




Sustainable Material Answers™  
**Circular Economy**





As climate change continues to be one of the defining issues of our time, a commitment to sustainable solutions is essential—now more than ever. At Avient, we are proud to be a part of the solution, supporting the shift from a linear economy to a circular economy and driving sustainability for all of our stakeholders. We know designing sustainable solutions often comes with challenges and questions. That's why we created a three-part eBook series that dives deeper into the questions you have about sustainability.



# What is the Circular Economy?

## A new way of life

The circular economy is a rethinking of the way humans make, own, and use things. Inspired by regenerative ecosystems found in nature, the circular economy proposes that all goods and products find their way back into supporting the same system from which they were created once a person is finished using them. It assumes that the use of a product by a human is only a brief stop of an ongoing lifecycle. The materials, parts, polymers, chemicals and other components of the things we use are all designed to re-enter the ecosystem that helped produce them. The circular economy is a departure from the linear, take-make-waste system in which discarded goods and products end up in landfills once people no longer have a need for them.



## Origins

In its purest sense, the circular economy's origin is Mother Nature. Ecosystems found in nature are regenerative and restorative rather than linear. For example, a plant grows, a worm eats the plant, a bird eats the worm, then the bird eventually dies and its nutrients are absorbed by the soil—where a plant grows again. Each point on the circular continuum helped support and rebuild the system. You can find ideas applying this circular ecosystem to modern economics and manufacturing as far back as post-World War II.

## Defining circular

According to the Ellen MacArthur Foundation, a circular economy is one that is “restorative and regenerative by design.”

It is based on three principles:

- Design out waste and pollution
- Keep products and materials in use
- Regenerate natural systems

By following these principles, a circular economy can drastically reduce waste, pollution, and resource depletion.



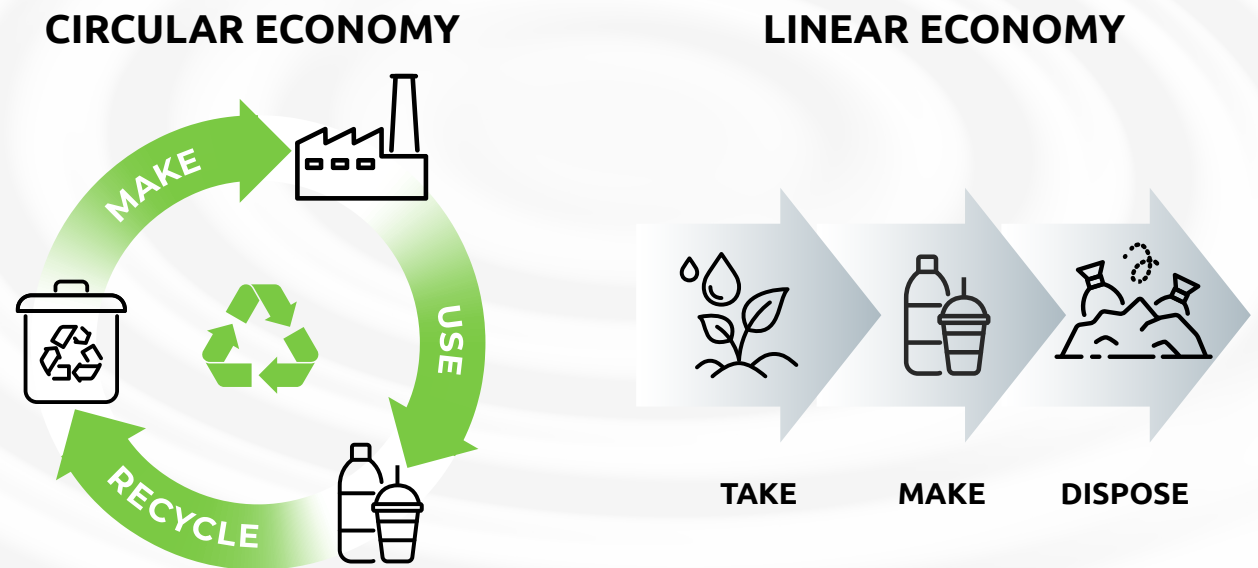
# The Circular Economy: A Self-Supporting System

The goal of the circular economy is to be a continuous, self-supporting system. This means ensuring the materials and products we create and bring into the ecosystem can be recycled or upcycled to avoid waste and minimize downcycling (reuse in a degraded form).

This graphic shows the difference between a circular economy and a linear one.

In the circular scenario, which repeats again and again, resources are used to create products, those products are reclaimed and/or recycled via collection infrastructures, and the resulting recycle is then formed into more products.

In a linear economy, humans take resources from the earth, make products with them, and dispose of those products. There is no repetition, and the resulting waste only grows.







