

For Us.

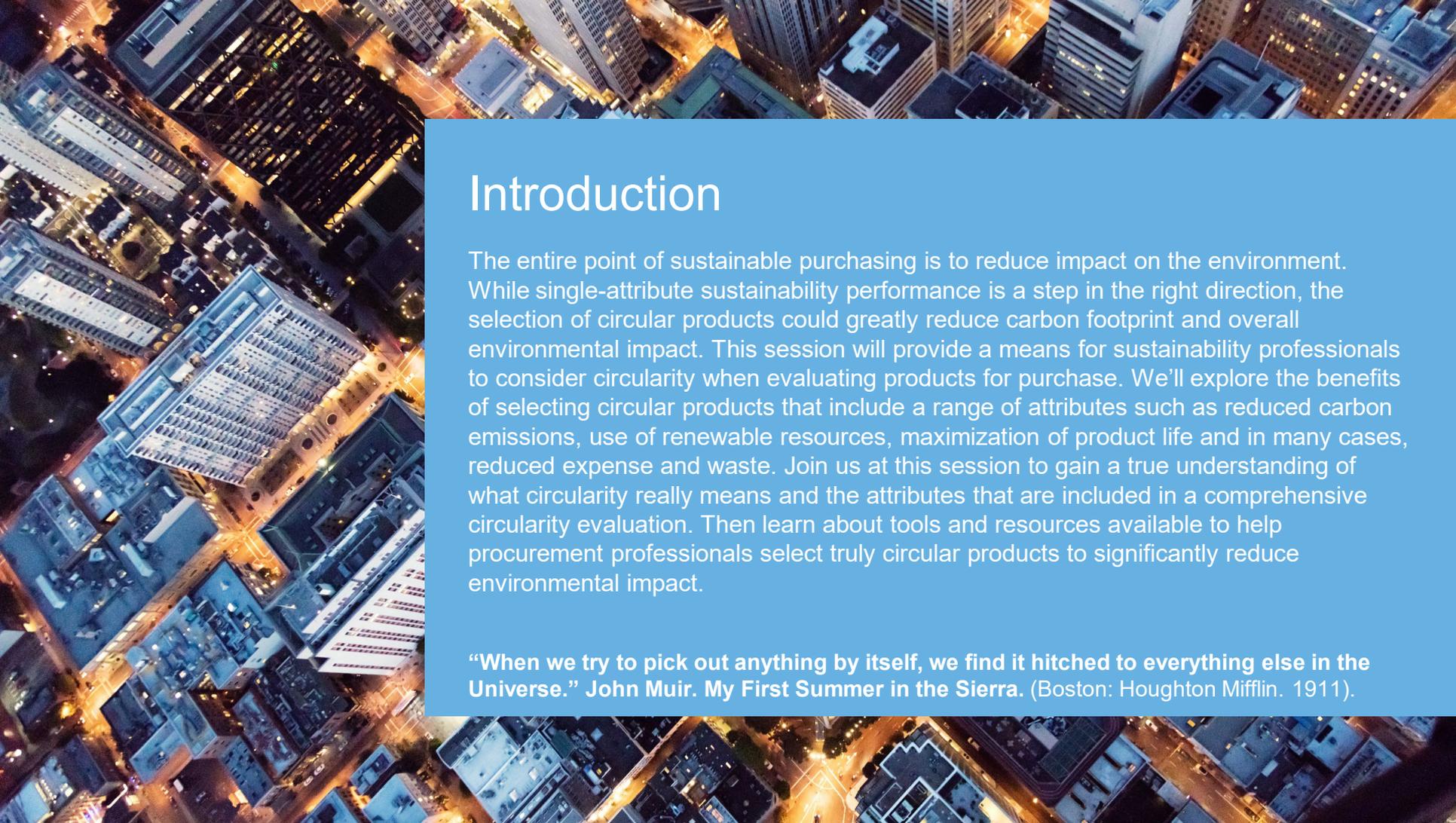
For Agencies.

For Good.

The Circular Economy and Procurement

August 2020





Introduction

The entire point of sustainable purchasing is to reduce impact on the environment. While single-attribute sustainability performance is a step in the right direction, the selection of circular products could greatly reduce carbon footprint and overall environmental impact. This session will provide a means for sustainability professionals to consider circularity when evaluating products for purchase. We'll explore the benefits of selecting circular products that include a range of attributes such as reduced carbon emissions, use of renewable resources, maximization of product life and in many cases, reduced expense and waste. Join us at this session to gain a true understanding of what circularity really means and the attributes that are included in a comprehensive circularity evaluation. Then learn about tools and resources available to help procurement professionals select truly circular products to significantly reduce environmental impact.

“When we try to pick out anything by itself, we find it hitched to everything else in the Universe.” John Muir. *My First Summer in the Sierra*. (Boston: Houghton Mifflin. 1911).

Josh Jacobs

Director of
Environmental
Codes & Standards

UL Environment &
Sustainability



Topics

- What is the circular economy and why it matters
- Examples of circularity in the marketplace
- Circularity and the built environment
- What you can do to create a more circular built environment





What is the circular economy and why it matters

What is the circular economy?

Circularity: Decoupling natural resource use and environmental impacts from economic growth.

Based on three principles:

- Design out waste and pollution
- Keep products and materials in use
- Regenerate natural systems

Source: Ellen MacArthur Foundation



Poll question

What percentage of global materials are used in construction?

- a) <15%
- b) Between 15 and 25%
- c) Between 25 and 50%

Answer:.

C) Approximately 40% of global materials are used for construction.

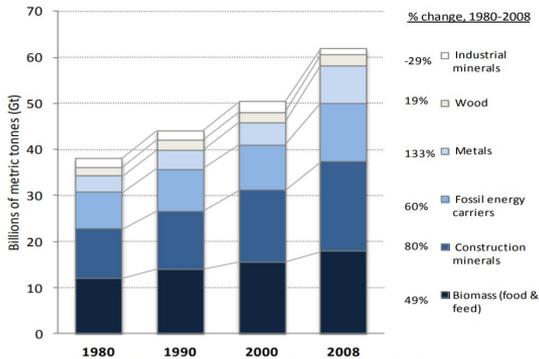
Source: Circle Economy, WBCSD, Scaling the Circular Built Environment: pathways for business and government



The problem today

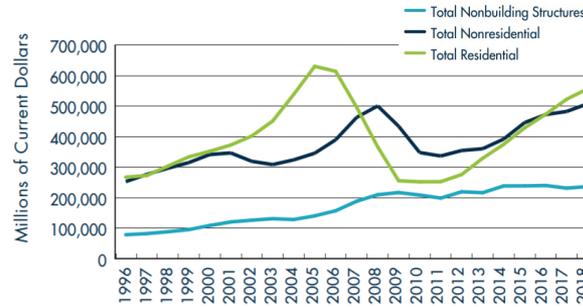
Take

Global material resource extraction



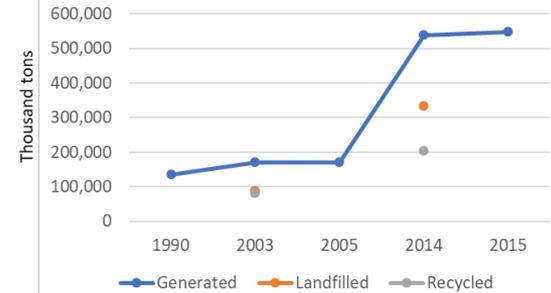
Make

Total construction put in place U.S.



Waste

Total construction debris generated in U.S.



