



Measuring Circularity

Circular economy and Circularity Indicators

Global Partners of the Ellen MacArthur Foundation:



CIRCULAR ECONOMY: Restorative and regenerative by design

Principles of a Circular Economy

A circular economy rests on three principles



Preserve and enhance natural capital by controlling finite stocks and balancing renewable resource flows



Optimise resource yields by circulating products, components, and materials at the highest utility at all times in both technical and biological cycles



Foster system effectiveness by revealing and designing out negative externalities

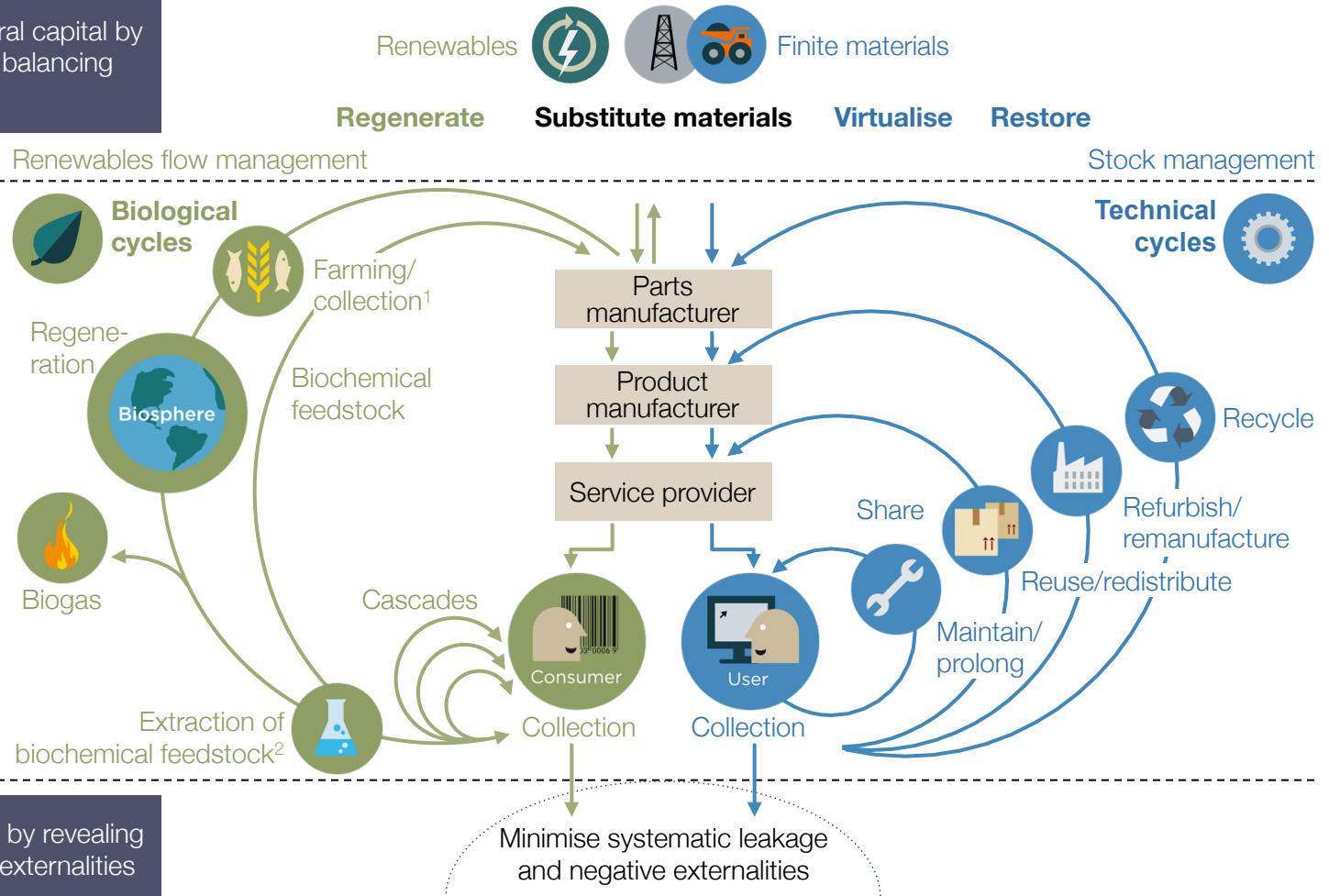
Outline of a Circular Economy

Circular economy – an industrial system that is restorative and regenerative by design