# Why is the Circular Economy Relevant Today?

The circular economy is perhaps more relevant today than any other time in history. By reducing waste and pollution—and relying on renewable energies rather than fossil fuels—a circular economy greatly reduces the negative impact an industry has on the environment.

## Climate Change

As more scientific reports continue to warn of the urgent and impending effects of climate change, implementation of circular economics can be a powerful step towards helping to solve the world's climate crisis. But it's more than just transitioning to renewable energies: it's designing out waste and pollution before production and manufacturing even begin. In doing so, we can cut the waste and emissions generated in the production of materials.


## Plastics

In many ways, plastics are a perfect example of why a circular economy is so important. If not recycled properly, plastics can end up in a landfill or, even worse, the ocean. But in a circular economy, every stage of a product's journey is considered before it's ever made—and that includes what happens after the consumer no longer needs it. Efforts can be made and systems can be built to keep discarded plastic in the economy to either be upcycled, recycled, reused or composted.

SOURCE: <https://ellenmacarthurfoundation.org/topics/climate/overview>

SOURCE: <https://ellenmacarthurfoundation.org/topics/plastics/overview>





# What is the End Result the Circular Economy Hopes to Achieve?

## The Environment

A circular economy is projected to have a positive effect on the environment and industry, and it's one of the necessary components in helping companies achieve net zero emissions. According to the Ellen MacArthur Foundation, switching to a circular economy can reduce emissions from construction materials by 38% by 2050. By 2040, a circular economy has the potential to reduce the annual volume of plastics entering our oceans by 80%, reduce greenhouse gas emissions by 25%, generate savings of \$200 U.S. dollars per year and create 700,000 net additional jobs..

## Industry

A circular economy would reduce the cost of materials and production, which in turn creates savings for industries. These savings are realized through circular activities that enable more efficient use of materials and less reliance on the raw materials market, where prices are often volatile. In addition, one of the largest comparative studies on the impact of implementing a circular economy demonstrated a positive effect on employment, in part due to new jobs in recycling and remanufacturing.

SOURCE: <https://archive.ellenmacarthurfoundation.org/explore/the-circular-economy-in-detail>





# What Stands in the Way of the Circular Economy?

## Three Barriers

Although the circular economy produces benefits for the environment, businesses and individuals, creating the circular economy involves macro changes and is not without challenges. The following are just three of the many barriers that often must be overcome before a circular economy is realized.

## Consumer Behavior

Simply put, consumers must be thoughtful about the way they use and own products in order to create a circular economy. Specifically, a shift in mindset is needed for those who are accustomed to throw out items they no longer have use for—this is the basis of the “make-take-waste” mindset. In a successful circular economy, consumers are aware of what happens to their goods and products once they no longer need them, they know exactly how to reduce their waste, and what to do with something after it’s been used.

To enable this transformation, more consumer education is needed. In general, people are still not sure exactly what they can do to support circularity.

SOURCE: <https://www.wri.org/insights/barriers-circular-economy-5-reasons-world-wastes-so-much-stuff-and-why-its-not-just>



## What Stands in the Way of the Circular Economy?

### Industry Infrastructure & Technology

Investment is needed to create the systems and industries that allow for goods and materials to re-enter the production cycle. For instance, recycling technology and infrastructure must be further advanced in order to sustain a circular economy. Due to a lack of sorting and processing technology currently available, for example, most recycled plastics are reprocessed and downcycled into lower-value materials like carpet fibers; only 2% are recycled into products with a similar value to the original product. This degradation of quality and value over time does not allow a material to successfully reintegrate into the economy. With better technology and infrastructure, recycled products could re-enter the ecosystem at the same or higher value, which in turn would better support a more circular economy.

### Reliance on Materials of Low Residual Value

The environmental and economic impacts of a material can vary greatly. Industries often choose a material because they are economically advantageous, but this also means the material can have low residual value. Materials like this can be difficult to integrate into a circular economy because their post-use feasibility is low. Demonstrating to industries the long-term benefits of choosing materials that have high post-use residual value is a challenge that must be overcome in order to create a circular economy.

SOURCE: <https://www.sourcetoday.com/supply-chain/article/21142961/four-challenges-standing-in-the-way-of-a-circular-economy>





A photograph of a traditional wooden windmill standing in a vast field of purple flowers, likely lavender, under a dramatic sunset sky with orange and pink hues. The perspective is from a low angle, looking down a path that leads towards the windmill.

# What is the Current State of the Circular Economy?

## Report

According to the [2021 Circularity Gap Report](#), our global economy is only 8.6% circular. The report also identifies strategies for nearly doubling that figure to 17% by 2030 by identifying sectors with a high potential for change.