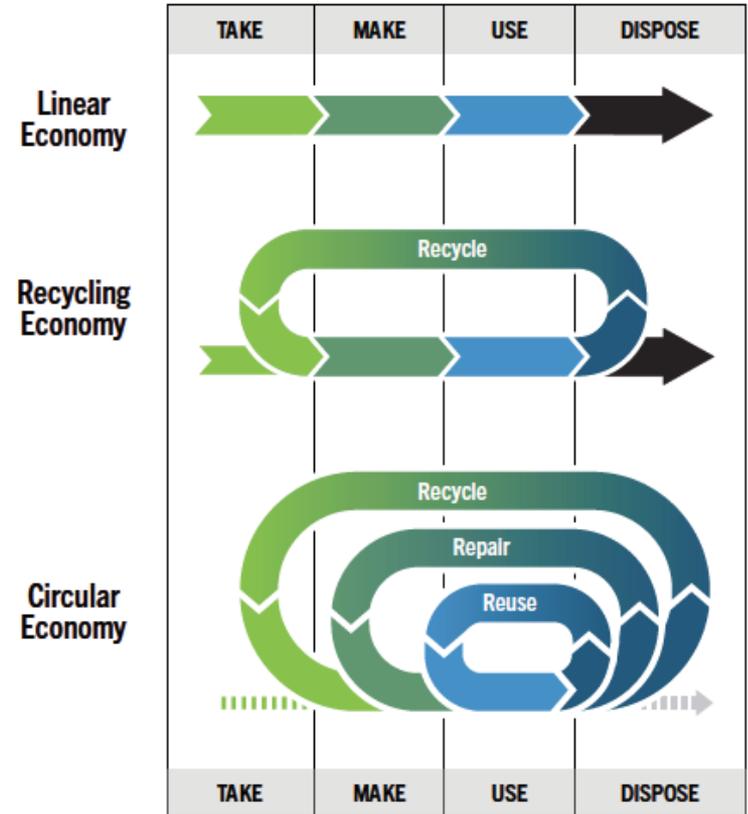
Sources: SERI (Sustainable Europe Resource Institute) material flows database, US Census and FMI Forecast, Waste USGS (2017) <https://minerals.usgs.gov/minerals/pubs/historical-statistics/#lithium> Statista (2017) <https://www.statista.com/statistics/326947/lcd-sales-by-region/>, UNU E-waste Monitor (2017) <https://i.unu.edu/media/unu.edu/news/52624/UNU-1stGlobal-E-Waste-Monitor-2014-small.pdf>

Is the circular economy just a new name for recycling?

No. Recycling, waste diversion and incorporation of recycled content are **important elements**.

In order to achieve more circular economies, we **also have to consider** new business models (e.g., sharing platforms, product as service), **revive and refresh** some tried and tested business solutions (e.g., product life extension, remanufacturing, refurbishment), and **collaborate** across the value chain.

Source: Stop Waste & Arup. Circular Economy in the Built Environment: Opportunities for Local Government Leadership, <http://www.stopwaste.org/resource/circular-economy-built-environment-opportunities-local-government-leadership>.



Mindsets are evolving



waste

[wāst]

noun

(1) damaged, defective, or superfluous material produced by a manufacturing process;

(2) an unwanted by-product of a manufacturing process

Synonyms: SCRAP,
RUBBISH, GARBAGE



resource

['rē-, sòrs]

noun

a stock or supply of money, materials, staff, and other assets that can be drawn on by a person or organization in order to function effectively

Synonyms: ASSETS,
SUPPLIES, MATERIALS



SUSTAINABLE DEVELOPMENT GOALS

1 NO POVERTY

2 ZERO HUNGER

3 GOOD HEALTH AND WELL-BEING

4 QUALITY EDUCATION

5 GENDER EQUALITY

6 CLEAN WATER AND SANITATION

7 AFFORDABLE AND CLEAN ENERGY

8 DECENT WORK AND ECONOMIC GROWTH

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

10 REDUCED INEQUALITIES

11 SUSTAINABLE CITIES AND COMMUNITIES

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

13 CLIMATE ACTION

14 LIFE BELOW WATER

15 LIFE ON LAND

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

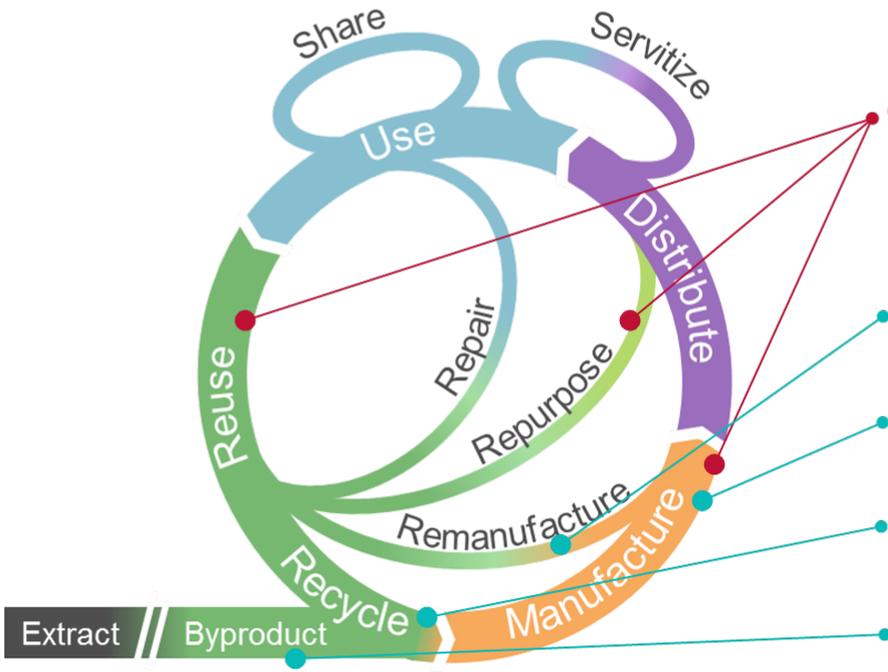
17 PARTNERSHIPS FOR THE GOALS

SUSTAINABLE DEVELOPMENT GOALS

Examples of circularity in the marketplace



Individual Concepts



Facility- or Site-level:

Zero Waste to Landfill / Waste Diversion
(UL ECVP 2799)

Product-Level:

Certified rebuilt
(UL safety certifications, various product categories)

Recyclability
(UL ECVP 2789)

Recycled Content
(including closed loop) (UL ECVP 2809)

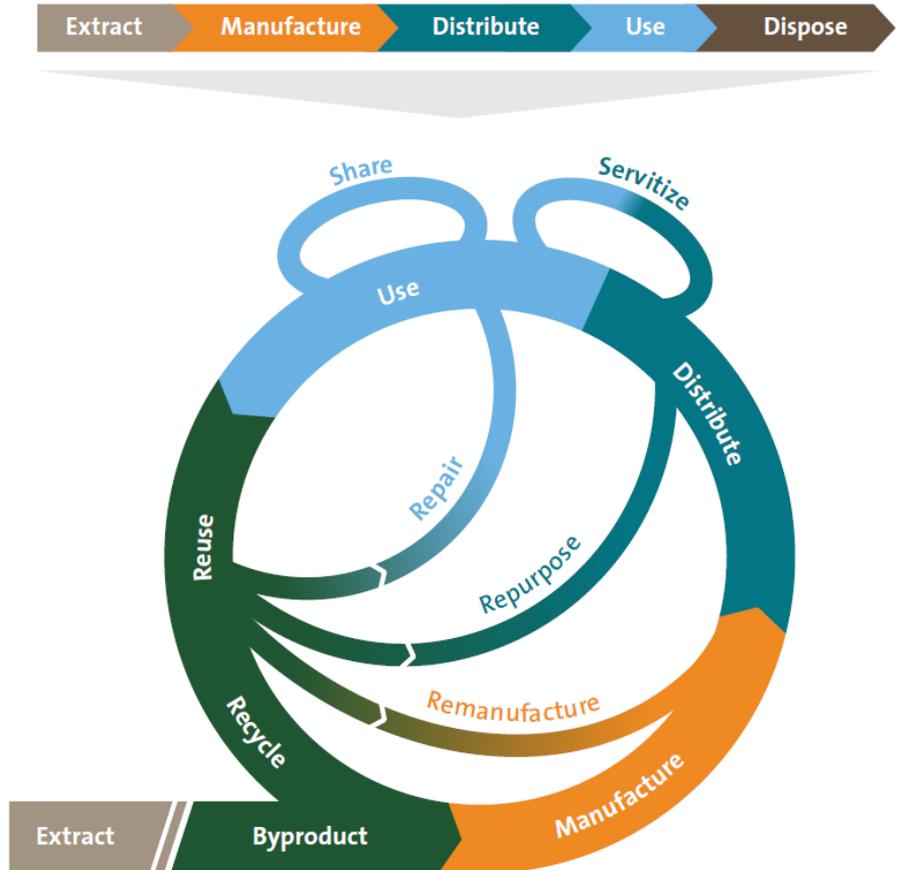
Byproduct Synergy
(UL ECVP 2990)

Biodegradability, biobased, rapidly renewable

Paths to circularity

Circular economic models “bend” the linear take-make-waste model of the traditional economy and divert materials from landfills, instead recycling, repurposing or making them feedstocks for other processes.

