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Intro to Circularity Thinking *from consumption to regeneration*

Eoin Bailey – UK Innovation Manager

MADE
MANUFACTURE
ADVANCED
DESIGN
ENGINEERING



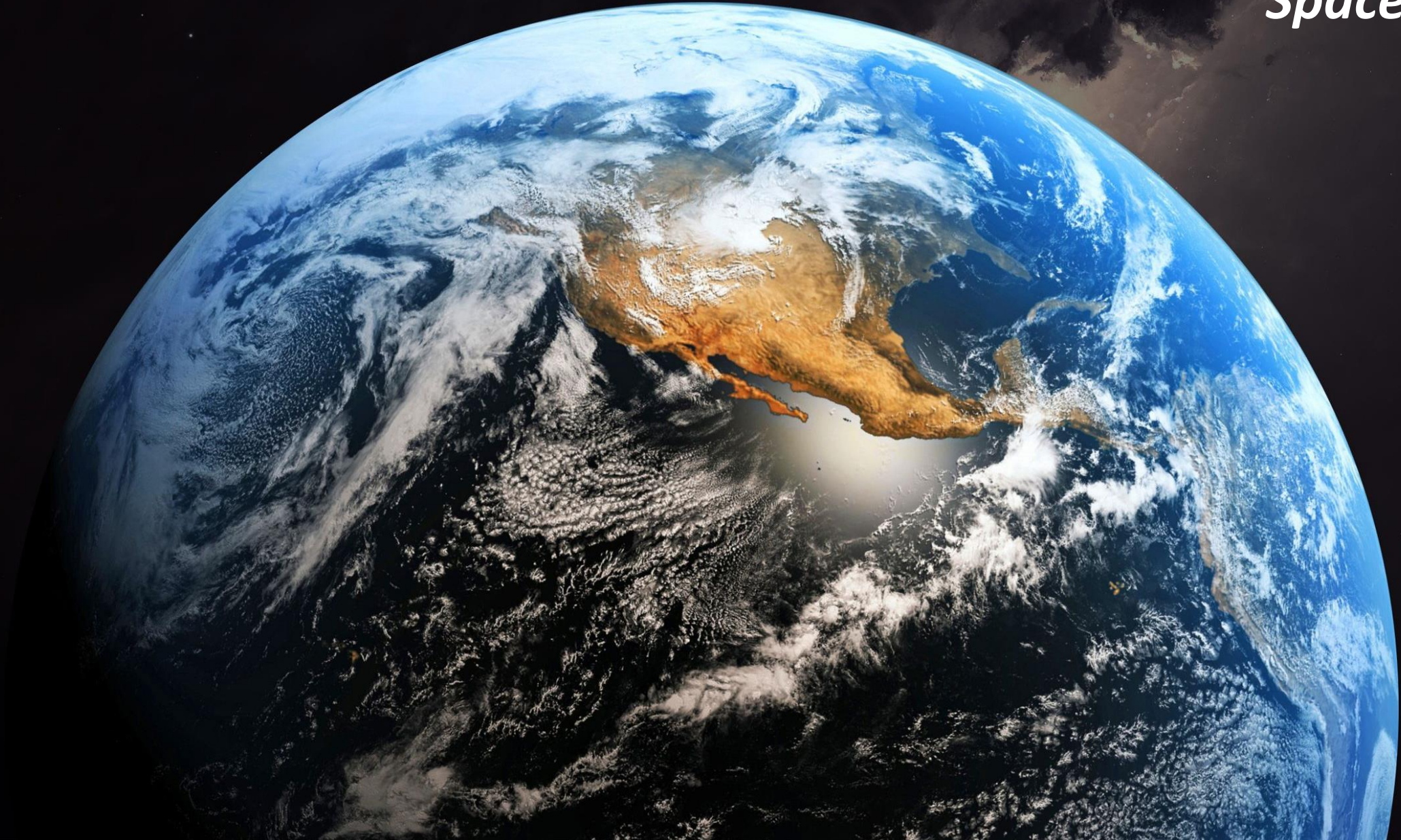
Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David