1 Preserve and enhance natural capital by controlling finite stocks and balancing renewable resource flows

2 Optimise resource yields by circulating products, components and materials in use at the highest utility at all times in both technical and biological cycles

3 Foster system effectiveness by revealing and designing out negative externalities



¹ Hunting and fishing

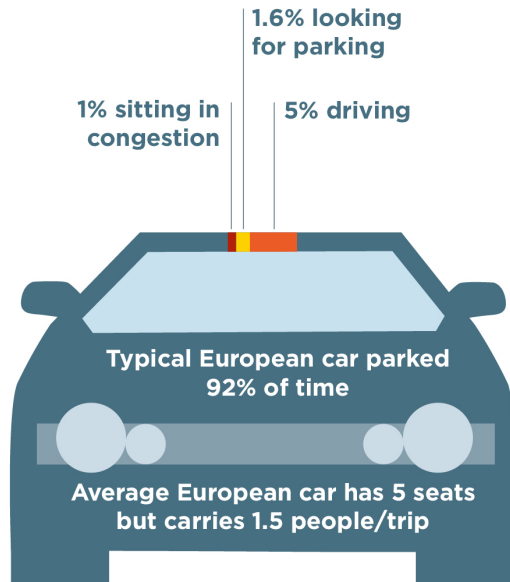
² Can take both post-harvest and post-consumer waste as an input

SOURCE: Ellen MacArthur Foundation – Adapted from the Cradle to Cradle Design Protocol by Braungart & McDonough

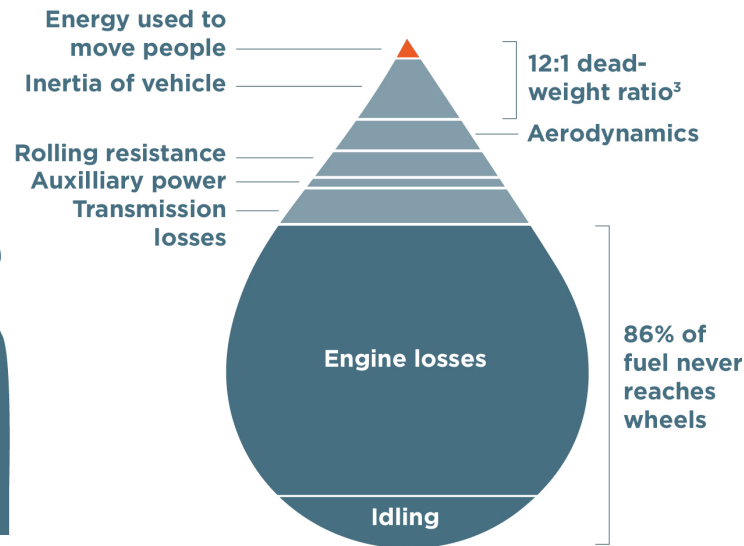
Example: Structural Waste in the Economy

STRUCTURAL WASTE IN THE MOBILITY SYSTEM

CAR UTILISATION¹



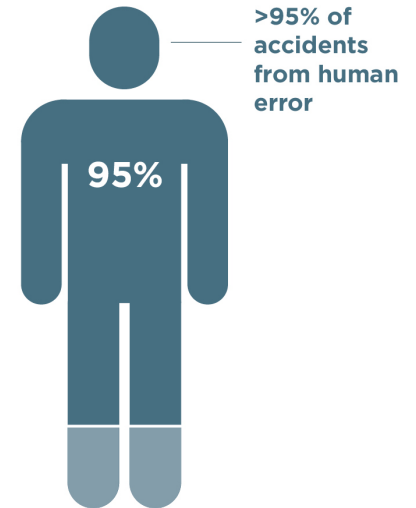
TANK-TO-WHEEL ENERGY FLOW - PETROL



● Productive use

DEATHS AND INJURIES/ YEAR ON ROAD

30,000 deaths in accidents and 4X as many disabling injuries²



LAND UTILISATION:

5%

Road reaches peak throughput only 5% of time and only 10% covered with cars then

50%

50% of most city land dedicated to streets and roads, parking, service stations, driveways, signals, and traffic signs



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Economic and societal benefits

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electric drive

Environmental benefits



The need for measurement in a circular economy

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Metrics Adopted From Circular Economy Principles

		PRIMARY METRIC	SECONDARY METRICS
PRINCIPLE 1	Preserve and enhance natural capital by controlling finite stocks and balancing renewable resource flows	Degradation-adjusted net value add (NVA)¹	<ul style="list-style-type: none"> • Annual monetary benefit of ecosystem services, e.g. from biodiversity and soils • Annual degradation • Overall remaining stock
PRINCIPLE 2	Optimise resource yields by circulating products, components and materials in use at the highest utility at all times in both technical and biological cycles	GDP generated per unit of net virgin finite material input²	<ul style="list-style-type: none"> • Product utilisation • Product depreciation/lifetime • Material value retention ratio (energy recovery, recycling and reman industry) / value of virgin materials (rolling net average last 5 years)
PRINCIPLE 3	Foster system effectiveness by revealing and designing out negative externalities	Total cost of externalities and opportunity cost	<ul style="list-style-type: none"> • Cost of land, air, water, and noise pollution • Toxic substances in food systems • Climate change, congestion, and health impacts

¹ The System of Environmental-Economic Accounting, 2012.

² Adapted based on the EU's Resource Efficiency Scoreboard (Eurostat, 2014). The adaptation is to deduct recovered materials and only include finite materials.

Source: Growth Within: A circular economy vision for a competitive Europe, Ellen MacArthur Foundation, 2015.



CIRCULARITY INDICATORS

AN APPROACH TO MEASURING CIRCULARITY



Pilot Companies and Stakeholders Involved

A variety of stakeholders and experts contributed to the development of the indicators

Pilot companies



Further stakeholders

Investors

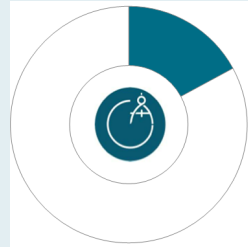
Regulators

Universities

Indicators Overview

Circularity Indicators have been developed on a product and company level

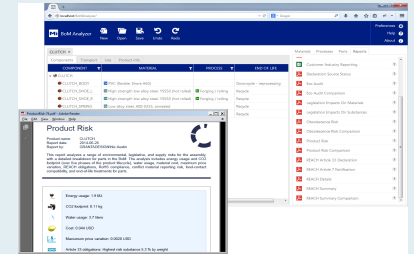
Product level



Material Circularity Indicator (MCI)