In this section, we explore how companies in a variety of industries have invested in circular business models to make their companies more environmentally sustainable as well as build long-term viable business models.



This graphic is adapted from Building Services Design Consulting Engineer

Extract – byproduct – manufacturing



Extract

Seeks to replace raw material extract with material that is recovered or replenishes feedstock.

Marks & Spencer's Pure Super Grape products are made from waste pinot noir grape skins from the company's Chapel Down vineyard.



Byproduct synergy

Identifies partners that can use one company's waste as a resource stock.

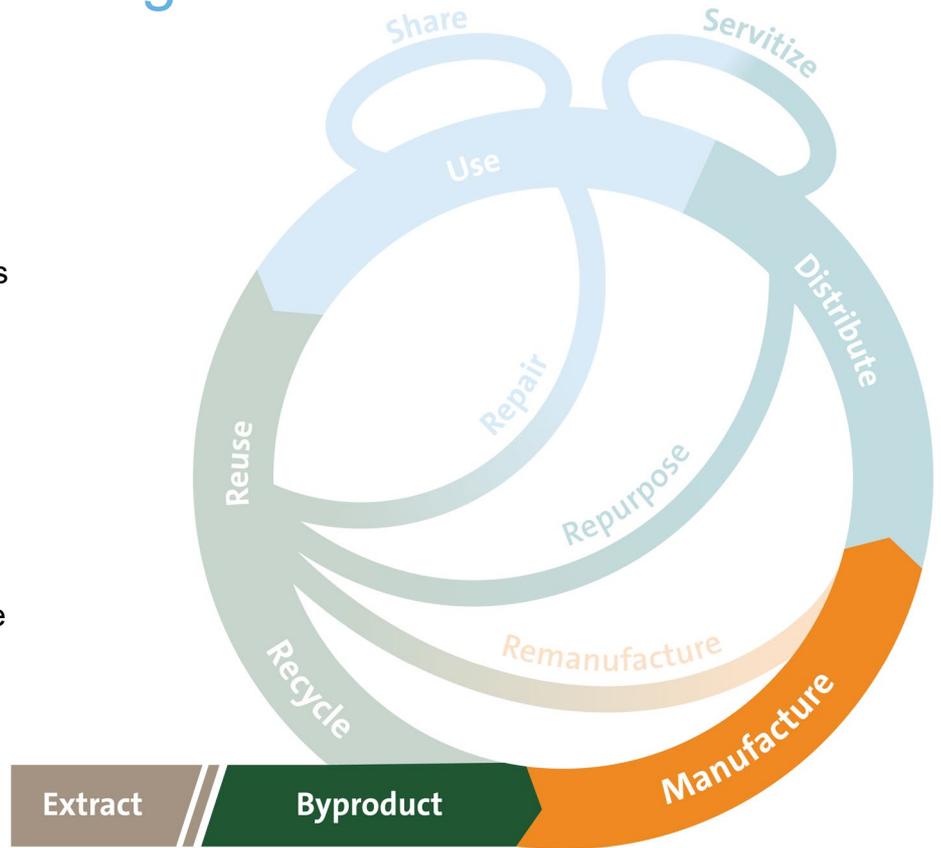
The U.S. Business Council for Sustainable Development's Materials Marketplace facilitates company-to-company byproduct sale to support material reuse.



Manufacturer

Manufactures with zero waste to landfill.

Apple suppliers have achieved 100 percent zero waste to landfill validation for all final assembly sites in China.



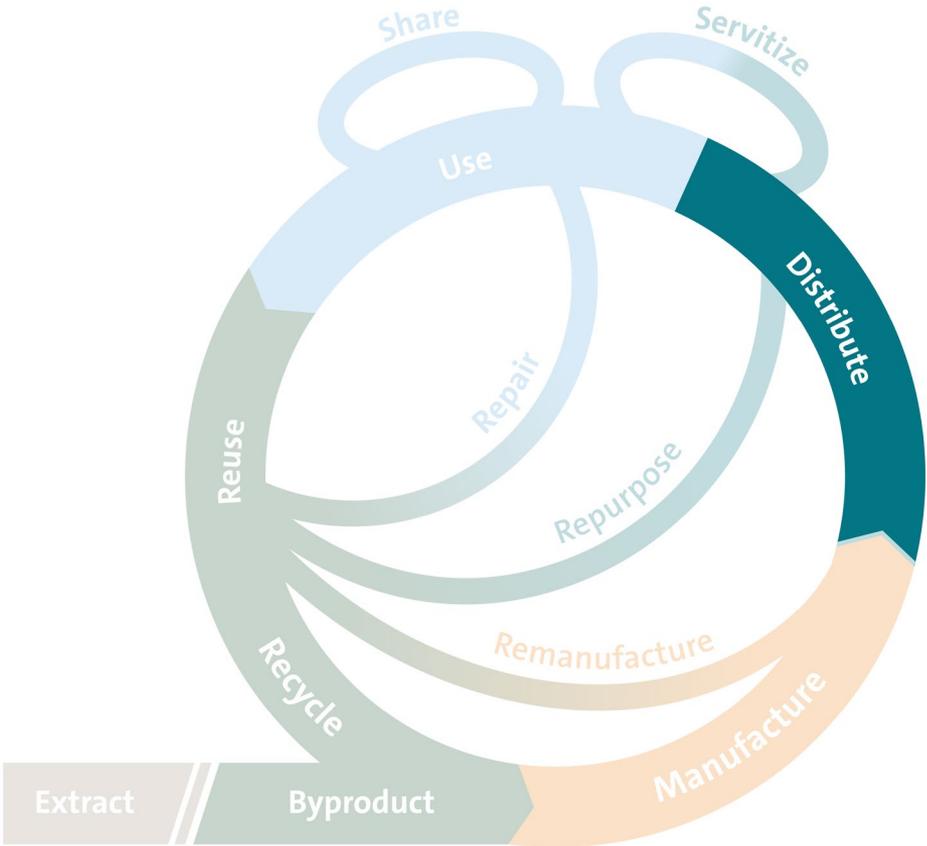
Distribute



Distribute

Lightweights packaging and/or provides reverse logistics to reuse it.

USG's EcoSmart sheetrock panels weigh significantly less than standard sheetrock, lowering transportation costs as well as material cost and waste.



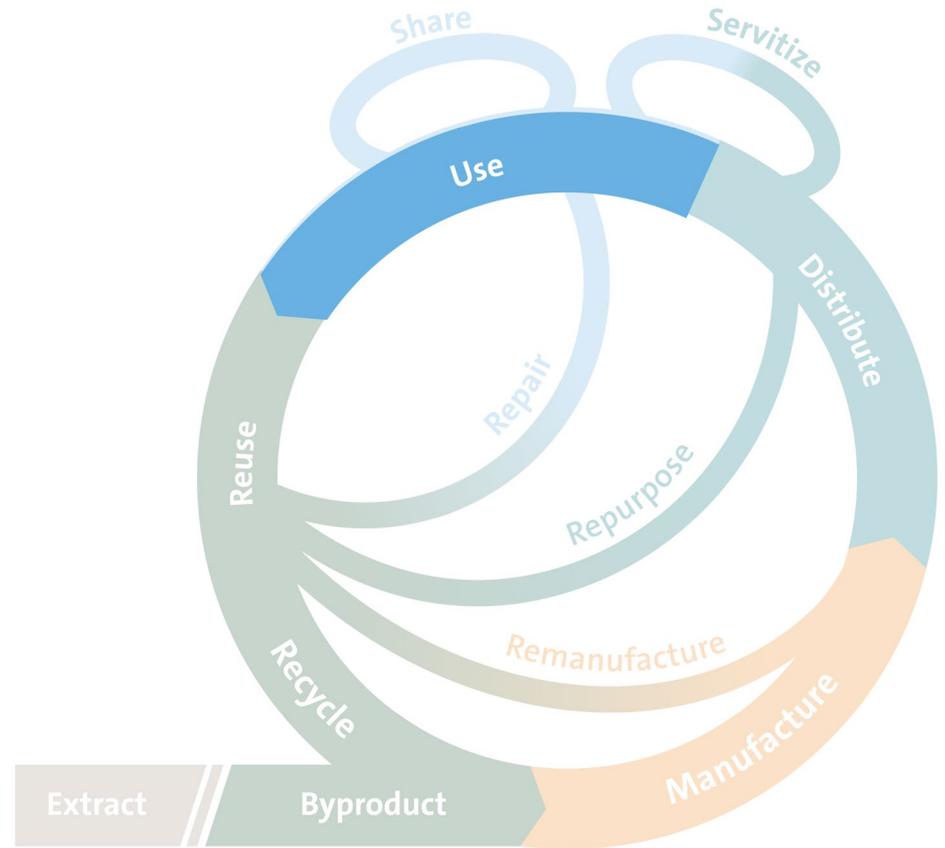
Use



Use

Establishes takeback programs to prepare materials for further use.