April 28th 2023

INNOVATION MANAGEMENT

Spaceship Earth





GROWTH

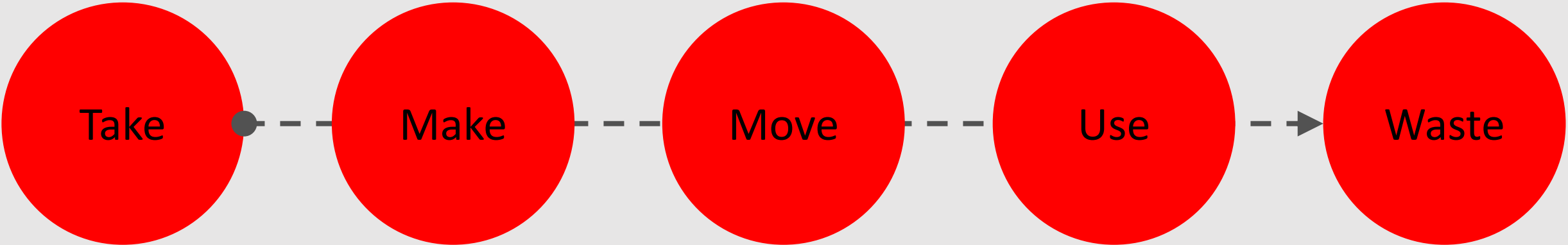
GDP



IMPACT



CO₂



Linear by Design



300,000 Years



Exploration

**Western
Thinking**



Socrates

470 BC

**Colonial
Exploitation**



Columbus

1492

**Nature
Disconnect**



Descartes

1596

**Perceived
Value**



Locke

1632



Industrialisation

1st



Mechanise

1800

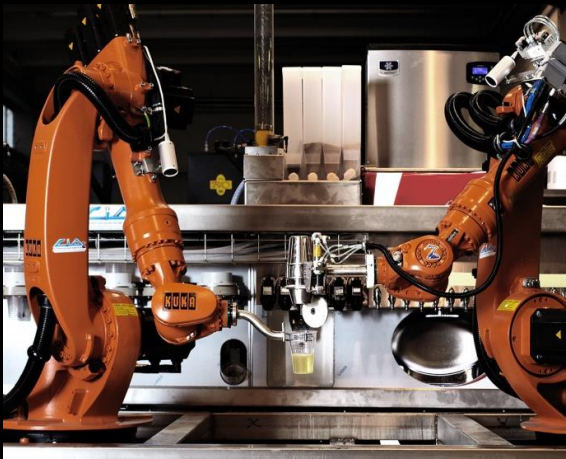
2nd



Mass Produce

1900

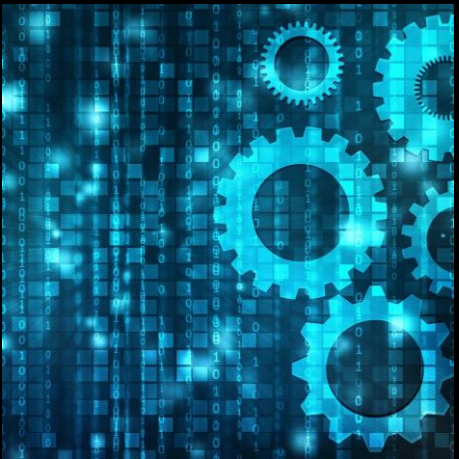
3rd



Automate

1950

4th



Digital

2015



Still, Linear by Design



April 2023



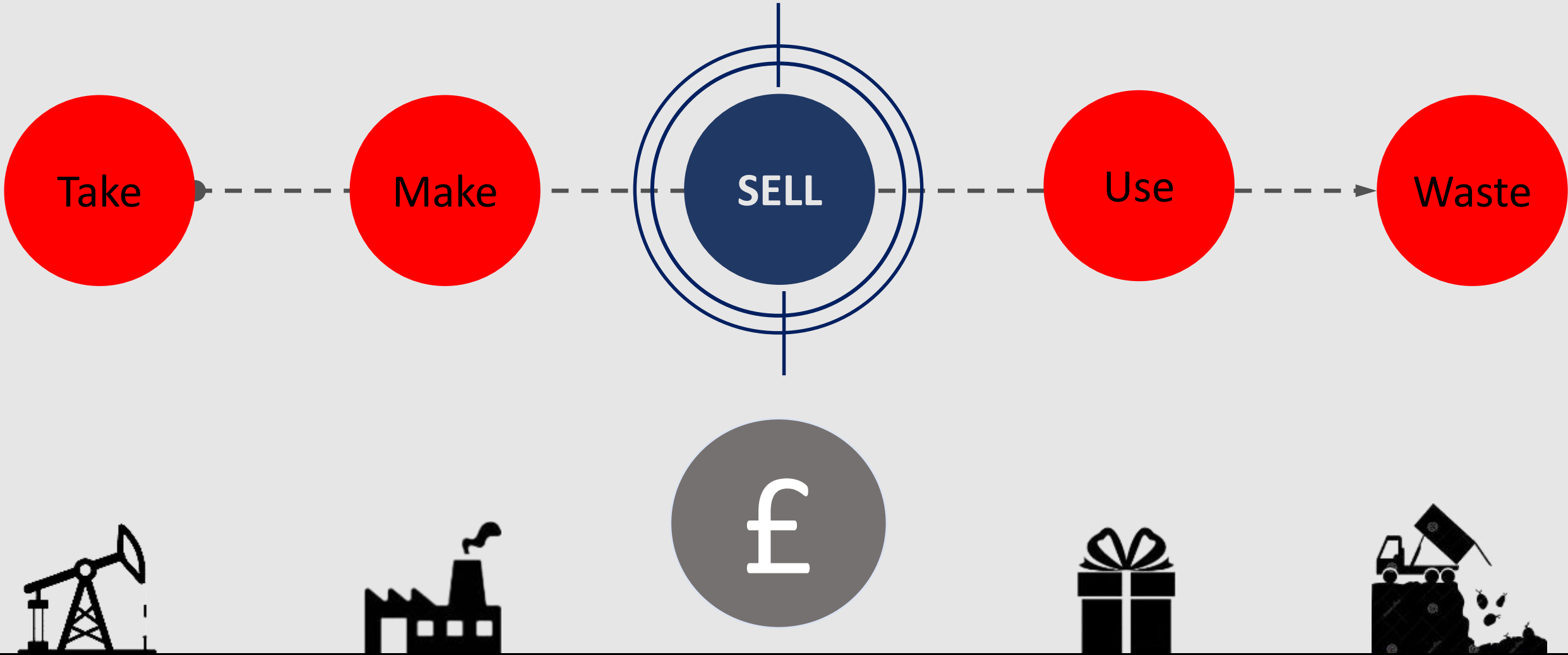
Still, Linear





Still, Linear



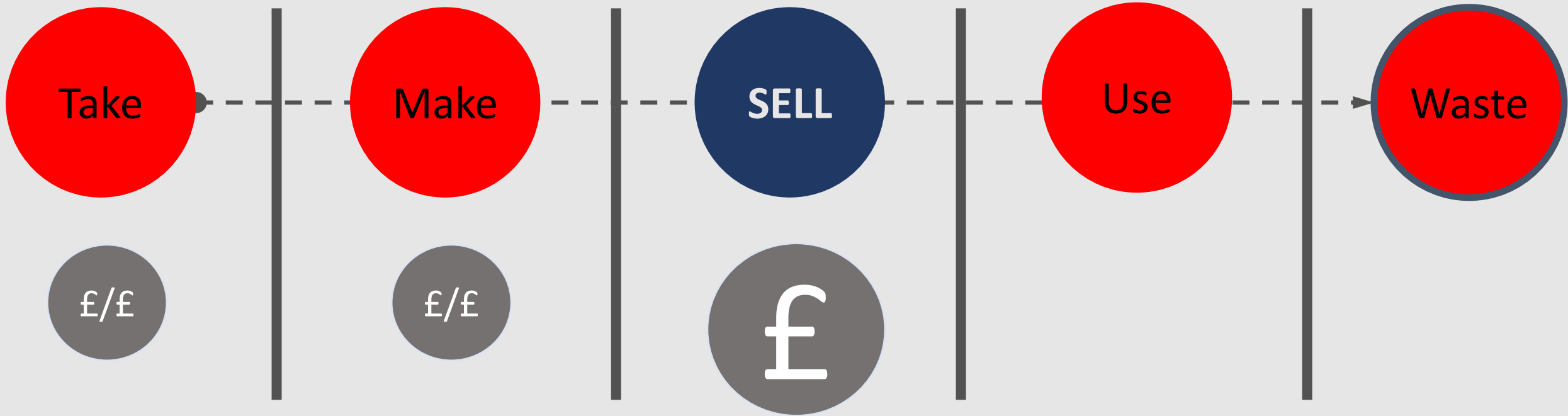


“Nature on its own provides little of value to society, labour expended in the creation of goods gives them their value.”

- John Locke (1690)
godfather of IPR

Linear Economy | Silos | Impact

GDP

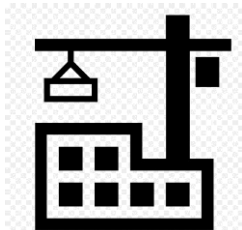
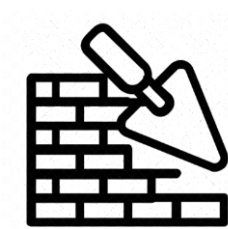
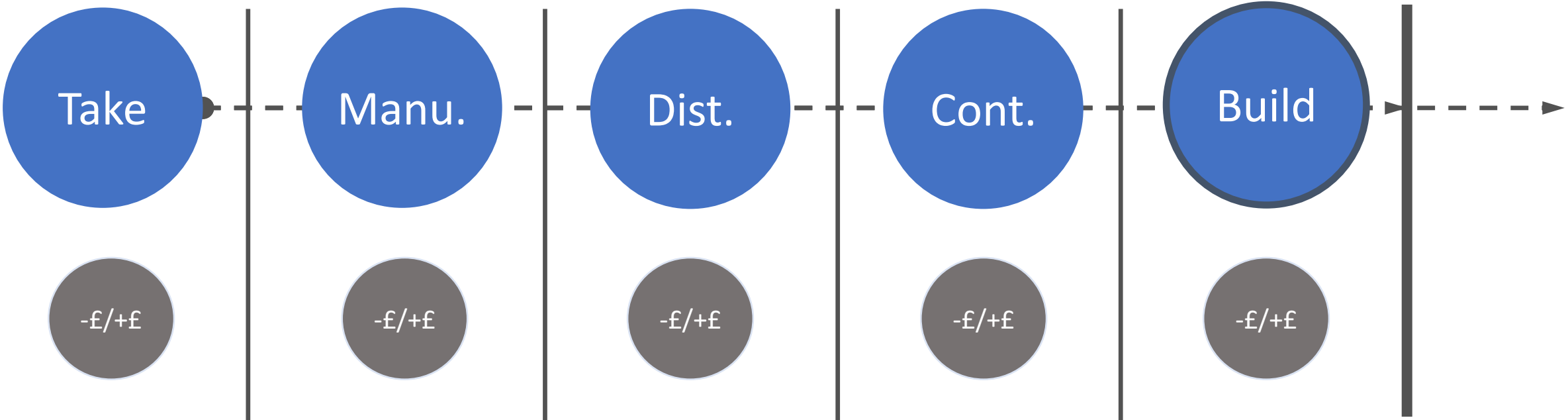


