Circular economy business models

A review of the business models emerging from the circular economy

Are we out-running nature?

Human consumption is approaching twice what nature can regenerate each year, suggesting the current consumption model is unsustainable. Addressing this imbalance requires greater efficiency in consumption and greater re-use/recycling from the current levels of sub 10%. These actions are driving a shift to the circular economy.

Why is circularity the next big opportunity?

The year 2021 saw climate change and carbon take centre stage in the sustainability agenda. Global warming is obviously a critical issue and it has come to the fore with events such as droughts, record temperatures, wildfires and floods providing the stark evidence to galvanize worldwide public opinion.

But carbon is only one of many of the world’s natural resources that humans consume, and the growth in population and living standards is leading to ever increasing consumption. This level of consumption now far exceeds nature’s ability to replenish it. This is perhaps best demonstrated by the ‘Earth overshoot day’, the date when humanity’s demand for ecological resources and services in a given year exceeds what the Earth can regenerate in that year. In 2020 it was 22 August, up from 23 September in 2000, on the way towards global human consumption of twice what nature can replenish, a figure already surpassed in the developed world.

The solution is clearly improved use of resources and greater recycling; it is estimated that only around 10% of what is consumed is currently recycled (source: EMF). The Circularity Gap Report 2022 puts this even lower at 8.6%, but also estimates that doubling circularity could reduce emissions to below the Paris 1.5% target. While this agenda is well understood, progress has been slow as the chart illustrates, with UK consumption per head showing limited improvement in recent years and still estimated by the ONS at over eight tonnes a year.

Hence, there is increasing pressure to move to a more circular economy. Our previous note on the circular economy focused on the pressures driving the movement away from the linear ‘make, use, waste’ model to a circular ‘reduce, re-use, recycle’ economy, along with the implications of such a transition.

We look at five types of business model that are emerging to support and benefit from the move to a circular economy. These should not be seen as independent single models but often co-exist and will sit alongside existing business models. Of the five models discussed, three refer to the traditional product phase, dealing with the physical assets, and two are in the consumption phase of the life cycle.

Circular inputs

Circular inputs involve replacing existing linear materials and supplies with inputs that have been and can be recycled. This leads to a direct reduction in the need for virgin raw materials. Inputs include renewable power, bio-products such as compostable plastics or materials that are fully recycled and recyclable.

Edison Insight

‘The circular economy is clearly changing the paradigm within which companies operate. The winners will be those who embrace these changes within their own business model.’

David Larkam, analyst

Renewable energy is clearly a key beneficiary from the drive to use circular inputs, increasingly assisted by the corporate drive to reduce carbon footprints. Investment in clean energy is expected to reach $753bn (in 2019 dollar terms) in 2021 accounting for 40.7% of all energy investment, up from 34.0% in 2017 according to the International Energy Agency. In the UK renewable
electricity generation (43%) outperformed fossil fuels (38.5%) for the first time in 2020, according to the Department for Business, Energy and Industrial Strategy.

Products are made from a range of input materials. A key area of environmental concern has been plastics, particularly in packaging, reflecting both its source from hydrocarbons but also the impact from disposal, particularly on the oceans. The UK government's recently introduced plastic recycling tax covers plastics with less than 30% recycled content. The EU is targeting 25% of plastics from recycled sources by 2025 and 30% by 2030. While regulation is important, it is worth noting the pledges being made by a range of international companies:

- **Unilever** – at least 25% recycled content in its packaging by 2025.
- **Nestlé** – 100% recyclable or reusable packaging by 2025 and reduce use of virgin plastic by one-third.
- **Danone** – by 2025, aims to reach 25% of recycled material on average in plastic packaging, and 50% on average for water and beverage bottles.
- **L’Oréal** – all plastics in packaging recycled or bio-based by 2030 (50% by 2025).
- **Johnson & Johnson Consumer Health** – the brands will use 100% recyclable, reusable or compostable plastic packaging by 2025.
- **Coca-Cola** – by 2025 will source 50% of plastic bottles from recycled content.