H&M collects unwanted, used textiles at their retail stores and distributes them for second-hand use or recycles them into fibers used to make insulation.



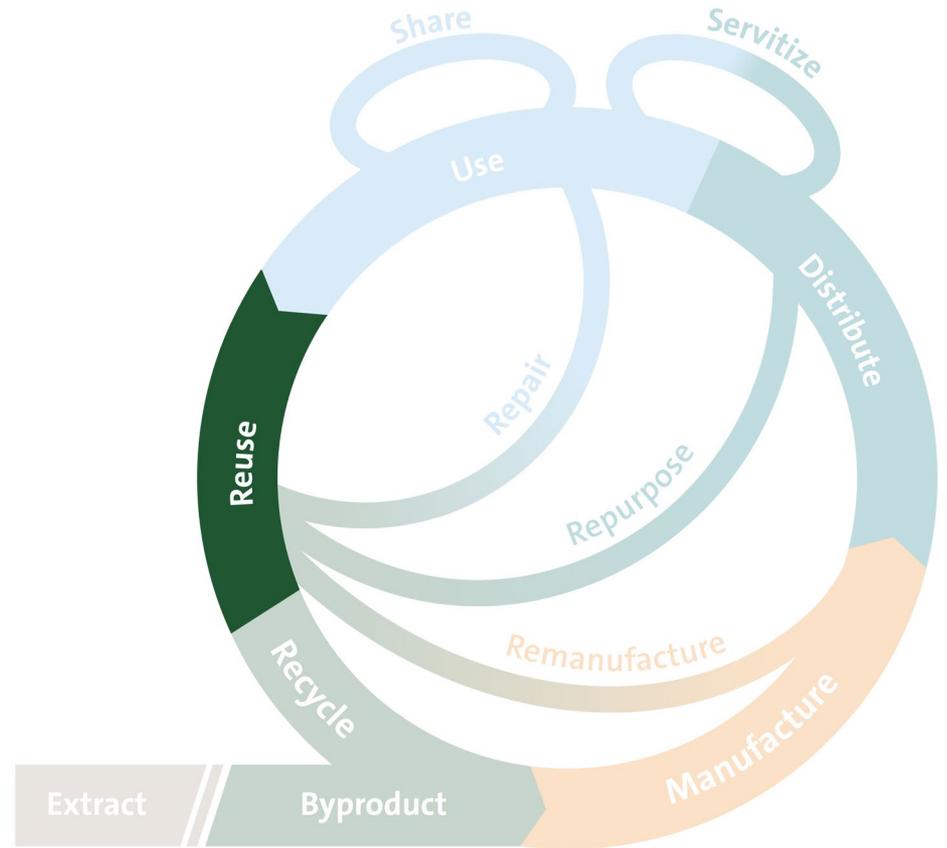
Reuse



Reuse

Extends product life through repair instead of replacement.

LimeLoop makes resilient, reusable mailing pouches that consumers send back for reuse.



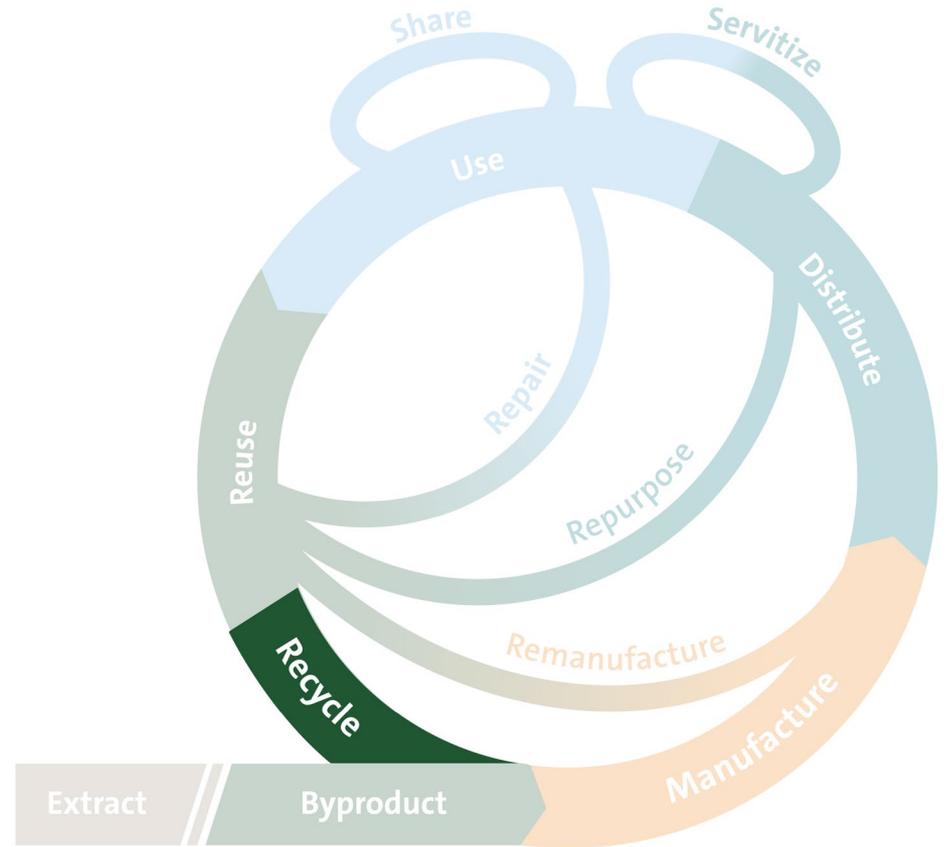
Recycle



Recycle

Integrates recycled content into designs or closes the loop using reverse logistics to reclaim and recycle materials.

Through their closed-loop recycling process, Dell recovers plastics used in their products and recycles them for use in new Dell products. .



Repair – repurpose - remanufacture



Repair

Extends product life through repair instead of replacement.

Patagonia offers a repair service to repair clothes, thereby extending the life of products they sell.



Repurpose

Leverages old products/materials for new uses to maximize asset life.

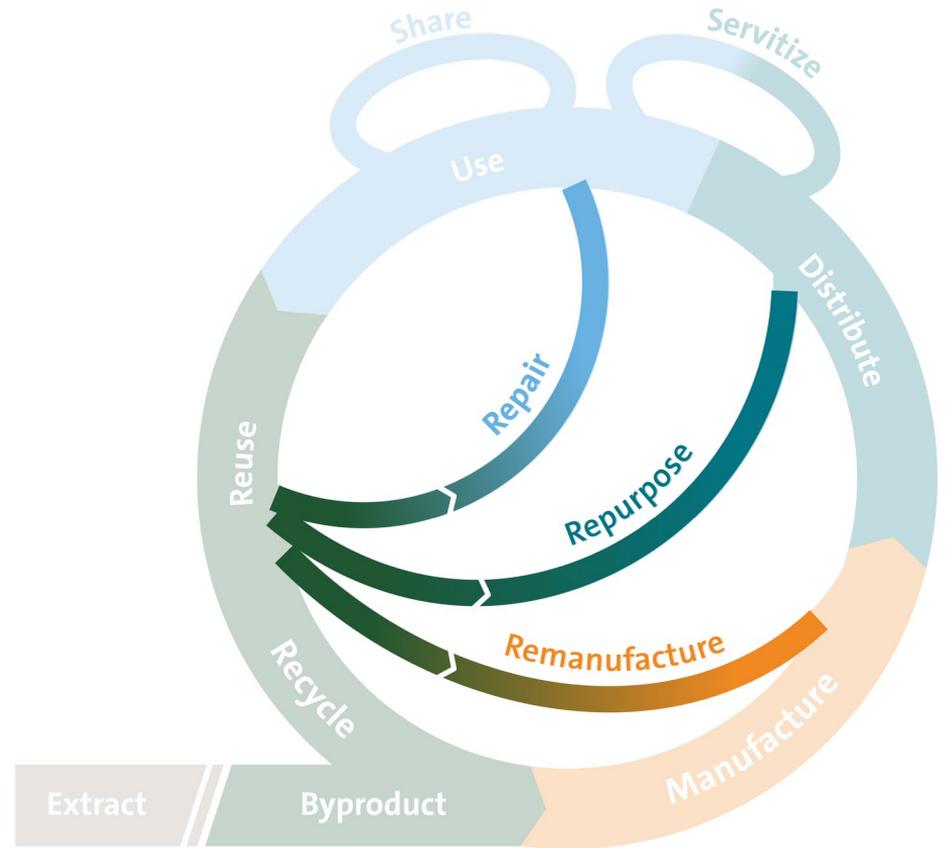
Manything takes old cell phones and turns them into security monitoring devices for home security.