- RISK
- UNCERTAINTY
- INEQUALITY

- CONTRADICTIONS
- UNINTENDED CONSEQUENCES
- UNFORSEEN COST

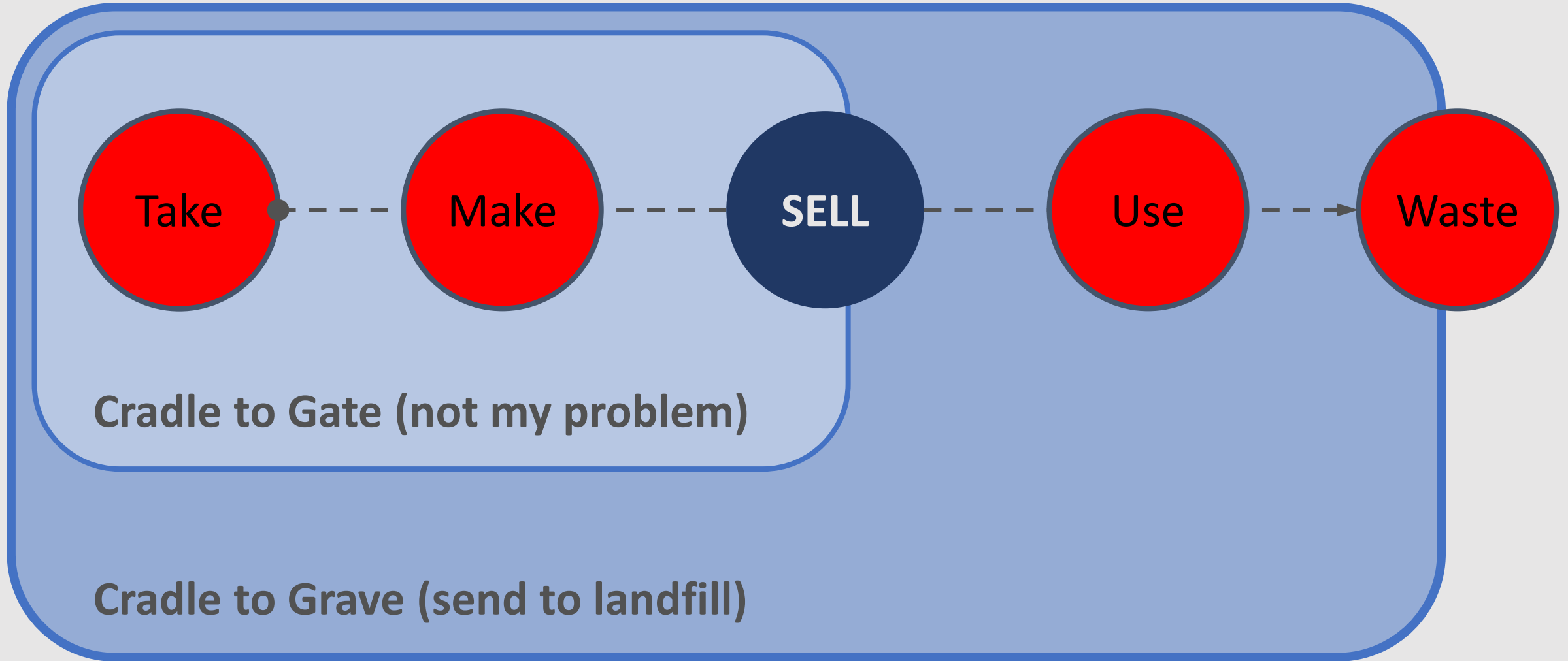
Supply Chains | Silos | Competition

Cost



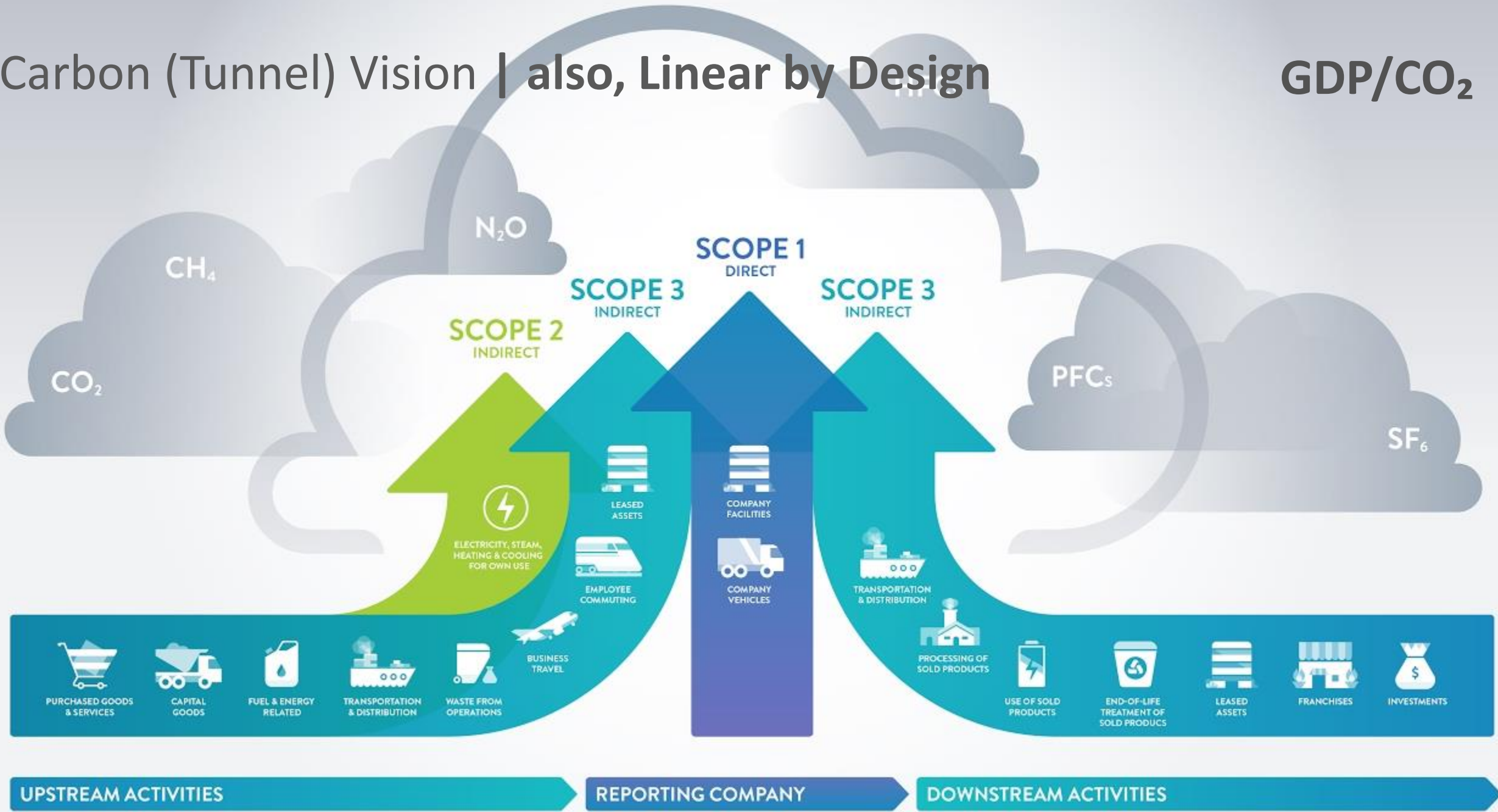
Linear Economy | Misguided Lifecycle Understanding