Complementary risk and impact indicators



Webtool implementing MCI and complementary indicators

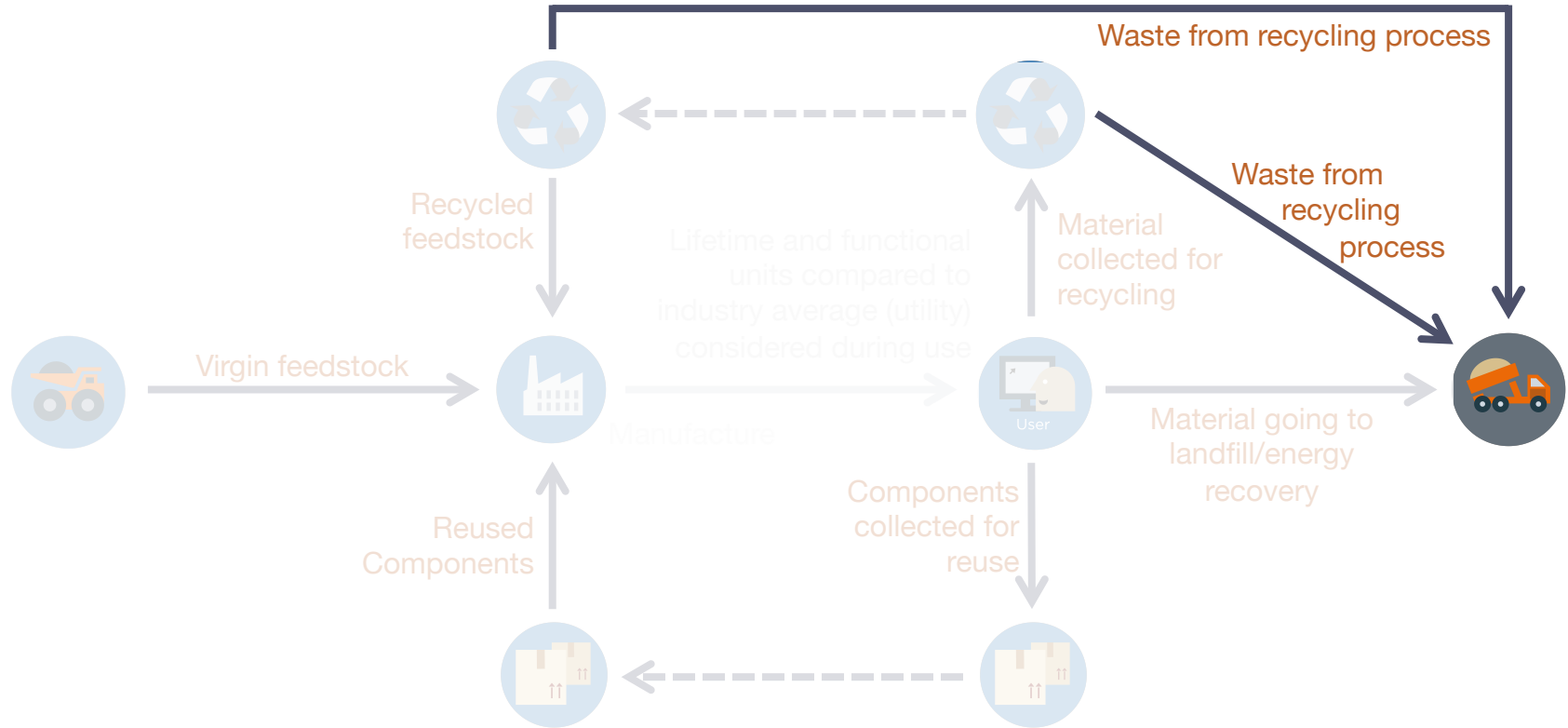
Company level

MCI aggregated from product level

Complementary indicators aggregated from product level or use existing indices

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Material Circularity Indicator Overview