Remanufacturer

Uses old products and materials for new uses to maximize asset life.

ASUS refurbishes old equipment to reuse materials, reduce waste and minimize extraction of natural resources.



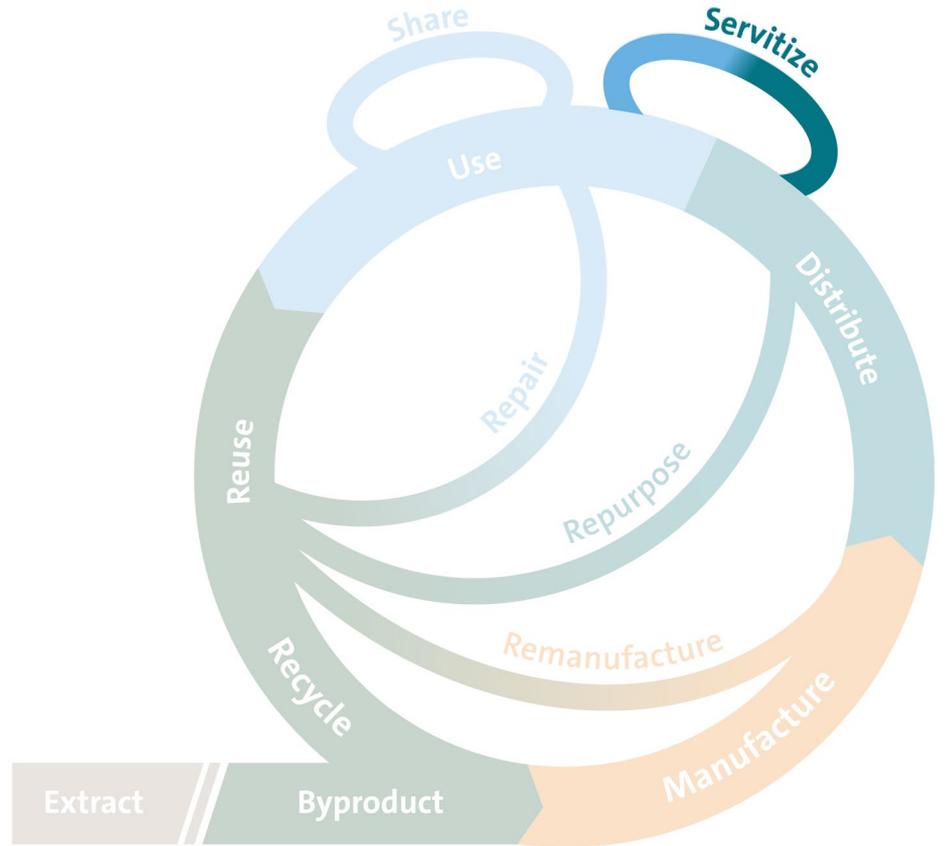
Servitize



Servitize

Shifts from traditional product-based business to service-based model.

Philips circular lighting offers customers contracts to manage lighting, including replacement and reverse logistics.



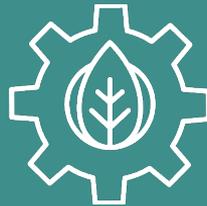
Circularity and the built environment



Poll question

What percentage of global natural resources are consumed in cities?

- a) <10%
- b) Between 10 and 25%
- c) Between 25 and 50%
- d) >50%



Answer:

D) Cities account for 75% of natural resource consumption, 50% of global waste production, and 60-80% of GHG emissions.

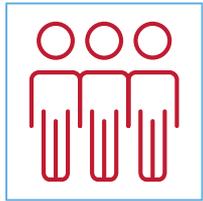


Source: Cities in the Circular Economy: An Initial Exploration, Ellen MacArthur Foundation 2017

Nexus: Circularity, cities and the built environment



+



=

Urbanization and
population growth

+



=

Underutilization and
climate change

Circular planning and construction goals – a model



Increase utilization: Gain more use out of existing buildings through increased utilization and occupancy, retrofits, adaptive reuse

Enhance flexibility: Design new buildings to be resilient and flexible, encouraging high usage rates and adaptability to changing future conditions

Retain asset value: Extract more value out of components in the existing built environment through deconstruction, salvage, and reuse

Design for disassembly: Design new construction and select components to enable recovery and reuse in the future

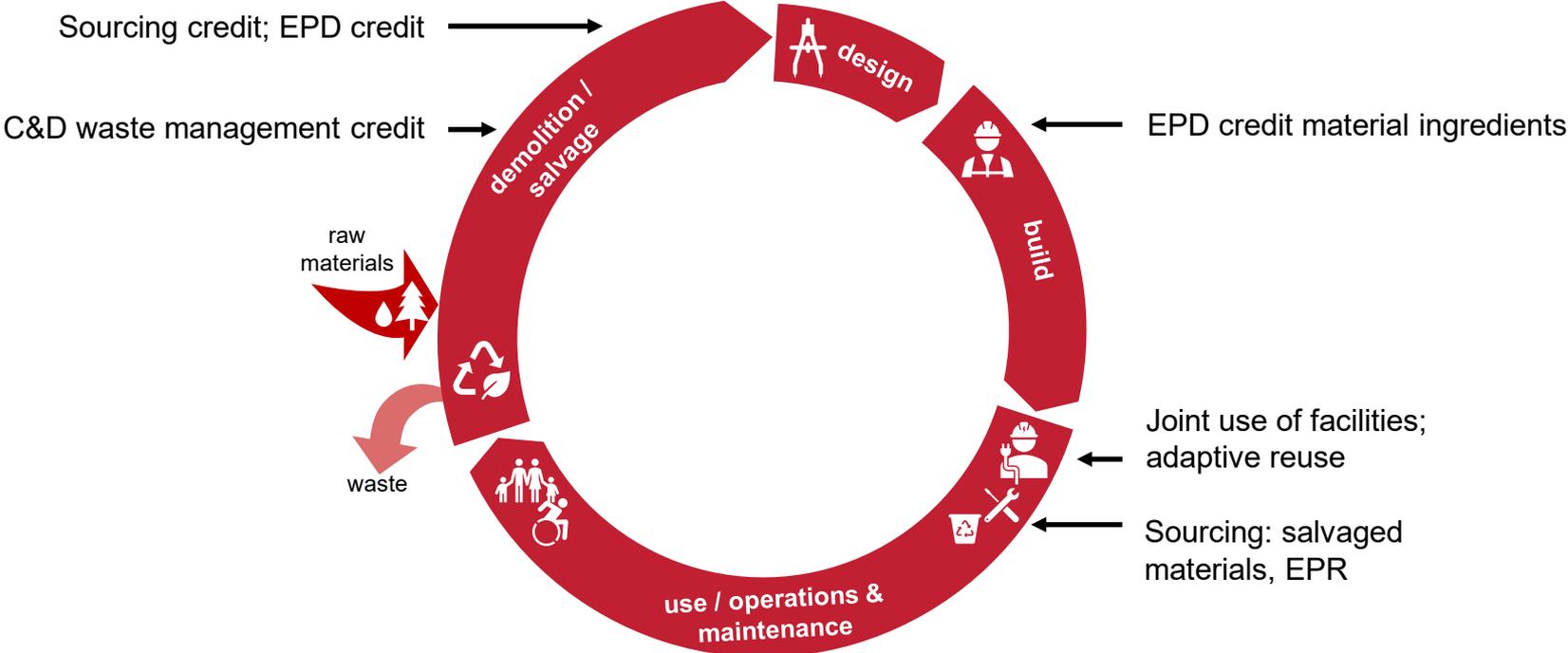
Recycle: Maximize recycling rates of materials at end of life

Adapted from Stop Waste and ARUP. Circular Economy in the Built Environment Opportunities for Local Government Leadership, <http://www.stopwaste.org/resource/circular-economy-built-environment-opportunities-local-government-leadership>

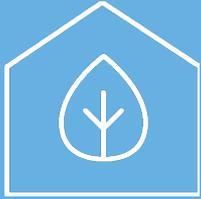


LEED 4 and 4.1 – resources!

