



# Quantifying the circular economy and product circularity

Boost credibility by validating your sustainability and circularity claims

# Executive summary



Today, companies seeking to increase the effectiveness of their sustainability efforts are embracing a “circular” mindset. Rather than the traditional “take-make-waste” approach to production, their products are “made to be made again.”<sup>1</sup> These sustainability practices can also strengthen an organization’s overall health and profitability. Viewing business and economic activity through this lens of circularity contributes to a tangible and practical approach to sustainability, boosting synergy between profitability and environmental progress.

## Embracing sustainable practices in business

For many organizations, the Sustainable Development Goals (SDGs) developed by the United Nations (U.N.) Global Compact Initiative and adopted by world leaders in 2015 have served as a starting point for engaging with issues of social responsibility, environmental stewardship and sustainable governance. However, it is not just the U.N. SDGs driving this mindset shift for manufacturers. Other major drivers for transitioning to a circular economy include: environmental factors such as climate change, 73%; institutional progression (including global agendas), 52%; and socioeconomic pressures or changing economic conditions, 51%.<sup>2</sup>

According to The Global Reporting Initiative (GRI), a leading organization focused on sustainability, investors “are increasingly interested in directing funds toward companies that are leading the way of responsible business.”<sup>3</sup>

This clearly signals that the adoption of sustainable practices has the potential to provide important economic advantages to companies and shareholders. As yesterday’s waste becomes tomorrow’s production input, data from the World Bank Group’s consumption and waste generation databases indicate that the implementation of a circular economy could displace approximately a third of virgin input.<sup>4</sup> However, there may be additional benefits:<sup>5</sup> According to one source, the circular economy could have a positive economic impact of \$4.5 trillion (USD), contributing to global economic growth while supporting efforts to help ensure a sustainable future for the world.

To support organizations in their efforts to verify their sustainability practices, UL/ANSI 3600, the Standard for Measuring and Reporting Circular Economy Aspects of Products, Sites and Organizations (Ed. 1, Jan. 9, 2023), details a first-of-its-kind, industry-accepted way to measure and validate product circularity through the quantification of product input and an examination of end-of-life outputs.

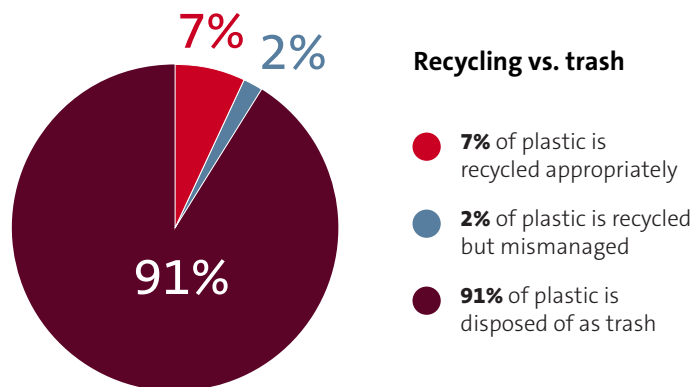


## Infrastructure constraints restrict efforts

The march toward adopting more sustainable practices is strong, but traditional approaches are not without their challenges. Access to suitable and scalable recycling infrastructure is becoming more and more limited. This is especially true as participants begin to fully appreciate the complexity of effective recycling operations. The limits imposed by the increased use of complex multimaterial products that are increasingly difficult to recycle adds to the challenge.

### Foreign regulations

In 2017 and 2018, recycling challenges were brought into sharp focus when China, previously one of the world's largest markets for recyclable materials, implemented regulations that significantly restrict the importation of contaminated paper and plastics.<sup>6</sup> An underdeveloped recycling infrastructure can also compound the challenge of finding a sufficient supply of materials that conform with sustainability objectives.



### Infrastructure constraints

Globally, only 7% of plastic is appropriately recycled, while 2% is mismanaged and 91% is simply disposed of as trash, contributing to plastics pollution. Furthermore, the 46 million tons of recycled plastic resin produced every year represents at most just 12% of the total volume of plastic resin produced globally. This landscape limits the amount of recycled materials available for production and makes recycled materials more expensive for well-intentioned producers, further affecting demand.

Access to suitable and scalable recycling infrastructure is becoming more limited.

## Strategic alignment

Another challenge facing circularity concerns the validity of recyclability claims manufacturers make. Today's global supply chains are long and complex. This can make it difficult to accurately trace every aspect of material production. In addition, some supply partners may lack the requisite knowledge or skill to consistently produce materials that conform with customers' expectations.

