model is needed to ensure—in a world that is expected to add more than 3 billion new middle-class consumers by 2030—that businesses find new ways to meet what is likely to be an

“unprecedented demand for goods and services.” This assumption, along with deepening concerns about climate change and an expected long-term rise in commodity prices worldwide, suggests that now is the time for the global business community to rethink the linear approach to industrialization—sometimes referred to as the take-make-dispose economy—and replace it with an industrial system “that is restorative or regenerative by intention and design.”

The core principles of a circular business economy are:

1. Design out waste, while optimizing disassembly and



Packaging Wraps Up the Circular Economy

By PAUL W. RANKIN

reuse. The more times a product is used in its original intended form, the greater the cost savings and environmental savings. Recycling and disposal systems require large amounts of energy and labor.

2. Differentiate between consumable and durable components of a product. Use non-toxic and/or biodegradable components, and design the durables associated with the product (e.g. packaging, engines, etc.) for reuse.

3. Approach energy use in a sustainable manner, and use renewable energy sources whenever possible. Reducing energy dependence can also limit exposure to price volatility

and materials unavailability.

The idea is to eliminate all waste not just from manufacturing practices, but at every stage of the production and distribution process.

Legislative Backing

The circular economy already has concrete support from governments including Germany, Japan, China and the European Union.

Germany was the first European country to adopt national legislation designed to reduce waste sent to landfills. In the early 1990s, laws including the Closed Substance Cycle Waste Management Act created a

framework for what has come to be known as Extended Producer Responsibility. In essence, EPR, through local implementing laws, imposes on producers a duty to take back packaging materials and, where feasible, to reuse or recycle them.

In 2015, the European Commission adopted a detailed action plan that proposes a “transition to a more circular economy, where the value of products, materials and resources is maintained...for as long as possible.” Importantly, the action plan states that businesses “are key to driving this process.”

Unfortunately, many EU member states define nearly all used products, including packaging, as “waste,” which often severely and unnecessarily restricts reuse and recycling options. Waste materials are subject to a range of restrictive management rules that add unnecessary costs and liabilities at every stage of the collection and handling process. In addition, laws in many EU countries conflate definitions of consumer and industrial packaging, even though the two are handled in entirely different post-use management systems and should therefore be addressed separately.



Inneger - iashatanango - Fotolia

In 2000, the Japanese government adopted the Law for the Promotion of Efficient Utilization of Resources, also known as the BasicRecLaw. The law addresses a product's entire lifespan and requires manufacturers to operate disassembly plants that prioritize material recovery.

China adopted the Circular Economy Promotion Law in 2008, which created an administrative department of circular economy tasked with crafting

Packaging in Action

The most widely used industrial packagings are 55-gallon (210-liter) steel and plastic drums, and 275-gallon (1,000-liter) composite intermediate bulk containers.

The International Confederation of Container Reconditioners estimates that annual production volumes for these three container types in Japan, Europe and North America are about 120 million steel drums, 30 million

With few exceptions, no matter where one goes in the world, a reconditioner is available to safely collect, clean and process empty industrial packaging for reuse.

Interestingly, this global system developed and thrived because the containers fit almost perfectly the criteria of an exemplary circular economy product. Take for example the venerable 55-gallon steel drum, which has been a staple of global industrial pack-

the container and its closures can be recycled after cleaning.

A steel drum produced in Japan and shipped with product to North America can easily be prepared for reuse in a reconditioning facility. The Reusable Industrial Packaging Association, which represents industrial packaging reconditioners in North America, reports that its members operate over 120 plants that collect, recondition and resell more than 25 million steel drums every year. They also reprocess millions of empty plastic drums and composite IBCs.

"Steel drums retain residual value when empty because they can be cleaned and reused, often multiple times, for a wide range of products," said RIPA Chairman Dan Burek. "And, when the drum can no longer be used for its original purpose, it and its constituent parts still have value as recyclable materials."

"Because of their consistent design and manner of construction," Burek continued, "empty industrial packagings are a kind of global currency in nearly all industrialized countries." Not only do the drums have value in the aftermarket, replacement parts like closures and gaskets can be readily purchased from local businesses.

As reported in the April 2014 issue of *Lubes'n'Greases*, an Ernst & Young study found that the manufacture and one-time use of a new open-head drum results in emissions of approximately 77.3 pounds of carbon dioxide equivalent, whereas using a reconditioned open-head drum reduces carbon emissions by 60 percent to about



Photo: zrenjantnac - Fotolia

an ongoing development plan, and sets forth specific rules for activities controlled by every level of government. It also makes Chinese producers responsible for recycling or rendering harmless empty or discarded products or packages.