Circularity-related credits in LEED 4 and 4.1



LEED 4 and 4.1 credits and the circular economy



New construction (NC)

NC MR: Prerequisite: Construction and demolition waste management planning

NC MR: Building life-cycle impact reduction

NC MR: Building product disclosure and optimization - environmental product declarations

NC MR: Building product disclosure and optimization – sourcing of raw materials

NC MR: Building product disclosure and optimization – material ingredients

NC MR: Construction and demolition waste management

Commercial interiors (CI)

CI MR: Long-term commitment

CI MR: Interiors life-cycle impact reduction

Existing buildings: O&M (EBOM)

EBOM MR: Prerequisite: Purchasing Policy

EBOM MR: Prerequisite: Facility maintenance and renovations Policy

EBOM MR: Purchasing

Design for disassembly

Sample strategies

Design for disassembly

Buildings as material banks (BAMB)

Material passports

NC-2009 MRc2:

Construction Waste Management

Credit achievement rate

89%

8867 of 9870 certified projects in this rating system earned this credit

- Sample LEED v4.1 Related Credits
- BD+C: New Construction (2 points)
- Construction and demolition waste management

Intent: To reduce C&D waste disposed in landfills and incinerators by recovering, reusing, & recycling materials.

Requirements Summary: Multiple Pathways.

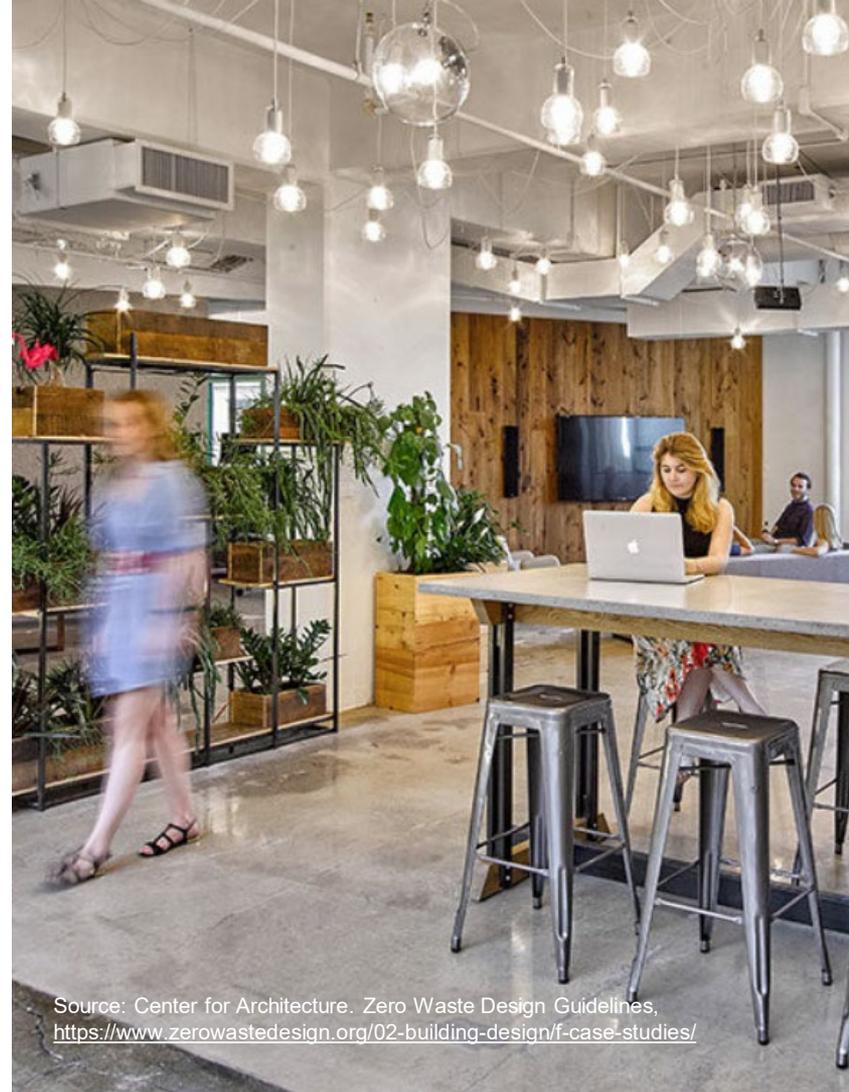
Option 2. Reduction of Total (C&D) Waste Material

Salvage or recycle C&D debris and utilize onsite waste minimizing design strategies for new construction. Achieve waste generation thresholds and create narrative describing how project addresses waste prevention and/or achieves waste generation thresholds via design strategies.

C&D waste management – case study

Best practice strategies (Construction and demolition)

- Maximize asset utilization through programming
- Design to optimize material usage
- Reuse building and materials on-site
- Use reclaimed components and materials
- Specify recyclable materials with high recycled content
- Require a construction waste management plan
- Separate construction waste on-site



Source: Center for Architecture. Zero Waste Design Guidelines.
<https://www.zerowastedesign.org/02-building-design/f-case-studies/>

Increased utilization - adaptive reuse

Sample strategies

Historic building reuse

Renovation of abandoned or blighted building

Building and material reuse

Life cycle assessment

- Sample LEED v4.1 Related credit
- ID+C: Commercial Interiors (2 points)
- Credit: Building life-cycle impact reduction

Intent: To encourage adaptive reuse and optimize the environmental performance of products and materials.

Requirements Summary:

Option 1: Interior Reuse (2 points)

Option 2: Furniture Reuse (1 point)

Option 3: Design for Flexibility
(1 point ID&C, 2 points Retail CI)