## Supply chain issues

One final, fundamental challenge inhibiting many current corporate sustainability efforts is a lack of alignment with overall business strategy. Despite numerous examples that validate the link between strong sustainability efforts and increased market valuation, many organizations still view sustainability programs as ancillary to key financial metrics. The potential impact of sustainability on an increased shareholder value is viewed as tenuous at best. Therefore, little effort is made to fully explore innovative business models and practices that could result in a radical transformation. Change of any magnitude requires an investment of money, time and resources, creating a further barrier to sustainability implementation.



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# Circularity and the circular economy

For organizations willing to reevaluate their current approaches to sustainability, the concept of circularity holds significant promise. At its most basic level, circularity presents an approach to economic activity that is fundamentally different from the traditional take-make-waste model.

Economic activity based on circularity adheres to three principles:

- Eliminate waste and pollution from product design.
- Extend the longevity of material use and/or reuse products and materials.
- Regenerate natural resources and systems used in the process.

Circularity focuses on disconnecting the consumption of resources from economic growth to build and rebuild both systemic and economic sustainability and health. As such, circularity is about reducing the negative impacts associated with linear economic activity while also making economic systems more resilient and less susceptible to resource and material shortages.

Ultimately, applying the concept of circularity can lead to the development of innovative business practices. These practices can improve an organization's financial performance and competitive position in the global marketplace. The number of organizational efforts built on the circularity concept has grown at an



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increasingly rapid rate in just a few short years. The Circular Economy Club reported that its circular economy database, an open-source project intended to map circular economy efforts around the globe, is currently tracking approximately 3,000 individual circularity efforts in 100 cities and 60 countries. Private-sector entities in a wide range of industries, including fashion, real estate and energy, have initiated the majority (71%) of these efforts.

The potential of circularity to transform the world's environment and economy is staggering. A 2018 report by the World Business Council for Boston Consulting Group estimated that reducing worldwide resource use by only 1% could save approximately 840 million tons of metals, fossil fuels,

minerals and biomass — along with 39.2 trillion liters of water — each year. Transitioning to a circular economy could also unlock \$4.5 trillion (USD) of GDP growth worldwide by 2030.<sup>2</sup>

Applying a circular economy perspective to current commercial and industrial activities can offer transformative solutions for reversing the world's rapidly diminishing supply of natural resources. It could also help regenerate the critical assets necessary to shelter, feed and clothe the world's growing population. However, circularity is not just good for the environment; it can also help organizations implement innovative tools, enabling them to become more self-sufficient while reducing their overall risk from external variables.



# UL Solutions' approach to supporting the circular economy

Transitioning to the circular economy can be challenging if you don't approach it strategically. However, committing to change is the first step toward circularity. It's also where you can see the benefits first. Once businesses have committed to adapting current processes, operations, design strategies and goals, new efficiencies rapidly appear. Ultimately, they disrupt and change the status quo.

**Organizations seeking to apply the concept of circularity to their operations must begin by answering several key questions:**

- Which aspects of our operations represent potential focal points to help support the circular economy?
- What metrics can we use to measure the impact of our circularity efforts on both the environment and our financial performance?
- Finally, how can we bring objectivity and transparency to our circularity efforts?

## UL Solutions' stance on product circularity

Circular products help accelerate the transition to a more environmentally prosperous future. As such, designers and manufacturers can create novel ways to extend the usefulness of a material or product. They can uncover processes to ensure that products are recycled or reused, and develop and launch products that can be transformed into something new rather than becoming waste.

The content of the materials entering the system and how those materials are coming out of the system will determine the approach.

UL Solutions separates the materials or inputs into two different categories: technical and biological. Technical materials do not come from the natural world. Plastic is the most common technical material in use today. At the end of their life, technical materials should be broken down and recycled or repurposed into new products.