GDP



Carbon (Tunnel) Vision | also, Linear by Design

GDP/CO₂



Take

RISK

UNCERTAINTY

INEQUALITY

+

CONTRADICTIONS

UNINTENDED
CONSEQUENCES

UNFORSEEN COST

Tantalum Mine – Democratic Republic of the Congo

Take



RISK

UNCERTAINTY

INEQUALITY

+

CONTRADICTIONS

UNINTENDED
CONSEQUENCES

UNFORSEEN COST

Neodymium Mine – Mongolia



Waste

RISK

UNCERTAINTY

INEQUALITY

+

CONTRADICTIONS

UNINTENDED
CONSEQUENCES

UNFORSEEN COST

Neodymium Toxic Tailings Lake – Mongolia



Waste

RISK

UNCERTAINTY

INEQUALITY

+

CONTRADICTIONS

UNINTENDED
CONSEQUENCES

UNFORSEEN COST

End of Life Solar



Waste

RISK

UNCERTAINTY

INEQUALITY

+

CONTRADICTIONS

UNINTENDED
CONSEQUENCES

UNFORSEEN COST

End of Life Wind



Waste

RISK

UNCERTAINTY

INEQUALITY

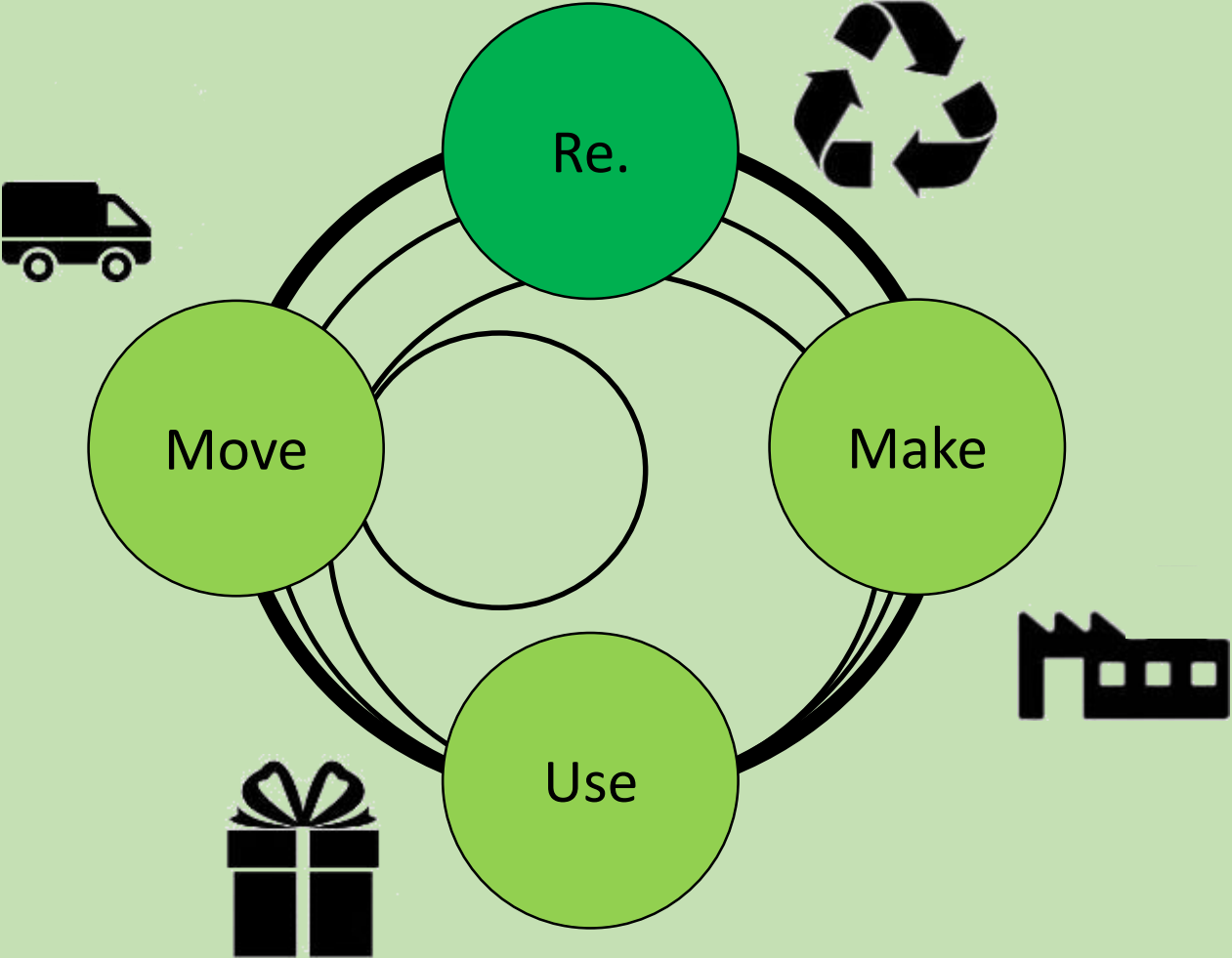
+

CONTRADICTIONS

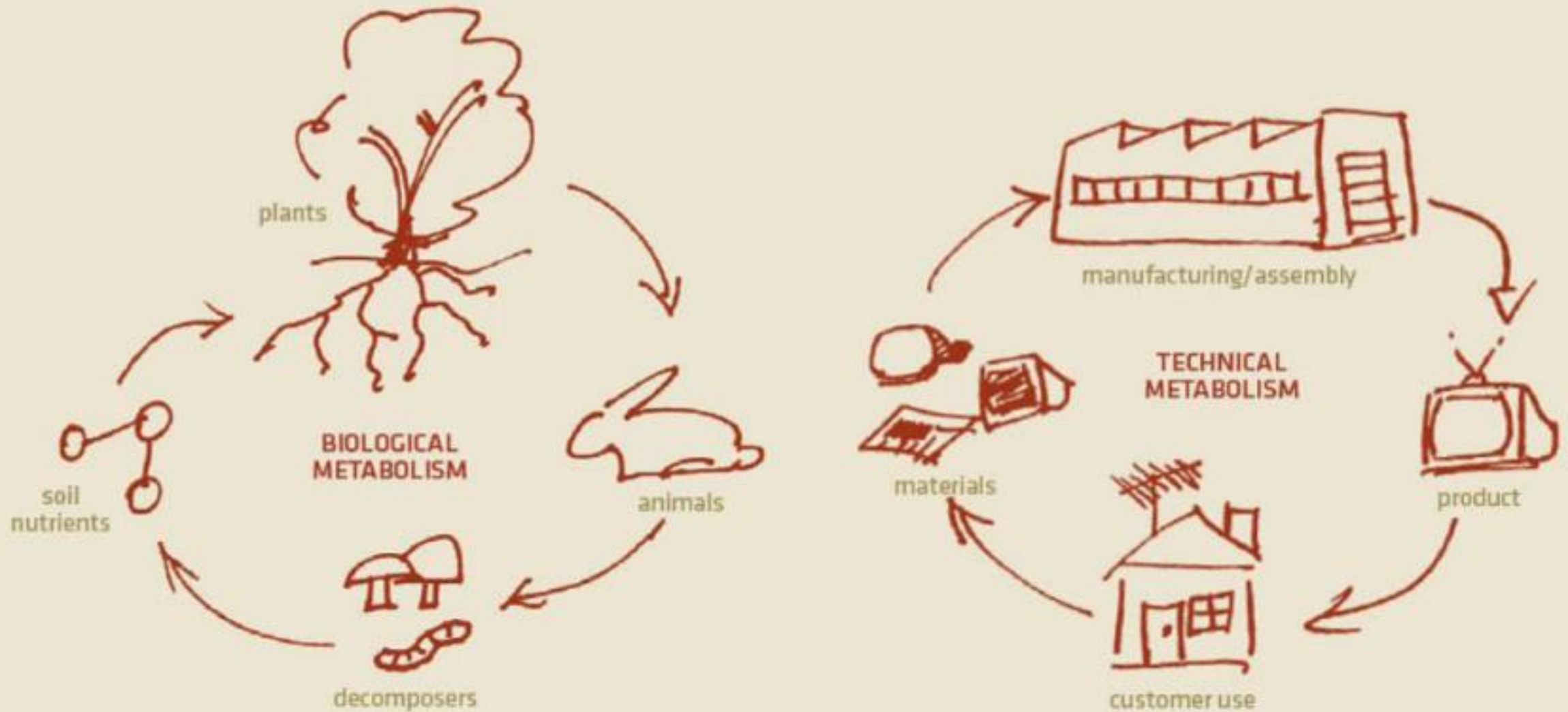
UNINTENDED
CONSEQUENCES

UNFORSEEN COST

End of Life Vehicles



Mimic Natural Systems | food & feedstock



Circular Economy Principles | BS 8001:2017

1. Systems Thinking

- Understanding the system-wide impacts and opportunities

2. Innovation

- Rethinking and utilising our business management as lens for value creation

3. Collaboration

- Securing system-wide benefits by cooperating with lifecycle stakeholders

4. Stewardship

- Taking responsibility for our actions, while protecting and advancing our industry

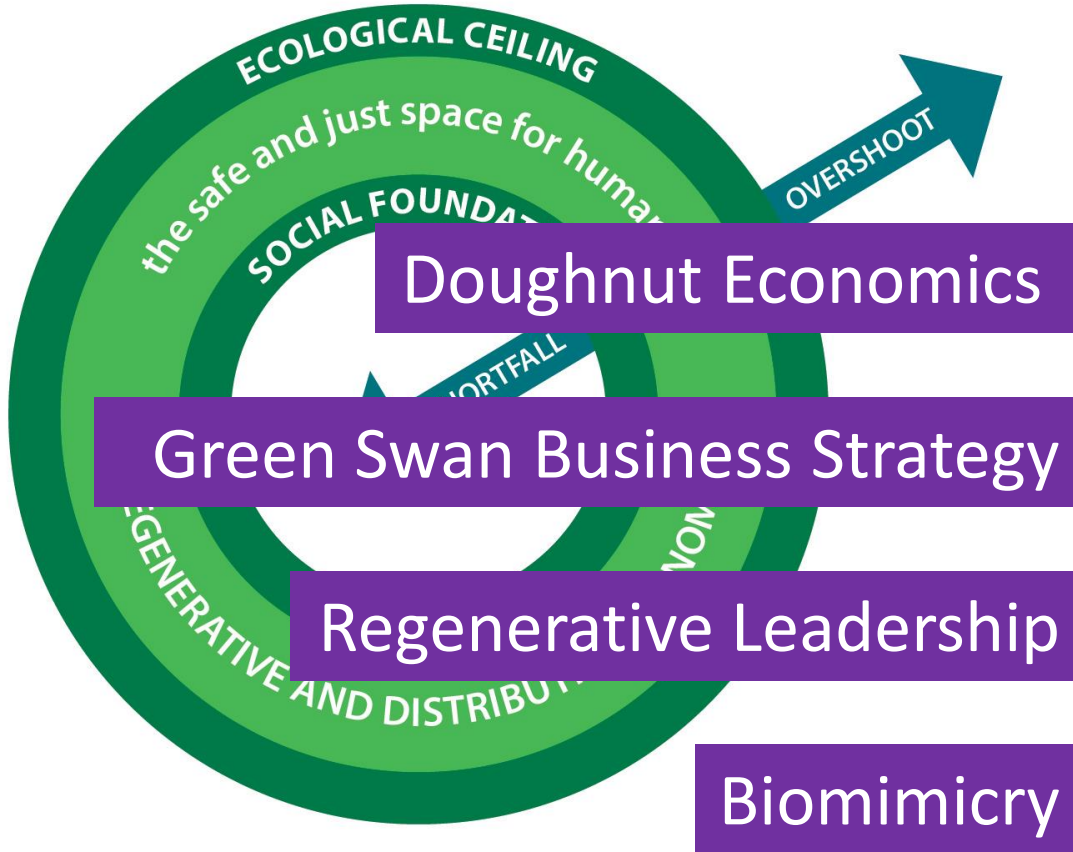
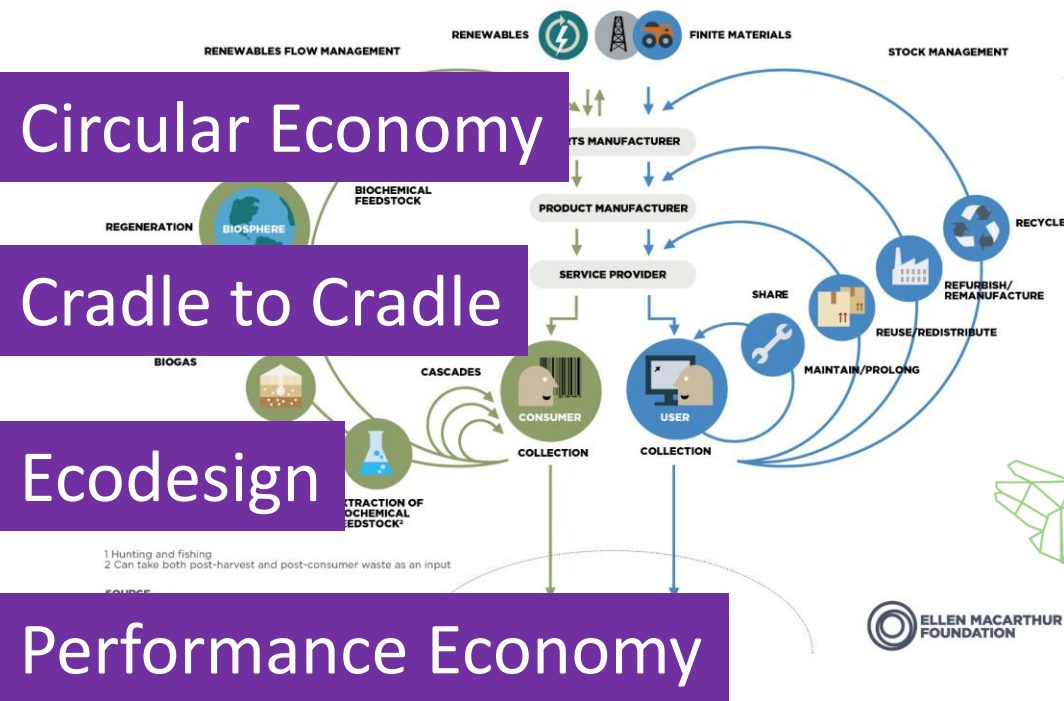
5. Optimisation

