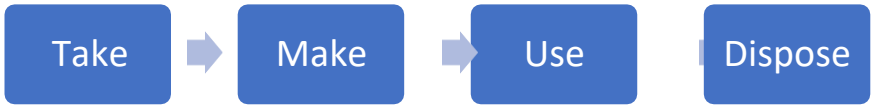
Circular Economy

To understand "circular economy", one must first understand "linear economy" and how it came to be.

Linear Economy



Aptly described by its name, all actions in the **linear economy** are stream-lined in one direction. So, as an economy grows, the number of raw materials needed grows accordingly. As long as economies were relatively small, especially compared to the natural ecosystems in which they are located, this was feasible. In this type of economy natural ecosystems were both the source from where raw materials were extracted and the place in which they were disposed.

In the linear economy all materials are treated as if there is an infinite supply but economic growth in the recent years together with globalisation and increasing material shortages showed that this is not a sustainable model.

The alternative is the **circular economy,** which at its core is a "make/remake – use/reuse" economy. This means products and the materials from which they are made are recovered and reused wherever possible. The aim is to limit the extraction of raw materials and the reduction of waste. The circular economy is not limited to only the product itself but also to its packaging and more. In a way, the circular economy tries to mimic natural ecosystems or living systems where everything is in a continuous cycle.

In mimicking these living systems, four principles for a circular economy can be identified.

1. Waste equals "Food"
    - The materials of a current product will be the materials of the next
2. Build resilience through diversity
    - Greater diversity provides a bigger pool of possible materials and acts as a buffer for unexpected events
3. Use energy from renewable resources
    - To be sustainable in the long run, the circular economy needs renewable energy
4. Think in Systems
    - Circular economies cannot live on their own

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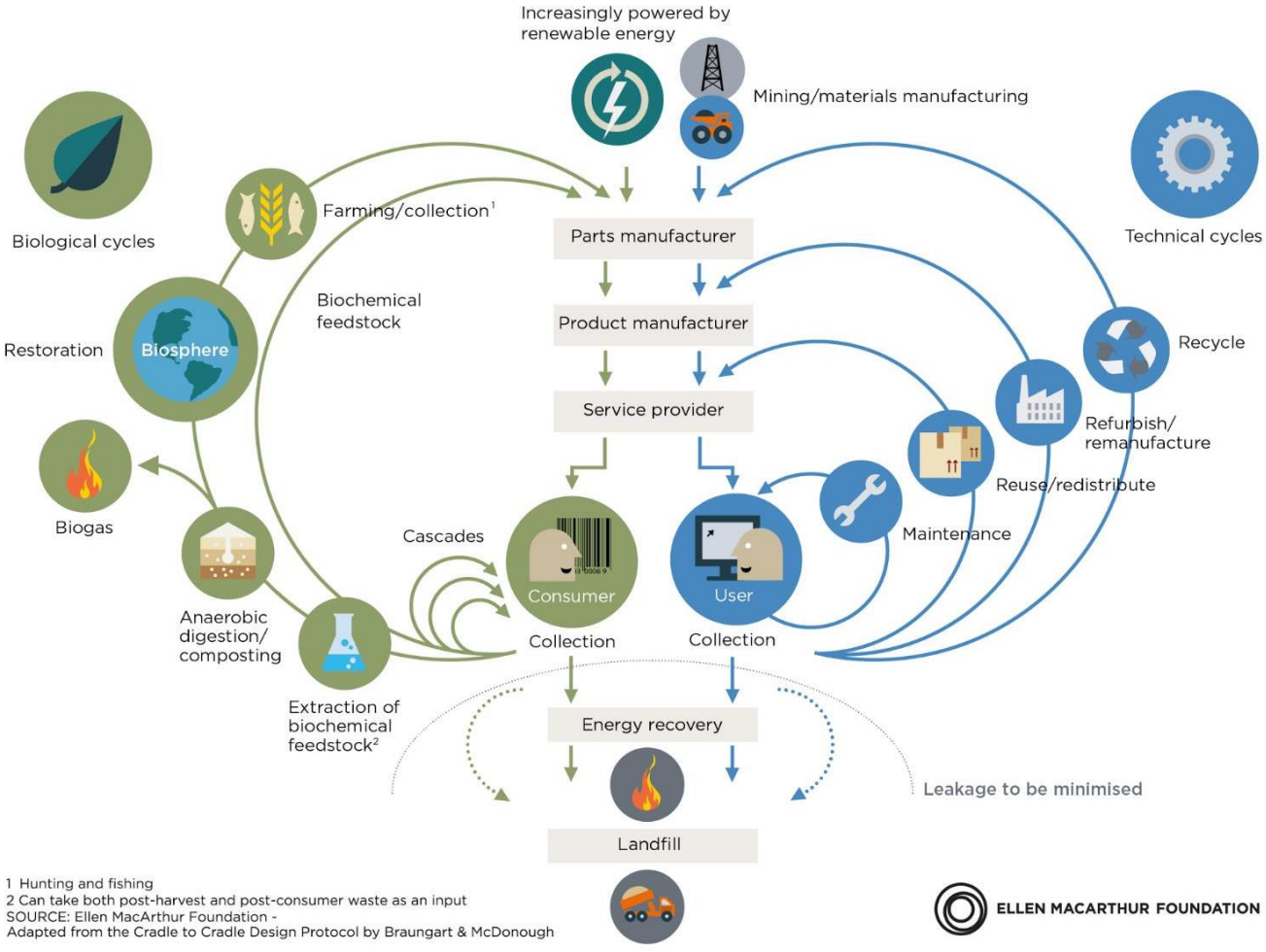
In recognising these basic principles, it becomes obvious that circular economy deep down isbased on the design of products and processes. The overarching goals are to:

- eliminate waste and pollution
- circulate products and materials at their highest value, and
- regenerate nature

One of the most comprehensive depictions of how the circular economy can be built comes from the Ellen Macarthur Foundation and is called "the Butterfly diagram". This diagram takes the current linear economy in the middle and places the cycles of the circular economy around it.

The green cycles to the left represent the biological cycles, in which materials are safe to be returned to the environment from where they were extracted. This approach may indeed add value to the biosphere. An example for this approach is wood.



The materials within the technical, or blue, cycle cannot be returned to the biosphere as is. To retain the value of these materials they must be cycled through systems continuously. An example for this approach is plastics.

As a rule of thumb, it can be said that "the smaller the loop, the better a product is fairing on the side of sustainability". Thus, the sequence would be Maintenance – Reuse/redistribute – Refurbish/remanufacture – Recycle.

The main goal in designing a product or process would be to create a "closed loop", meaning that the said product can cycle the loop as often as possible. This requires the processes of acquisition (the right materials, for the right price), reprocessing (refurbishing or remanufacturing) and remarketing (identification of the right markets) to be optimised and maintained. Other processes can be involved but if any of these key processes fails, the loop cannot be closed.

Closing a loop can generate value not only for the environment but for customers and the company (in the form of sourcing and environmental value).

The circular economy is the economy of our future, if done right. This approach is fundamental to the European Green Deal and the EU's push towards greater circularity.