## A Global Leader: The Netherlands

Applied principles of the circular economy can be found throughout the world. The Netherlands, for instance, has established itself as a global leader in growing the circular economy—with an estimated 24.5% of its economy circular. The Dutch government has set an ambitious goal for a complete circular economy by 2050.

SOURCE: <https://www.circularity-gap.world/updates-collection/countries-critical-in-achieving-a-global-circular-economy>



## What is the Current State of the Circular Economy?

### Latin America

Elsewhere, Alicia Bárcena, Executive Secretary of the Economic Commission for Latin America and the Caribbean (ECLAC), affirmed that promoting greater incorporation of the circular economy will enable the region to move towards a more sustainable, inclusive and low-carbon development pattern.

### Western European Nations

France, Germany, Belgium, Italy, Luxembourg, Portugal and Spain have all adopted actions or made pledges to grow the circular economy in their respective countries. Each country has acknowledged its benefits both environmentally and economically, and are working to implement principles and infrastructure that will allow for the circular economy to flourish.

SOURCE: <https://www.circularity-gap.world/updates-collection/countries-critical-in-achieving-a-global-circular-economy>

SOURCE: <https://www.construcia.com/en/noticias/which-countries-are-leading-the-change-in-circular-economy/>





# Solutions that Support the Circular Economy

Avient is committed to solving the world's most complex materials science challenges, which includes creating innovations that contribute to restorative and regenerative systems. Below are highlights from our portfolio of materials and solutions that support and advance the circular economy.

## **REDUCED ENERGY USE**

CESA™ Dry Additives  
CESA™ Release Additives  
OnCap™ CTR Process Optimization  
ColorMatrix™ Joule™ & Smarheat™ Infrared Absorber  
Specialty Low Cure Inks  
SiteCool™ Infrared Absorption Technologies

## **BIO-DERIVED CONTENT**

reSound™ OM Bio-Derived Thermoplastic Elastomers  
reFlex™ Bio-Derived Plasticizer  
OnCap™ Bio Additives  
OnColor™ Bio Colorants  
reSound™ Natural Fiber Reinforced Formulations

## **LIGHTWEIGHTING**

Glasforms™ Pultrusion Technologies  
Polystrand™ Continuous Fiber Composites

## **IMPROVED RECYCABILITY**

CESA™ IR Black Additives  
CESA™ Extend Additives  
ColorMatrix™ Lactra™ SX Light Blocking Additive for PET  
ColorMatrix™ Ultimate™ UV Light Barrier  
ColorMatrix™ Capture™ Oxygen Scavenger for PET  
ColorMatrix™ Triple A™ Acetaldehyde Scavenging Additives  
ColorMatrix™ Reprize™ IV Builder for PET  
OnColor™ IR Sortable Black for Recyclable Packaging  
Bergadur™ Post-Industrial Recycled Content Polyester Formulations  
Nymax™ PIR Post-Industrial Recycled Nylon Formulations  
Maxxam™ FR Flame Retardant Polyolefin Formulations





# What Up Next for the Circular Economy?

## Predictions

Gartner predicts circular economies will replace linear economies in 10 years, noting that supply chain leaders must adapt to circular models in order to keep up in a marketplace with a growing emphasis on sustainability. Both consumers and governments are placing pressure on industries and companies to reduce waste—and current linear economies are a leading cause of waste. To stay competitive and relevant, businesses must create solutions for end-of-use materials and reintegrate them back into the ecosystem. For example, companies may explore ways to collaborate to reuse materials and packaging, and consumer goods brands will likely continue testing sustainable refill models.

SOURCE: <https://www.gartner.com/en/newsroom/press-releases/2019-09-26-gartner-predicts-circular-economies-will-replace-line>

SOURCE: <https://www.greenbiz.com/article/6-circular-economy-trends-will-shape-2020>



### Overcoming Challenges to Achieve Circularity

A global understanding is key to facilitating the growth of the circular economy and spreading its benefits across the world. Reaching circularity requires a coalition of governments, industries, and consumers that all understand the importance and value of a circular economy.

To start, nations must work toward updating their climate and international trade policies to include plans for post-use materials. Industries should also develop action plans for transitioning to sustainable energies and materials that can retain a high value in the post-consumer market. Last but not least, individuals must rethink how they use products and commit to lifestyle changes that will have economic and environmental benefits for everyone.







# Taking the Next Steps

## Take the Circular Economy to the Next Level

Because sustainable material solutions and technology are evolving at the speed of life, it takes fresh thinking, agile R & D, and imaginative use of next-generation materials to bring life-changing products to market safely and quickly. Connect with us to learn more about how Avient can deliver specialized material solutions that keep pace with the ever-increasing demands for sustainability and support the creation of a circular economy.

Contact us today