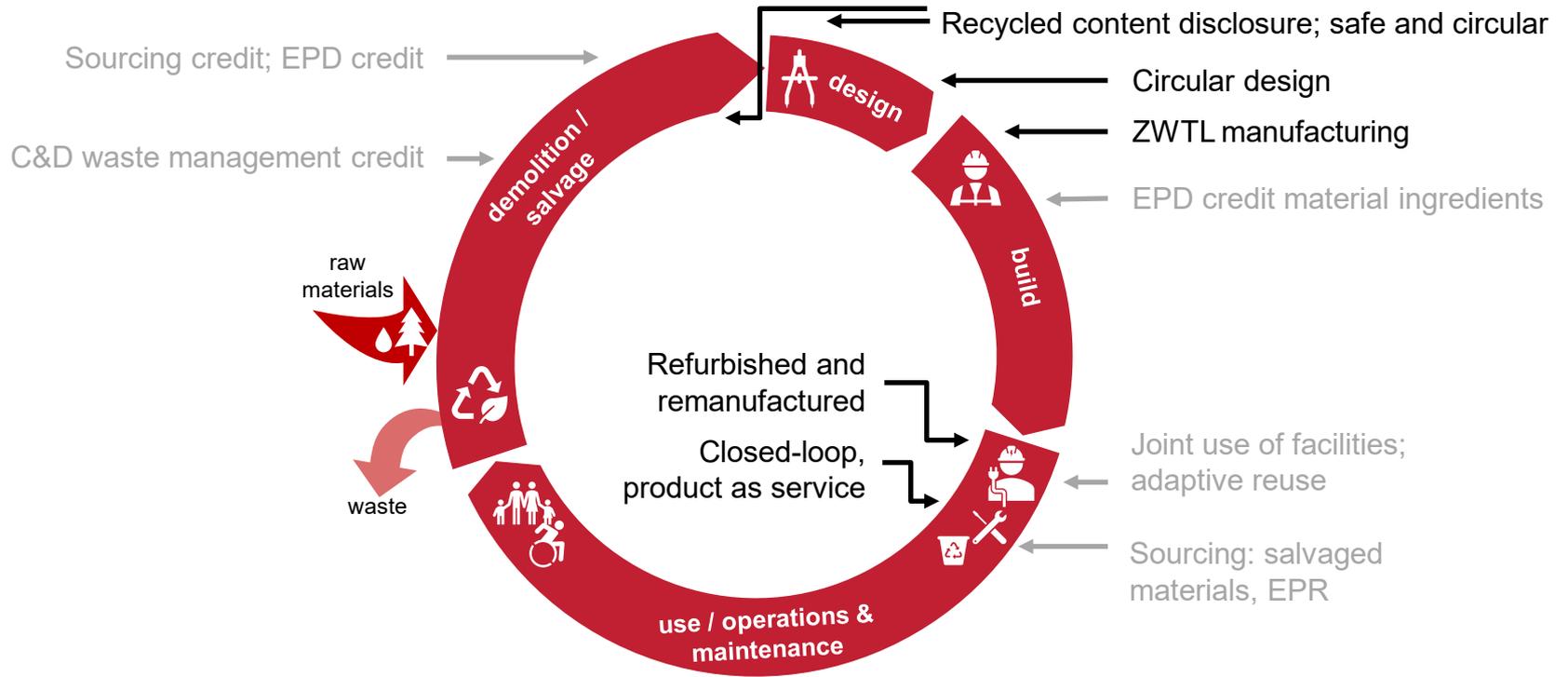
Example of historic building reuse



Empire State Building – LEED Gold EBOM 2011

- 3 million square feet
- Built in 1930
- 2008 Retrofit – Included remanufacturing of 6,514 windows onsite into super-windows
 - Existing insulated glass units retrofit included suspended coated film and gas fill
 - Renovation of old chiller plant vs. replacement and expansion— saving more than \$17 million of budgeted capital expenditure
 - Additional Measures: Radiative barrier, Demand control ventilation/DDC VAV AHUs Daylighting/Plugs Tenant energy management Chiller plant retrofit

+ New LEED 4 and 4.1 pilot credit – product level circularity in construction



Pilot credit – circular products

Intent

Reward project teams for selecting products that support the circular economy that are:

- Manufactured with zero waste
- Designed to be cycled multiple times through repair or remanufacturing
- Recovered at the end of their useful life to be remade into new products
- Not duplicate other attributes of product circularity captured in other LEED credits

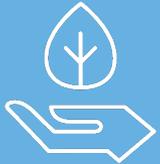
Requirements

Use at least five permanently installed products from three manufacturers that demonstrate achievement of at least one of the circular product reports listed below:

- Supply chain circularity
- Zero waste manufacturing
- Designed for circularity
- Closed loop products

<https://www.usgbc.org/credits/new-construction-core-and-shell-schools-new-construction-retail-new-construction-healthcare?return=/credits/New%20Construction/v4.1>

LEED credits and the circular economy



Supply chain circularity

- Recycled content disclosure
- Safe and circular

Zero waste manufacturing

Acceptable certifications are:

- GreenCircle Zero Waste to Landfill
- NSF Landfill-Free verification
- TRUE Zero Waste
- UL 2799

Designed for circularity

- Products designed for disassembly, repair, or reuse
- Manufacturer provided information on maintenance, reuse, disassembly and recovery
 - Public type III EPD
 - Cradle to Cradle v3/4 Gold certification in Materials Reutilization

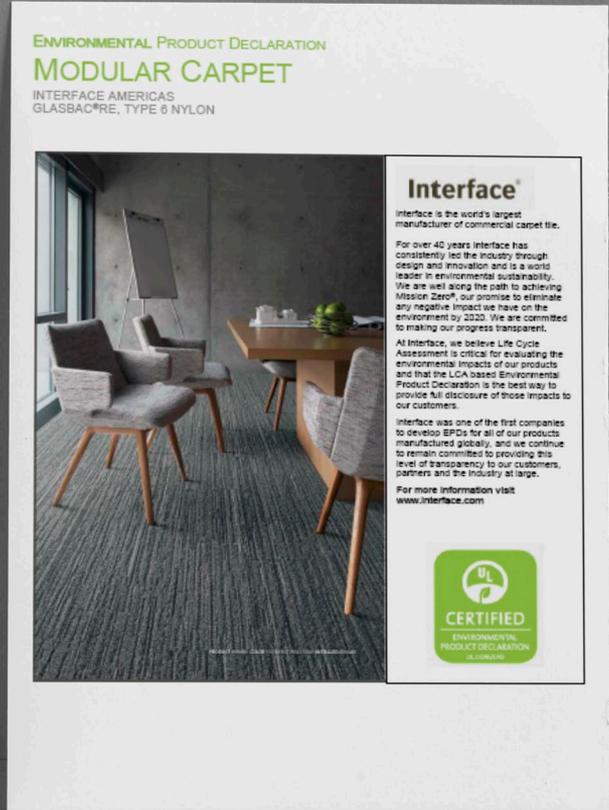
Closed loop products

- Verified closed loop product:
 - Certified Closed Loop, GreenCircle
 - Cradle to Cradle v3/4 Platinum certification in the Materials Reutilization
- Products-as-a-service
- Refurbished or remanufactured products

Circular product example: Modular Carpet

EPD with cradle-to-grave analysis

- Carpet tiles are packaged in boxes made with 100% post-consumer recycled cardboard. Packaging waste should be reused or sent local cardboard recycling facilities.
- The modular aspect of the product along with Tactile installation as opposed to glue-down methods allows for easy reuse of the product.
- The product is intended to be recycled through a takeback process.





Other global rating systems – more resources!

Circularity recognition in green building requirements globally (1)

Many green building recognition programs have long integrated circular economy aspects into their thinking – we just were not using the language of a circular economy when these systems were first established. E.g.:

| BREEAM [®] | | greenstar |
|------------------------------------|---|---|
| Region | Founded 1990 in UK, global application | Founded 2003 in Australia, adopted in Australia, New Zealand and South Africa |
| Purpose | Sustainability assessment method based on built environment lifecycle analysis; covers new construction, in-use and refurbishment projects. | Sustainability assessment of communities, new construction, performance and interiors |
| Sample circularity-concepts | <ul style="list-style-type: none"> • 5.0 Management > 02 Life cycle cost and service life planning; 03 Responsible construction practices • 11.0 Waste > 02 Recycled aggregates; 06 Functional adaptability | <ul style="list-style-type: none"> • Design & as-built > Materials > Life Cycle Impacts > B. Prescriptive Pathway – Life Cycle Impacts > 19B.3 Building Reuse • Sustainable Products > 21.1 Product Transparency and Sustainability > A. Reused Products, B. Recycled Products, C. EPDs |

Circularity recognition in green building requirements globally (2)

Many green building recognition programs have long integrated circular economy aspects into their thinking – we just were not using the language of a circular economy when these systems were first established. E.g.:

| |   |  |
|------------------------------------|--|--|
| Region | Founded 2003 to provide certification in U.S. and Canada | Founded 2005 in Singapore to drive green construction in the country |
| Purpose | Assessment method focused on energy conservation, reduced water consumption, responsible use of materials, ecological stewardship and healthy indoor environments for occupants for new construction, multifamily homes, existing buildings, and interiors | Green building assessment for new construction and existing buildings for a wide range of applications |
| Sample circularity-concepts | <ul style="list-style-type: none"> • New Construction > 5 Materials > 5.4 Sustainable materials attributes (e.g., recycled content) • New Construction > 5 Materials > 5.5 Reuse of existing structures and materials | <ul style="list-style-type: none"> • Non-residential buildings > 3. Resource stewardship > 3.2 Materials > 3.2a Sustainable construction (e.g., conservation and resource recovery) • 3.3 Waste > Environmental construction management plan |

What can you do to create more
Circular Procurement?