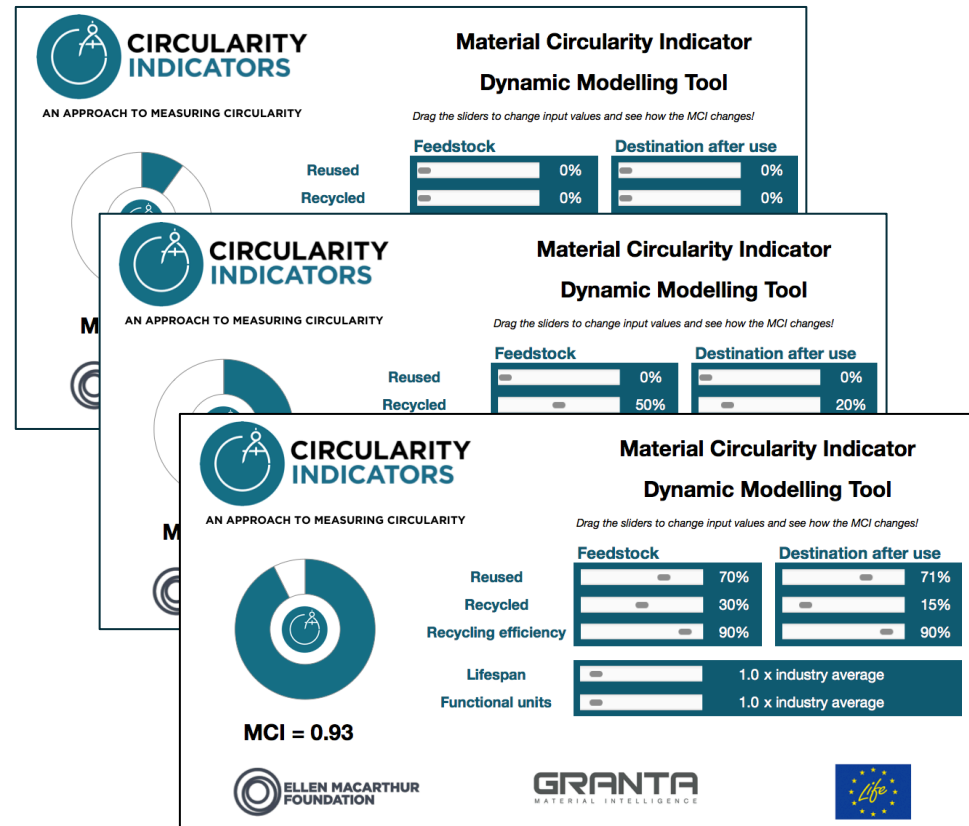
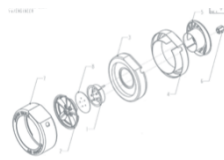
Circularity Indicators Use and Applications

Businesses internally

- Design of new products
- Procurement
- Internal reporting

Universities, public sector, investors, etc.

- Research
- Rating and evaluation
- Policy making
- Education



**OUR MISSION
TO ACCELERATE
THE TRANSITION TO A
CIRCULAR
ECONOMY**

The Ellen MacArthur Foundation

The Ellen MacArthur Foundation works across four areas, with the aim of accelerating the transition towards a circular economy:



**INSIGHT
& ANALYSIS**



**EDUCATION
& TRAINING**



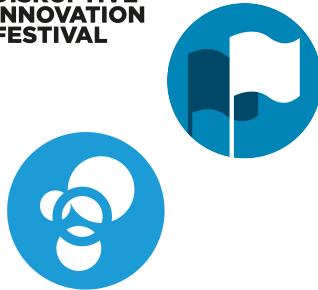
**BUSINESS
& POLICY**



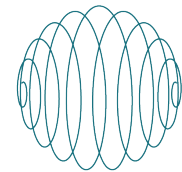
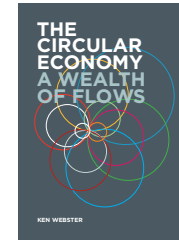
**COMMUNICATIONS
& PUBLISHING**



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DISRUPTIVE
INNOVATION
FESTIVAL



**PROJECT
MAINSTREAM:**



CIRCULATE

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INTERNATIONAL BROADCASTER

Ali Velshi



A EUROPEAN PERSPECTIVE

Ida Auken, Jyrki Katainen



COLLABORATIVE ECONOMY

Robin Chase



NATURAL CAPITALISM

Hunter Lovins



CIRCULAR ECONOMY VALUES

George Lakoff



REGENERATIVE AGRICULTURE

Leontino Balbo Jr.



DEEP LEARNING MACHINES

Jeremy Howard, Rand Hindi, IBM's Watson



DESIGN

Michael Braungart



SHARING REDEFINED

Michel Bauwens, April Rinne, Neal Gorenflo



CIRCULAR ECONOMY

Ellen MacArthur





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