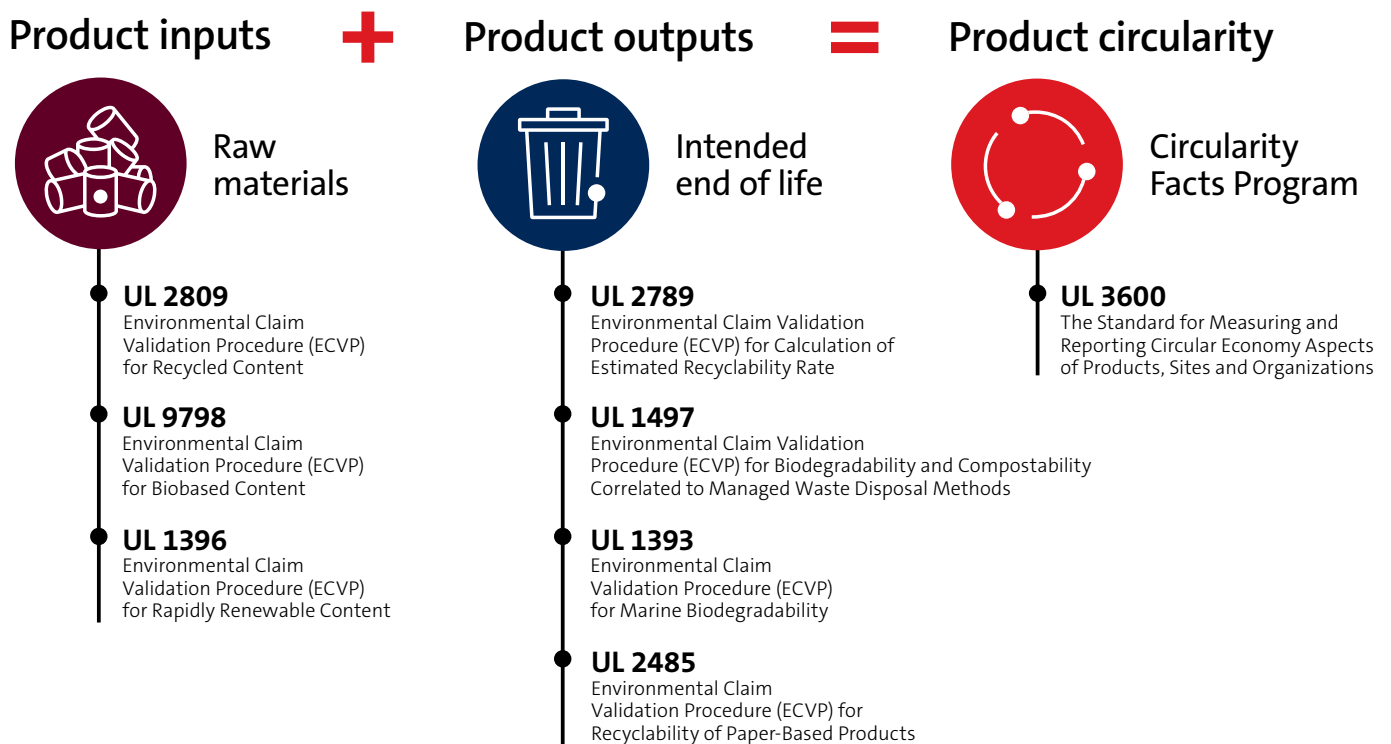
Biological materials are the opposite of technical materials. They're made from natural or biobased contents. At the end of their life, they can biodegrade and return nutrients to the environment via composting or anaerobic digestion, continuing their circular journey.

Product circularity depends on the content of the materials entering the system.

# Defining the circularity of products

**UL 3600, the Standard for Measuring and Reporting Circular Economy Aspects of Products, Sites and Organizations, details a first-of-its-kind, industry-accepted way to measure product circularity and is the foundation of our Circularity Facts™ Program.**

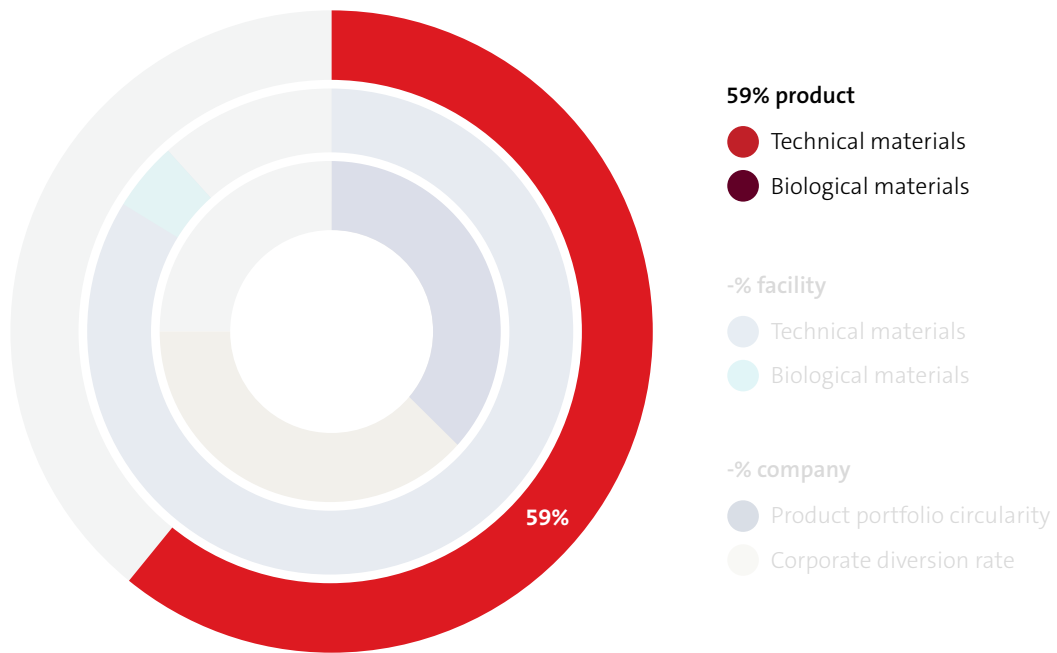
To support organizations in their efforts to verify product circularity, UL 3600 details a first-of-its-kind, industry-accepted way to measure and validate product circularity through the quantification of product input and an examination of end-of-life outputs.