Even in these countries, implementation of circular economy programs remains piecemeal and fragmented. Nonetheless, it is clear the concept is being taken seriously by governments around the world.

plastic drums and nearly 16 million IBCs. Figures for other large volume industrialized economies such as China and India are unavailable, but ICCR believes a reasonable count would more than double the cited production volumes.

Today, there is a sophisticated global network for empty packaging management made up of private businesses that collect, transport, clean, refurbish and resell steel drums, plastic drums and composite intermediate bulk containers.

aging since its invention in the early 1900s, and is appreciated the world over for safety, durability and reusability.

Made anywhere in the world, 55-gallon steel drums are uniform in shape, size and material. Except for a few small gaskets and the requisite linings and decorative coatings that together represent less than 2 percent of its total weight, steel drums are made entirely from carbon steel. Even after a drum has reached the end of its useful life, both

30.1 pounds. A similar comparison for tight head drums reveals an emissions reduction of about 36 percent.

The use of a reconditioned 275- or 330-gallon composite IBC with a steel pallet saves more than 67 percent of the emissions for newly manufactured IBCs of the same type. This translates into savings of over 180 pounds of greenhouse gases for every reconditioned 275-gallon IBC and over 218 pounds for each 330-gallon reconditioned IBC used in place of a new unit.

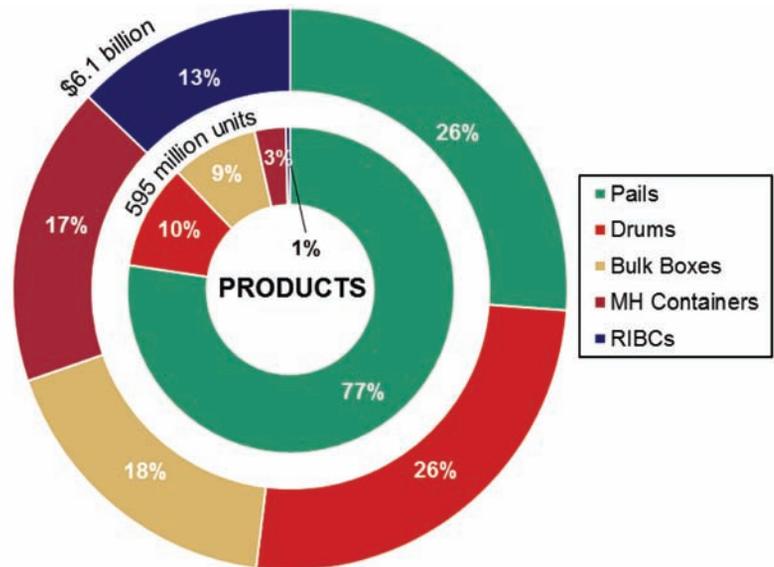
In a linear economy, packaging manufacturers can claim environmental benefits by reducing the amount of material used to produce a specific product. A steel drum manufacturer can use thinner steel to manufacture a drum, or a producer of plastic water bottles can reduce the amount of plastic used to manufacture the bottle.

However, the lighter steel drum may only be capable of being reused for its original purpose one time after its initial round trip, after which it must be recycled. The plastic bottle almost certainly must be recycled after a single trip.

In a circular economy, manufacturers and product purchasers will be expected to examine the life-cycle of products and optimize their environmental value. Since manufacturers of steel drums know that a global return-and-reuse system exists for their product, they would be expected to produce a more robust drum made from thicker steel to facilitate many reuse cycles. Plastic bottle producers, on the other hand, may find that no effective collection and reuse system exists for their

Rigid Bulk Packaging Demand in the U.S., 2015

Source: The Freedonia Group



product in every market, so the most effective environmental solution for bottles sold in such places is raw material reduction in the production process, coupled with localized recycling.

Circling Back

It is important to acknowledge there are numerous and often significant barriers to full implementation of a circular economy. Products are frequently made from parts sourced globally, so geographic dispersion and transportation logistics present some obvious roadblocks to implementation. The design of some products is necessarily complex and, therefore, they may be difficult to break apart for efficient recycling. Reuse or remanufacture may not be a viable option for certain products or materials because of design or mandated safety requirements. Reused and remanufactured parts must have a customer base, and reverse logistics

programs are complex and often costly. But these and related concerns should not deter efforts to move towards a circular economy.

The reuse of products and materials is growing exponentially. Packaging reuse—both consumer and industrial—is expected to expand as circular economy ideas take hold and businesses take advantage of emissions savings that accompany reuse programs. Materials like engine oils and cutting fluids that once were disposed of as waste after a single use now regularly are reprocessed and reused in appropriate industrial applications.

As businesses move away from the traditional take-make-dispose production model toward a circular economy, they will rely on efficient manufacturing systems, information technology and big data to create ever more efficient ways to save energy and conserve resources. Governments will

undoubtedly do their part, but when all is said and done, the success or failure of the circular economy rests primarily on the shoulders of the global business community. ■



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