

# Circular Economy

## What is the circular economy?

The World Economic Forum defines the circular economy as:

**“An industrial system that is restorative or regenerative by intention and design. It replaces the end-of-life concept with restoration; it shifts towards the use of renewable energy; it eliminates the use of toxic chemicals which impair reuse and are returned to the biosphere; and it aims for the elimination of waste through the superior design of materials, products, systems, and business models.”**

Simply put, a circular economy shares, leases, reuses, repairs, refurbishes and recycles existing materials, keeping them in use as long as possible. This reduces the need for new, virgin materials. In a true circular economy, resources are used in perpetuity.

Circularity is a sustainable alternative to our standard linear economy of ‘take, make, use, dispose’. It is becoming increasingly significant at policy and legislative level every year.



Diagram from European Parliament: Circular economy, definition, importance and benefits

## The circular economy in office design and fit out

**60% of total UK waste is generated from construction, demolition and excavation**

Defra Statistics (2021)<sup>ii</sup>

**Of the 92.8 billion tonnes of minerals, fossil fuels, metals and biomass that enter the global economy, only 9% is circular, i.e. reused annually.**

Circle Economy (2021)<sup>iii</sup>

Circularity is crucial to the whole life of an office: from its design and construction, through its use and operation, and its final deconstruction. Fit out and refurbishment projects embrace the circular economy merely by retaining the existing structure and changing the interior, rather than demolishing and building from scratch.

A push for circular thinking is increasingly being felt in the construction industry with many clients and consultants involving it at tender and project stage. One of the challenges is the need to change 'perceptions' and break away from the mindset of 'what worked before'. New ways must be considered and innovation must lead the way.

**BREEAM, LEED** and **SKA** assessments award credits for circularity, including flexibility in design, reuse of materials and ensuring those installed are durable.

## **Design for flexibility, longevity, adaptability**

Offices have so many different use scenarios and undergo constant change. When flexibility is built into the design of spaces, one use can flow into another over time. This avoids large level change and reduces the waste of materials and products.

An example might be for a business to switch from an open plan office to one focused on collaboration. This would use demountable, moveable partitions; specify resilient flooring that copes with changes in use; and identify easily moveable and reconfigurable furniture.

The response to COVID demonstrates a dramatic and wide scale office realignment that was needed through increasing hot-desks; the introduction of social distance requirements; and more space for collaboration.

Building in layers is an achievable circular economy design concept where:

**'during refits or refurbishment, the ability to peel off layers and apply new ones ensures that the neighbouring layers are undamaged.'**

The onion skin model starts with the inner core of an office being made up of its structural framework which has a long life span - such as steel. Attached to this framework are layers of other components which have a decreasing life span as you move away from that central core. As long as the office is designed so that the components in the outer skin of the onion can be replaced, changed or easily repaired, then there is less disruption to the longest lasting inner layers. In an office, the outer layers are made up of unfitted furnishings and furniture, then moving through the layers, the fitted furniture would be next and then the 'scenery' items such as partitions and ceilings and so on.

If an office is designed using this approach, a fit out exercise may meet the needs of new occupants by retaining some existing layers rather than having to undertake a complete reconfiguration.

## **Materials**

**'The bulk of emissions for new buildings are front loaded, and twice as high as those from refurbished buildings.vi'**

Embodied carbon is one of the largest sources of emissions and is created during the sourcing of raw materials, manufacture of new products and any associated transportation. By reusing materials and products and keeping the value of materials in use for as long as possible, we reduce embodied carbon.

Seeing buildings as 'material banks' rather than as being 'made up of materials' is an important shift in emphasis in the circular economy. Even when the building reaches the end of its life, the materials retain their value and can be removed and reused.

## Waste

The aim should be to eradicate waste by smart design, using new technologies and off-site prefabrication. We should design spaces that are easy to deconstruct and reuse elsewhere at the end of their life.

Over ordering materials can result in waste, so careful consideration of the phasing and quantity required is necessary. If stored on site, they require adequate protection from damage.