Furthermore, using established Environmental Claim Validations (ECVs), companies can select either the technical or biological track to validate circularity. Products are validated for their inputs and outputs to determine if they are designed to fit into the circular economy. Once validations have been achieved, our experts can quantify and measure the product's circularity by combining its content and design scores to arrive at an overall circularity score.

# New way to express circularity | Product

UL 3600, the Standard for Measuring and Reporting Circular Economy Aspects of Products, Sites and Organizations, through our Circularity Facts Program



Technical materials circularity	Content	Design
Product and component reuse	0%	0%
Recycling and byproduct synergy	52%	66%
Closed-cycle recycling	0%	0%
Technical materials total	52%	66%
Biological materials circularity	Content	Design
Biochemical feedback/biobased content	0%	0%
Composting	-	0%
Anaerobic digestion	-	0%
Biological materials total	0%	0%
<b>Circularity rate</b>	<b>52%</b>	<b>66%</b>





## Summary and conclusion

Companies play a central role in global efforts to eliminate wasteful practices. They can lead the regenerative use of valuable natural resources while helping to ensure the longevity and sustainability of our planet and the well-being of humanity.

By integrating the principles of circularity into their strategic priorities, organizations can make critical contributions to these efforts. They can also help make their companies more resilient by addressing supply and demand variations that can adversely affect financial performance and return on investment.

For organizations that embrace the values and benefits of a circular economy approach, validating the results of their circular efforts is essential to assessing the effectiveness and limitations of those programs while also identifying areas requiring further attention. Product circularity is one of the circular economy principles that will help businesses transition to an environmentally prosperous future.

UL 3600 and our Circularity Facts program are the first tools available to help companies objectively assess their material circularity. With them, businesses can measure the results of their efforts, determine whether they're creating more value through less waste and keep on the path of continuous improvement.

**Learn more at [UL.com/Environment](https://ul.com/Environment).**

# Endnotes

1. The phrase “made to be made again” was taken from the website of Ellen MacArthur Foundation, a nonprofit organization that actively promotes the concept of a circular economy. Web, 8 November 2018. <https://ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview>.
2. “25 years ago I coined the phrase ‘triple bottom line.’ Here’s why it’s time to rethink it,” Harvard Business Review, June 25, 2018. Web, 8 November 2018. <https://hbr.org/2018/06/25-years-ago-i-coined-the-phrase-triple-bottom-line-heres-why-im-giving-up-on-it>.
3. “Business reporting on the SDGs: An analysis of the goals and targets,” a report by the Global Reporting Initiative, 2017. Web. 8 November 2018. <https://3blmedia.com/News/Business-Reporting-SDGs-Analysis-Goals-and-Targets-Launched/>.
4. Based on a UL Solutions analysis of data available through the World Bank’s Global Consumption Database. Web. January 2019. <http://datatopics.worldbank.org/consumption/>.
5. From “Waste to wealth: The circular economy,” as quoted in the “CEO Guide to the Circular Economy” published by the World Business Council for Sustainable Development, 5 June 2017. Web. 20 January 2019. <https://docs.wbcsd.org/2017/06/CEO-Guide-to-CE.pdf>.
6. “Improving markets for recycled plastics: Trends, prospects and policy responses,” a report by the Organisation for Economic Co-operation and Development, May 2018. Web. 8 November 2018. <https://www.oecd.org/environment/waste/Policy-Highlights-Improving-Markets-for-Recycled-Plastics.pdf>.
7. “The New Big Circle: Achieving growth and business model innovation through circular economy implementation,” a report by the World Business Council for Sustainable Development and the Boston Consulting Group, January 2018. Web. 8 November 2018. [https://docs.wbcsd.org/2018/01/The\\_new\\_big\\_circle.pdf](https://docs.wbcsd.org/2018/01/The_new_big_circle.pdf).



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