NIGP
FORUM
2020

75TH
Connecting
Procurement
Communities

What can you do next



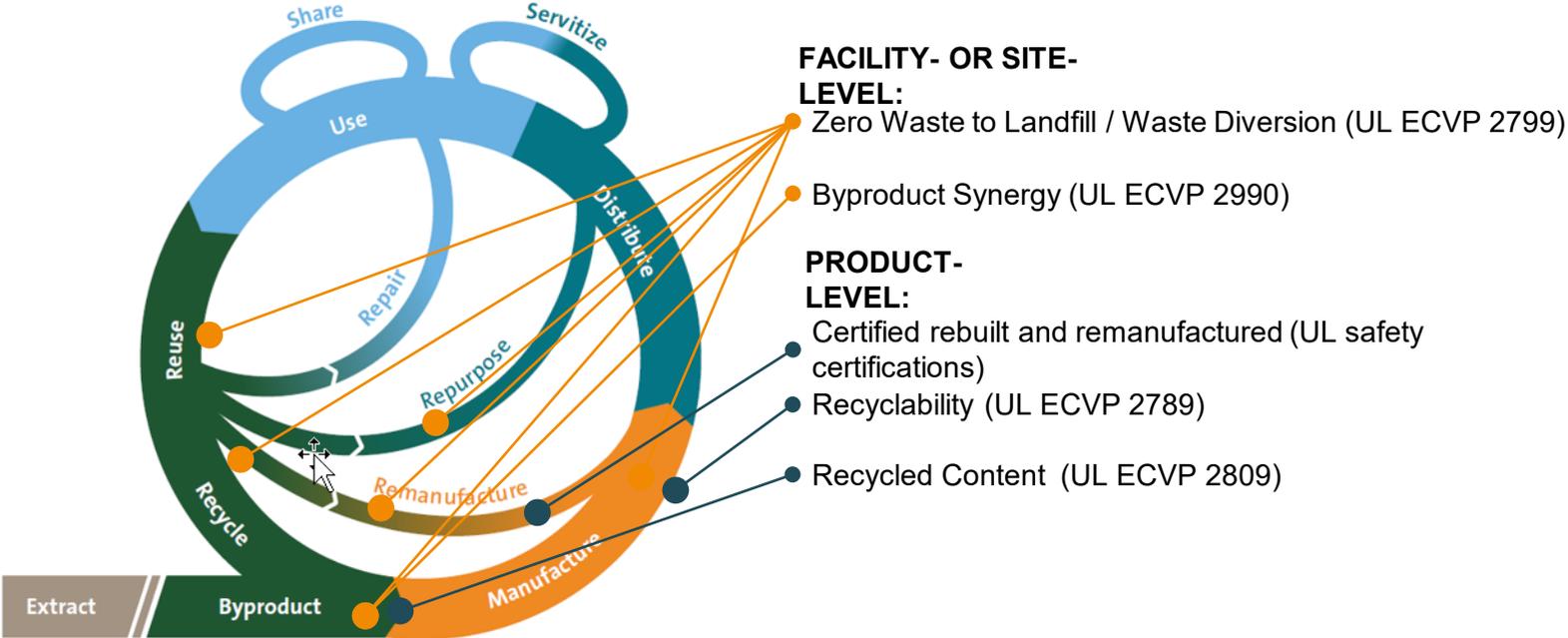
Despite the opportunities for embedding circularity into the procurement process there are challenges. Truly circular procurement can require changes to business models, different approaches to design, material selection, data management, and collaboration across a value chain. There are tools and places to start. Here are three:

- ✓ Integrate circularity thinking into the design phase of your projects and planning
- ✓ Identify key areas for circularity intervention that will work best for your project based (e.g., design out waste from the start; design in resource efficiency by considering where you can minimize material use; design for deconstruction and disassembly; ensure responsible sourcing of materials; use delivery and return logistics options with material suppliers; use product as service systems for certain materials)
- ✓ Use the new concepts in the marketplace from building rating systems (pilot credit)

Adapted from UK Green Business Council:

<https://www.ukgbc.org/sites/default/files/How%20to%20build%20circular%20economy%20thinking%20into%20your%20projects.pdf>

Use Pieces of Circularity



This graphic is adapted from Building Services Design Consulting Engineer



CIRCULAR CHARLOTTE

Towards a zero waste and
inclusive city

SEPTEMBER 2018

The built environment is essential to achieving circular economies

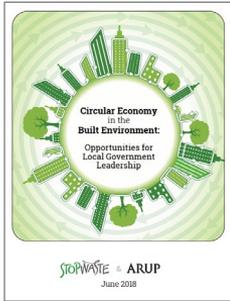
This report explores how Charlotte, NC, can implement its strategy to become the first circular city in the United States.

[View here](#)

Even if the next use of a building is unknown, there may be some basic structural requirements that allow for a maximum amount of flexibility to adapt for reuse. The Urban Land Institute has created an informative guide on universal structures: [View here](#)

Analysis of the benefits of construction and demolition debris recycling in the United States: [View here](#)

Circular Economy Tools



Geared toward policy-makers, this Ellen MacArthur Foundation report notes that a “city’s built environment today can contain over 300 tons of building materials per capita, more than triple the material intensity compared to 1960.” It suggests five guiding principles for circular construction and design. [View here](#)

The Design for Deconstruction (DfD) movement is to “responsibly manage end-of-life building materials to minimize consumption of raw materials. This case study offers several principles and DfD strategies, including minimizing building complexity, different types of materials, number of fasteners, toxic materials, and composite materials.

[View here](#)

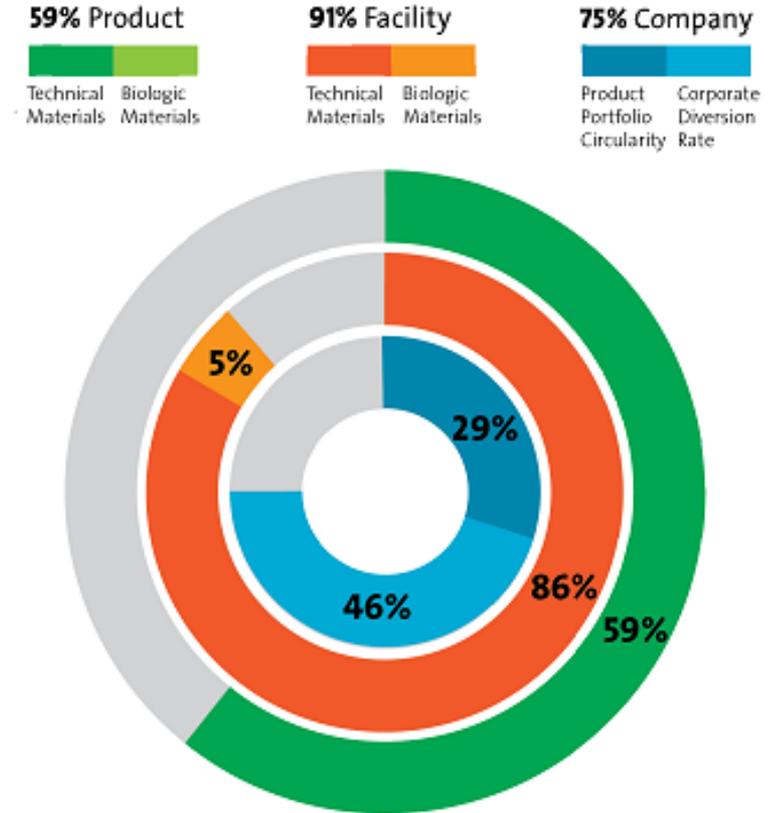


A new way to express circularity

Measuring & Reporting Circular Economy Aspects of Products, Sites & Organizations” (UL3600)

- Label is delivered through an EPD-like transparency report.
- Different shaded bars in each circle represent levels of achievement against specific concepts defined in the report.
- Flexible in terms of scope.
- Based on “bundles” of existing validations and certifications.
- In time, likely to evolve beyond material flows (CO₂e / SROI)

PURPOSE: to provide a clear way to measure and report progress toward circularity at the product, site, and corporate level.



UL's circularity thought leadership



Company case studies, customer profiles, blogs, white papers, press releases, webinars:

- Circular economy white paper: <https://www.ul.com/insights/bringing-transparency-circular-economy>
- Waste diversion webinar with Walmart: <https://ul.wistia.com/medias/m2nbom4tlw>
- Apple announcement in China: <http://www.apple.com/newsroom//2016/08/apple-announces-environmental-progress-in-china.html>
- Mass balance accounting of recycled content through chemical recycling – co-project white paper published by Ellen MacArthur Foundation: <https://www.ul.com/news/mass-balance-new-approach-calculating-recycled-content>

Circular Economy

- UL Circular Economy Page: <http://circular.ul.com/circular-economy/p/1>
- UL Waste Diversion / Zero Waste page: <http://circular.ul.com/zwtl/p/1>

Sample of relevant UL Standards (note: all UL environment and sustainability standards are available for free download as PDF from our standards sales site

<https://www.shopulstandards.com/Catalog.aspx>):

- UL ECVP 2799 - Environmental Claim Validation Procedure for Zero Waste to Landfill
- UL ECVP 2809 - Environmental Claim Validation Procedure for Recycled Content
- UL ECVP 2990 - Environmental Claim Validation Procedure (ECVP) for By-Product Synergy (in short, one company's waste product is another company's raw material input)
- UL 3600 - Outline of Investigation for Measuring and Reporting Circular Economy Aspects of Products, Sites and Organizations

Conclusion – josh.jacobs@ul.com



Thank you

Empowering Trust[®]