Other sectors are already well advanced in this area. Aluminium is a positive example, with a recycling rate of 76% and 32% of material consumed annually coming from recycled resources, while 75% of aluminium ever produced is still in use. The key driver here is economics. Recycled material uses 90% less energy than mining and processing bauxite, which is extremely energy intensive, hence the cost curve is driving circularity. Examples we would highlight include:

- **DS Smith**, a paper packaging specialist, is targeting 100% of packaging product sold is recyclable or reusable by 2023 (2021: 99.2%) and that by 2030 100% of product with be either recycled or reused (note the European packaging sector recycling rate is currently 85% according to FEFCO).
- **Castings**, an iron castings and machining business, uses steel scrap in its foundry and, despite being a heavy energy user, the group uses 100% renewable electricity. The immediate economic benefits are limited but are more likely to come into play as customers such as Scania, a manufacturer of heavy trucks, look to assess the credentials of their supply chains.
- **Carbios** develops proprietary enzymes capable of breaking down certain polyesters, in particular PET (polyethylene terephthalate) and PLA (polylactic acid), a biobased polymer. This enables both enzymatic recycling and the production of biodegradable plastics.
- **Envipco** and **Tomra** both supply reverse vending machines for collecting waste for recycling making them enablers in the recycling loop.

**Product life extension**

Products can reach the end of their lifespan through a range of events:

- Planned or built-in obsolescence where suppliers design a product with a limited life span.
- Premature obsolescence, where a product’s life span is less than consumer, and potentially the manufacturer’s, expectations.
- Indirect, where either replacement components are not available or repair is either impractical or uneconomic.
- Incompatibility/technology where products have been usurped by technological developments either in performance or compatibility.
- Style obsolescence, where owners perceive products as out of date, despite remaining fully functional.

Extending a product lifecycle suggests a reduction in overall consumption, a key theme of the circular economy. However, there are potential secondary effects from life extension. These include continued use of a less energy-efficient product. For instance, 68% of an internal combustion engine powered car’s emissions come from in-use fuel consumption and 22% from manufacture (source: VW). According to the Environmental Protection Agency improved technology reduced emissions for a new car by 3.5% between 2014 and 2019.

This means there is a crossover point at which it is beneficial to scrap (and recycle) an older car and replace it with a new, more efficient model. Obviously, an electric car would push this tipping point towards the replacement end of the scale. There are also secondary effects, such as the social impact on the manufacturers, retailers and repair sectors.

The traditional corporate business model is often built around maximising consumption. This leads to a view from corporates that obsolescence is good because it promotes re-purchasing and total consumption. Arguably, companies have consciously looked to build in obsolescence through the lifespan of components or non-retrospective technology upgrades.

Governments are starting to address this lifespan issue with legislation such as the recent ‘right-to-repair’ regulations introduced in the EU. This requires the manufacturers of dishwashers, washing machines, fridges, televisions and other electronic displays to provide spare parts for up to 10 years. The UK has enacted similar legislation. Austria is going a step further, with government-
funded repair bonuses being introduced in 2022 to promote the repair versus replace balance.

**musicMagpie (client of Edison)** is a leader in the re-commerce of consumer technology (including smartphones), disc media and books in the UK and US. The group not only offers the benefits of re-use but also refurbishes to extend the life (and value) of products.

### Resource recovery

Resource recovery encompasses recycling or ‘reverse logistics’ from all elements of the product lifecycle with a financial incentive to retain the highest economic value from a hierarchy of waste perspective. The Ellen MacArthur Foundation estimates that only 5% of material value of goods produced is recovered, suggesting significant scope for improvement.

Governments are looking to reduce waste. In Europe, municipal waste (40% of all waste) recycling was 47% in 2019. The target is for 60% by 2025 and 65% by 2030 along with an aim to reduce landfill to below 10% by 2035 from 24% in 2019.