Careful phasing will also mean that structural elements are undertaken before finishing materials are applied and installed. This prevents damage to those materials and avoids the need for replacements.

Designing spaces to regular sizing and linear layout enables integrated sets to be purchased (such as doors with their frames). Using raised access flooring tiles and ceilings also avoids wastage, as does the use of plasterboard margins rather than cutting tiles.

Making the most of every material reduces waste. For example, when dryliners cut boards carefully, this reduces the amount of offcuts. Any unavoidable remains can then be used around site, for example plasterboard offcuts as an under layer of columns. Companies like British Gypsum cut boards to size off site which reduces waste like other methods of manufacture and off site product prefabrication.

Reducing **single use packaging** and protection on site helps towards eliminating waste. Blankets can be used for protecting joinery; pallets and cable reels returned to suppliers; and reusable drawer systems used to bring products to site.

## Reuse

Reusing existing materials is one of the best ways to lower carbon emissions during an office fit out as this avoids sourcing and manufacture.

A pre-refurbishment audit will identify what is currently in the space, what could be reused and what materials be donated or sold to be reused elsewhere. When selecting materials, consideration can be given to installing reused or refurbished materials rather than buying new ones.

## Recycle

As the outermost ring of the circular economy, recycling is less desirable than reuse or designing out waste. However, where it is not possible to take advantage of reused or refurbished products, it is necessary to look for alternatives made up of a high levels of recycled content.

Many manufacturers offer 'direct-recycling take back schemes'. Direct-recycling means the material is recycled into a new product of the same value, with the same material properties. This circular option retains the value of the material by recycling offcuts and stripped out material to create new products, as often seen in plasterboard and carpet companies.

It is important to avoid manufacturers who simply send materials on for further recycling rather than creating new products. This results in a decrease in the value of the material until it cannot be recycled any further.

## Repair

A successful circular office ensures spaces are designed and built to last. This means the products installed need to be repairable, or replacement parts available. Materials and equipment throughout the space should be easily accessible by allowing for access panels in the walls and ceilings for concealed plant.

## Deconstruct

The design and build of a space should consider end of life and deconstruction on the same level of importance as the install and use. The installers' knowledge should be recorded in a 'deconstruction guide' as part of the O&M for reference when the space is stripped out at the end of its life. This should include information on how the element, product or space has been constructed, specifying for example what fastenings were used and what techniques are best for stripping out in layers.

Mechanical fastenings allow for materials and products to be carefully removed and separated. Installing

materials such as demountable partitions is preferable as they can be removed with less material wastage. Composite materials which bond different materials together and any materials that are difficult to manage at end of life such as PVC should be avoided.

Appropriate time should be allocated to deconstruct space, allowing for layers to be removed and reuse and recycling to be maximised. On fast-paced construction projects, time is often the biggest barrier to successful reuse, so for clients and contractors who deem this as important, it's critical that programmes are not squeezed to their limits.

### Sources:

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UKGBC: Circular Economy Guidance for construction clients  
BRE Group: A circular economy for the property sector

### References:

- i The World Economic Forum: "From linear to circular—Accelerating a proven concept"
- ii Defra Statistics: July 2021 UK Statistics on Waste
- iii Circle Economy: The Circularity Gap Report 2021
- iv David Cheshire: The Handbook to Building a Circular Economy
- v Julian M Allwood and Jonathan M Cullen: Sustainable materials, with both eyes open
- vi David Cheshire: The Handbook to Building a Circular Economy

## About Overbury

At Overbury, we fit out and refurbish outstanding offices and higher education facilities across the UK. Every project is carried out by passionate people who thrive on delivering an exceptional result, precisely as promised.

Our company-wide commitment to low carbon and sustainability means we have reduced our own emissions by 64 percent since 2010, as we continue to work towards our net zero target by 2030. On every project, we work closely with our clients, consultants and supply chains to help them achieve their own low carbon goals.

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