- Keeping materials at their highest level of value

6. Transparency

- Being honest and open about circular benefits and barriers

Restorative Solutions | Multiple Value Steams

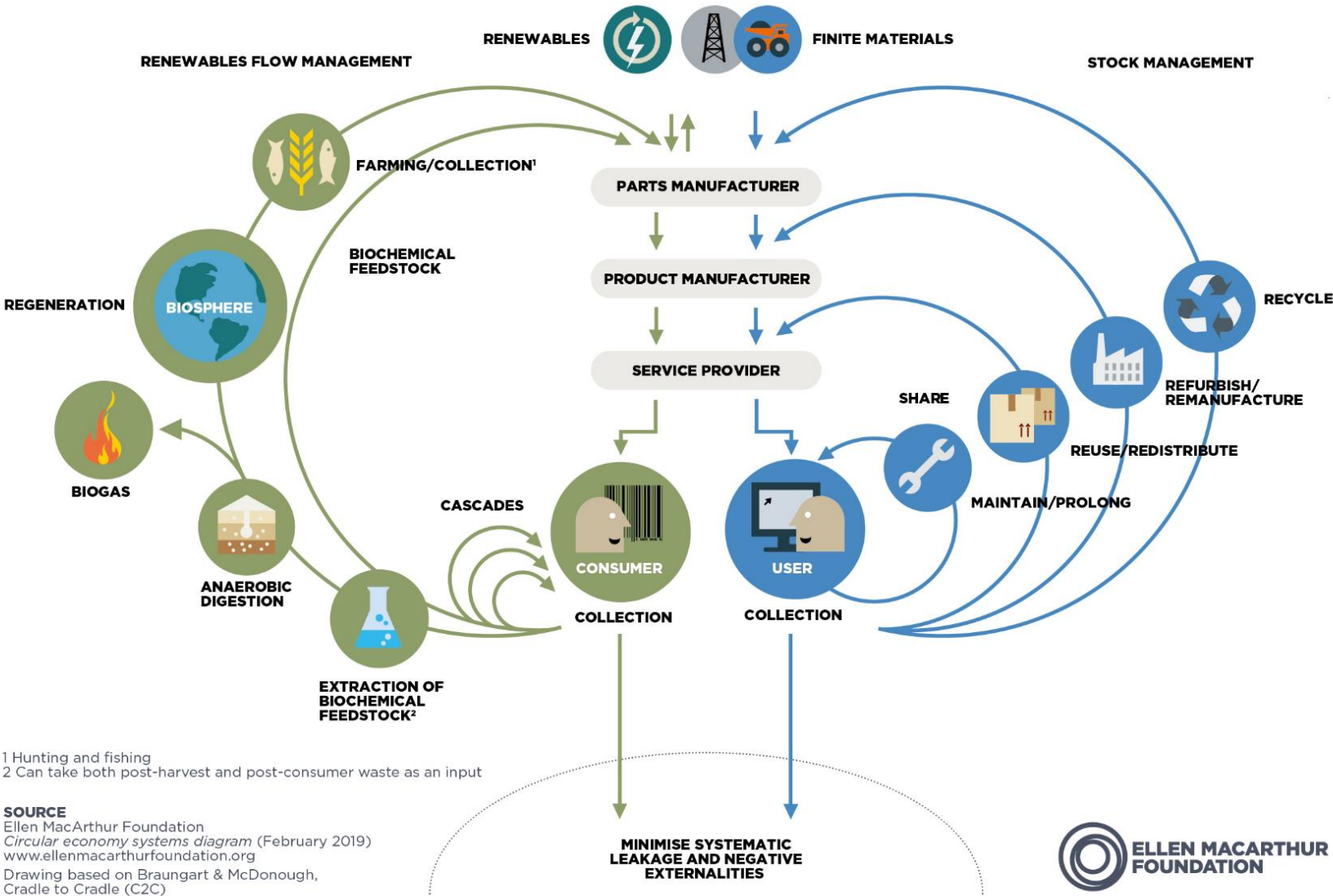


Systems Thinking | Lifecycle Performance

Restorative Solutions | Multiple Value Steams

Circular Economy

ellenmacarthurfoundation.org



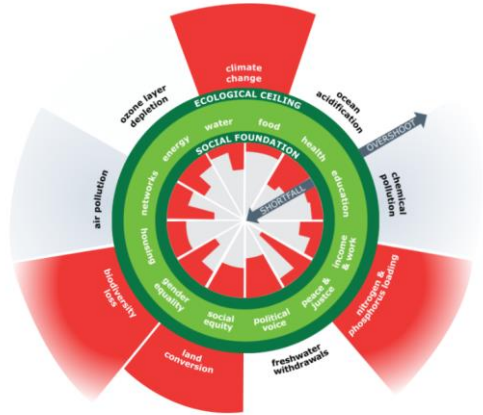
Systems Thinking
Lifecycle Performance



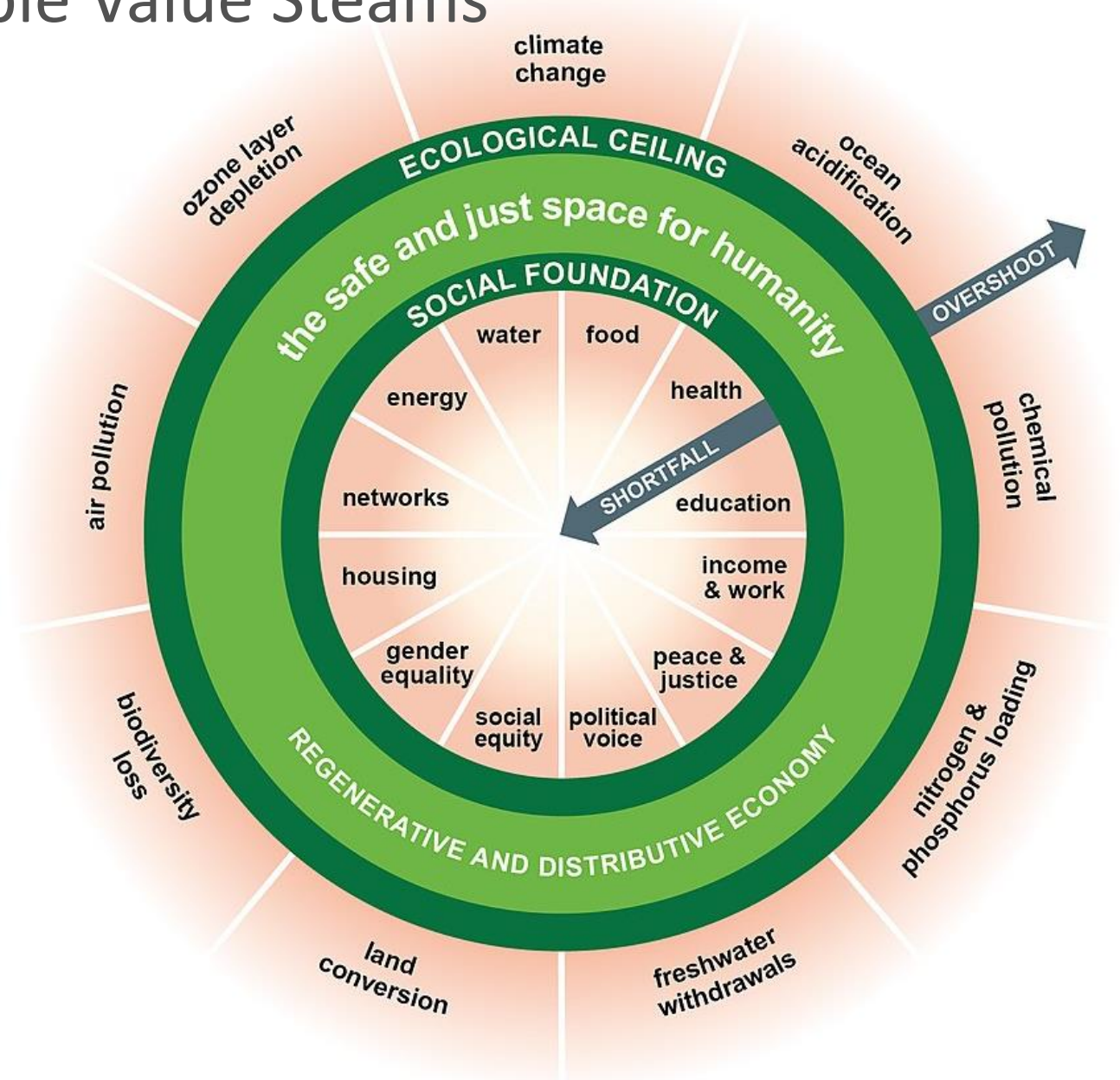
Restorative Solutions | Multiple Value Steams

Doughnut Economics

kateraworth.com/doughnut/



Systems Thinking
Lifecycle Performance





orangebox

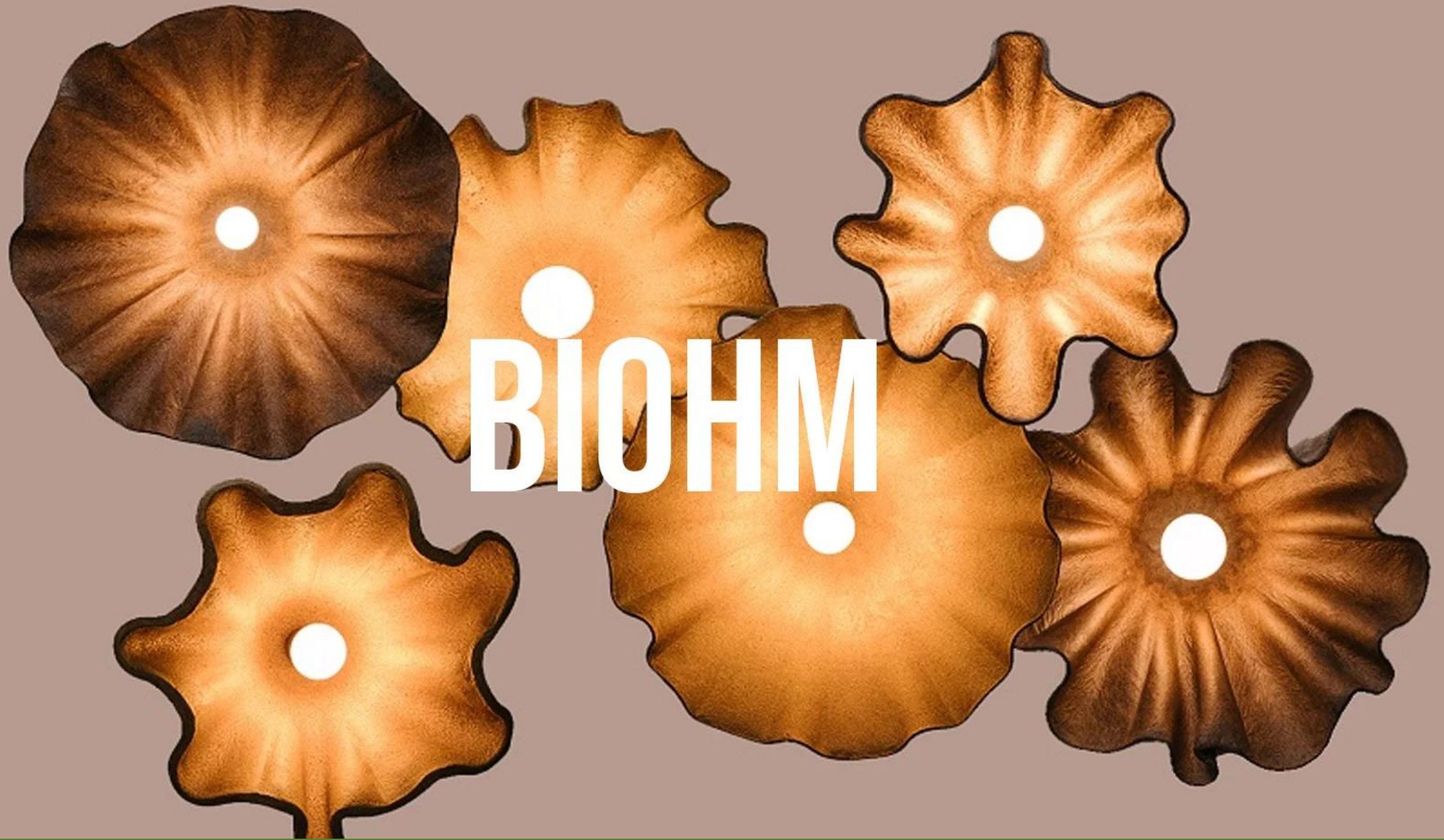


Revolving Furniture

riversimple[®]



Mobility Service



Magic Mycelium

Interface®



Their Carpet



Our Town

An **ECONOMY**
that is
CIRCULAR by nature!

The background of the slide is a photograph of a dark-colored car parked in a grassy field with trees in the background. The image is tinted with a green color overlay.

We want to be leaders
of the **CIRCULAR
SUPPLY CHAIN** to build
a **NET POSITIVE**
future.....

- Honesty
- Humility
- Creative Perseverance
- Ground-breaking Approach
- Teamwork
- Passion

Responsibility | Zero Carbon Ambitions



Major UK Recycler
Using 1.2 million tonnes per year of scrap steel



Local Sourcing
100% of scrap comes from the UK.
98% of raw material is recycled scrap



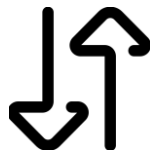
Family Owned Company with Family Values
Local Sourcing – 93% of our spend is in the UK



Electric Arc Furnace Production Only
Most resource efficient way to produce steel



Most Efficient in the EU
Energy Consumption & CO₂ emissions



Vertically Integrated
Upstream & Downstream

Kgs CO ₂ /T	CELSA UK EAF	European avg EAF	China BOS
Production (inc. energy)	429 647	785	2,200
Transport	+6	+160	+550
Total	435	945	2750