A key driver has been the use of extended producer responsibility (EPR) regulation where producers are responsible for the environmental impacts of their products when they become waste. There are over 400 EPR (source: OECD) systems in operation worldwide, with most relating to electronic and electrical equipment, packaging, tyres, or batteries. In Europe over 87% of cars were recycled in 2018 but less than 50% of electronic equipment (source: Eurostat).

Economics are also driving recycling. As commodity prices rise, so does the incentive to recycle. The year 2021 saw significant increases in commodity prices; steel c 40%, copper c 20% and PET (plastics) c 20%. There is also the potential for recovered materials to become a premium priced product as legislation on content requirement and corporate targets demands more recycled input content. Examples we would highlight include:

- **Renewi** (Edison client), which focuses on extracting value from waste and supplying high-quality secondary raw materials. Activities include capacity to recycle 1.5m mattresses with 90% re-use and treatment of contaminated soil. At present, 65.8% of waste collected is recycled with a target to increase this to 75% by 2025. In addition, the company produced 353,000 tonnes of innovative secondary materials from waste and is targeting one million tonnes by 2025.

- **Digimarc** (Edison client) provides digital watermarks that contain information about a product. For instance, on packaging this enables greater understanding of the different plastic content, facilitating deconstruction and recycling.

### Sharing platforms

Ownership has often been seen as a prerequisite for consumption, a perception that has been promoted by the traditional corporate economic model. This leads to significant underutilisation of assets and hence over consumption of resources.

Economically sharing, or renting, enables the owner to earn an income from their asset, the renter acquires access to the asset without requiring significant capital outlay. Sustainably, increased utilisation reduces the level of resource required without affecting overall consumption. The business model operates as an intermediary or broker between the owner and renter. This makes the model particularly capital light, but technology heavy. Like many platform businesses, there are significant market-leader benefits along with traditional scale economics.

A commonly cited market thought to offer potential for platform business is car sharing. In the UK the average car is used just 4% of the time (source: RAC Foundation). Depreciation and financing costs of a vehicle account for over 60% of operating costs in the first three years, far exceeding fuel costs or maintenance. To date, the large original equipment manufacturers and third parties have been developing car sharing schemes which are more aligned to product-as-a-service business model.

Examples of the sharing economy include:

- **Airbnb**. Although the rental market has long existed, Airbnb has proved a successful facilitator, providing an alternative venue for renters/rentors and expanding the market. Airbnb connects those with spare accommodation with those looking to rent for a short period. This increases utilisation rates, reducing the waste of empty accommodation and reducing the overall level of housing required.

- **Justpark** has an app that matches drivers looking to park their vehicles with individuals with a space to use on their drive.

### Product as a service

The traditional business model operates through the sale of a product. Companies have subsequently looked to extend this through aftermarket operations and the replacement cycle. The next stage is for the corporate to retain ownership of the product and sell the service that the product offers and the customer is looking to acquire.

There are a range of sustainability benefits, including lower resource utilisation from higher utilisation rates, which reduces the overall requirement for the number of units
produced. In addition, companies are financially incentivised to improve longevity, reliability and performance of products, which also reduces resource requirements.

Producers also retain control of the resources and have greater control over recycling than the current model, which tends to rely on legislation and schemes such as the EPR. Hence, recycling rates are promoted alongside the recycling hierarchy to maximise the value within the waste stream. From a corporate viewpoint, this model offers the potential to deepen the relationship with the customer from a single point of purchase and provide a more consistent income stream. A key negative is the potential additional capital requirements.

An example of product as a service is On. On is a Swiss sports shoe and sportswear company developing its Cyclon offering. This is a subscription model, where customers receive new replacement shoes at regular intervals from On, returning their old shoes, which are then recycled into raw materials and subsequently new shoes. On retains full control over the product, its materials and is able to enhance its circularity.