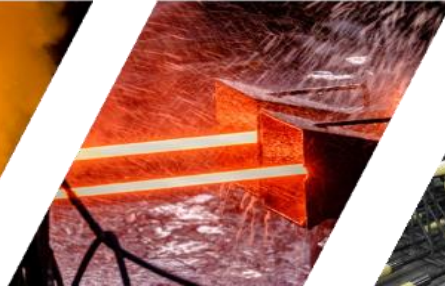
Process | Brands | Locations



Scrap



Melt Shop



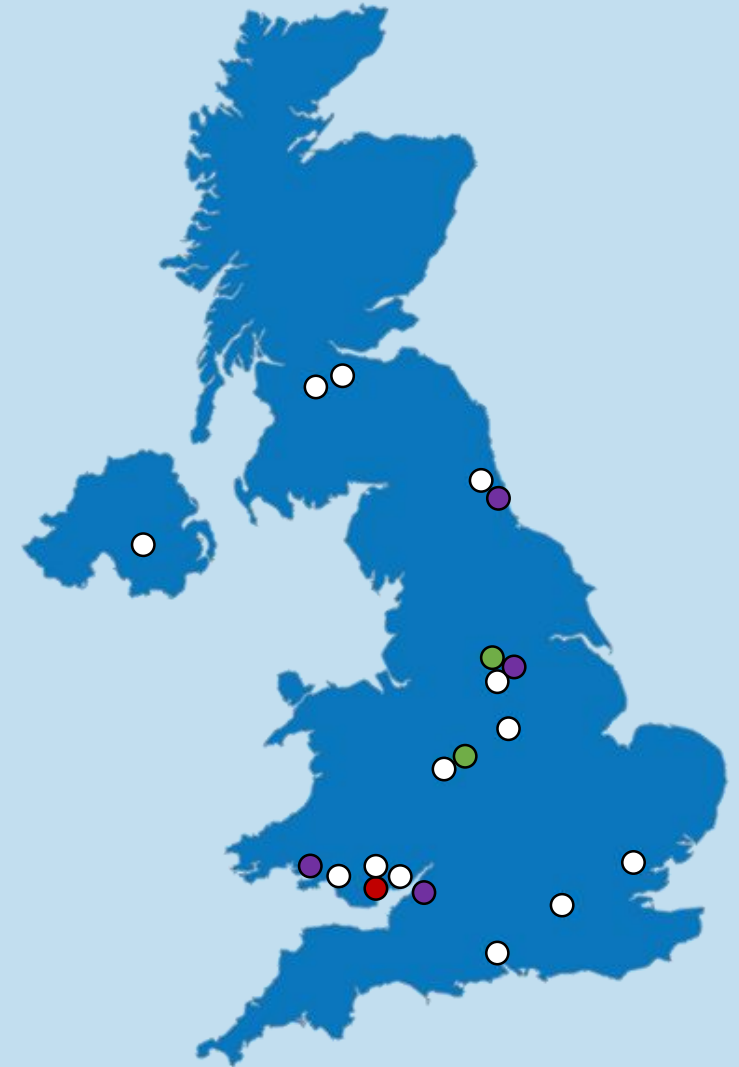
Mill



Fabricator

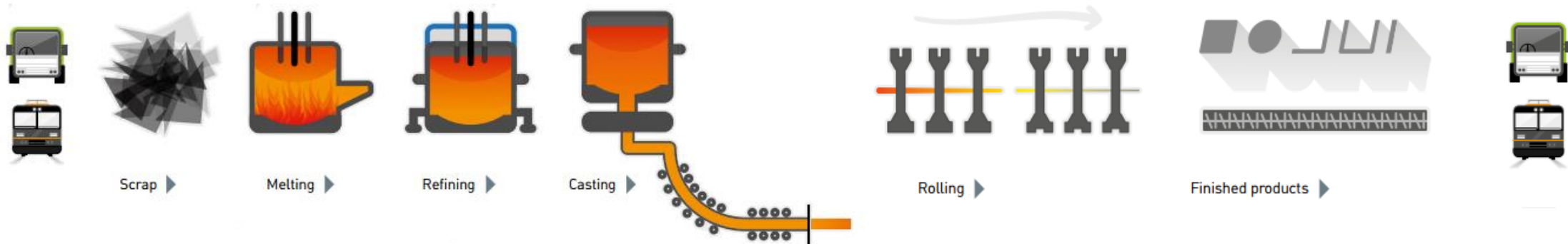


-  Scrap Facility
-  Head Office, EAF & 2x Mills
-  Fabricator
-  Mesh Producer



Material Flow | Products

Material Flow



Finished Products

Rod & Bar Mill



Reinforcing bars
For the reinforcement of concrete (Grade 500C)



High Yield Coils
For the reinforcement of concrete (Grade 500C)



Wire Rod
For the production of reinforcing mesh & other applications including wire drawing.

Section Mill



Channels, Parallel, Tapered Flange & UPN
Typically used in composite steel construction.



Plain round bars
With various applications including construction.



Equal & Unequal Angles
Typically used as a structural steel element in construction.

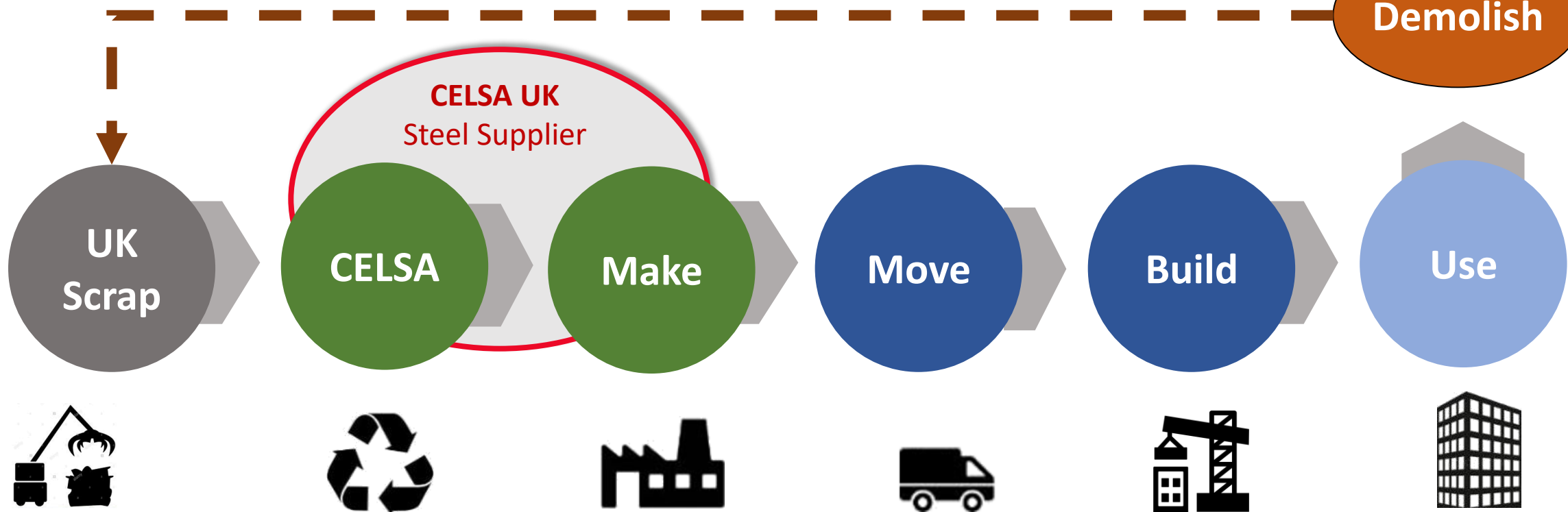
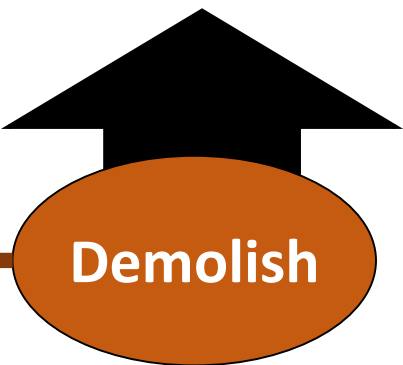


Flat bars
With various applications including construction, transport and machinery.

Commodity Steel Producer (Current)



87% Scrap Export

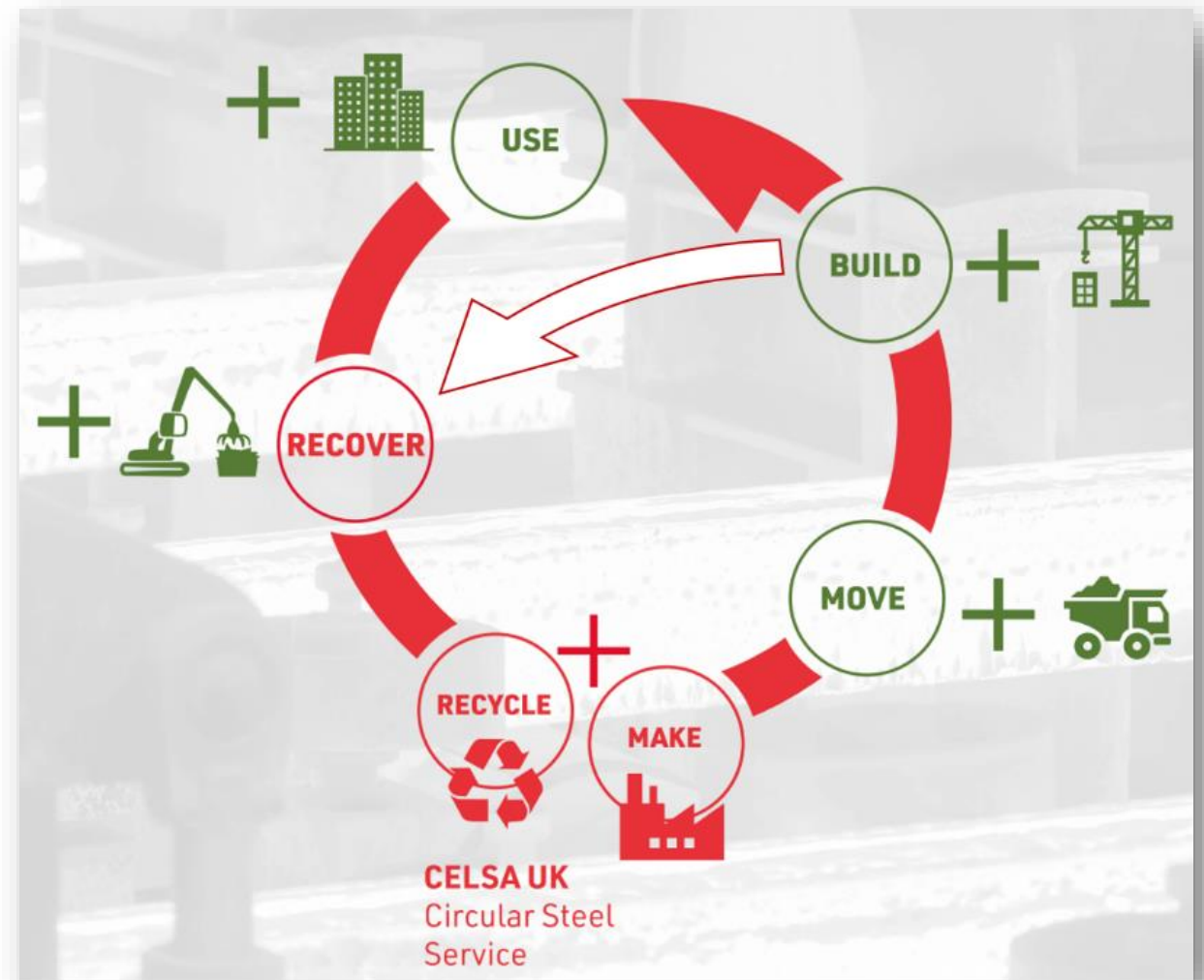


98% Recycled Steel | Low CO2 | within a Linear Economy

Circularity Transition | Collaboration

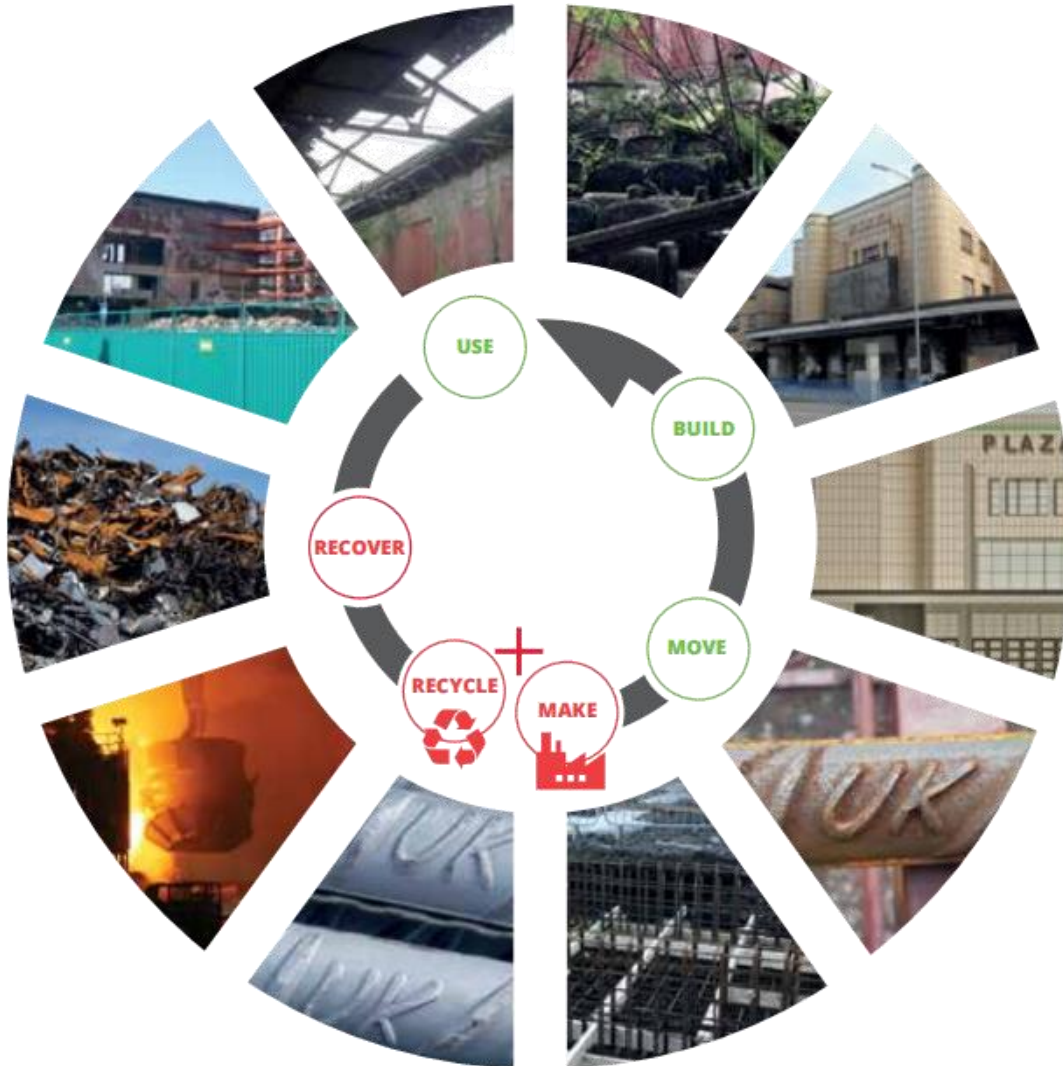
Construction Scope 3 Reduction

A platform for collaborative circularity that supports resource efficiency, carbon reduction and supply chain resilience across the built environment.



Shared Value | Shared Benefit

Plaza Cinema | Circularity Pilot Project



Plaza Cinema | Circularity Pilot Project



Collaboration based on:

- Trust
- Transparency
- Shared Vision
- Shared Values

Circularity Transition | Collaboration

Plaza Cinema | Circularity Pilot Project



The Project

Located in Port Talbot, Grade II listed, built in 1939, unoccupied since 1999

Scope of Works

- Retaining existing Art Deco frontage
- Partial demotion of the rear section allowing for new construction
- New mixed use community facility
- Recovery roof structural steels

Collaboration Time Lines

- Sept 2019 - Discussion at Supply Chain Sustainability School event (Cardiff)
- Nov 2019 - Meeting in BAM Cardiff office (inc Demolition Subcontractor)
- June 2020 - Start contract works (Demolition Waste = Scope 3)
- Sept 2020 - Steel roof trusses removed (25 tonnes to Celsa, Cardiff)
- Nov 2020 - New Rebar produced at the Cardiff
- Jan 2021 - New Rebar delivered for ground work (Procured Material = Scope 3)

Carbon Reduction Benefits based on:

- 25 tonnes scrap recycled
- 14 tonnes of reinforcement steel purchased

	Kg CO ₂ / T
Plaza Scrap Value @1.67 x 25	- 41,750
CELSA UK EPD @0.429 x 14	+ 6,006
Total Pilot Carbon Saving	- 35,744

Scrap Recycling Saves:

1,670 kg CO₂/T

<https://www.stenarecycling.com/insights/archive/the-value-of-recycling-metals/>



a **Linear Economy** has created the need for the **UNSDG's**



Circularity will eliminate that need for **future generations**

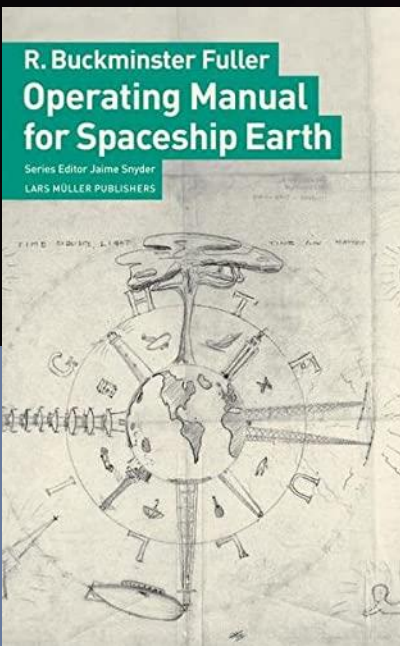


Linear
Stubbornness



Circular
Liberation





‘All of humanity now has the option to “make it” successfully and sustainably, by virtue of our having minds, discovering principles and being able to employ these principles to do more with less.’

- R. Buckminster Fuller 1969 (1895 – 1983)

- **Collaborate** always
- **Ask Questions** constantly
- Waste is **BAD DESIGN**





Circular Thinking | Circular Action



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Thank You



Passion for Steel
Passion for Innovation
Passion to build a better World