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).
• 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.

Source: U.S. Census and FMI Forecast
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.

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**

[ˈrē-,sŏrs]

*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
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
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.
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.


**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

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

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

Extends product life through repair instead of replacement.

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

Shifting 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

LEED 4 and 4.1 – resources!
Circularity-related credits in LEED 4 and 4.1

- Sourcing credit; EPD credit
- C&D waste management credit
- EPD credit material ingredients
- Joint use of facilities; adaptive reuse
- Sourcing: salvaged materials, EPR
## LEED 4 and 4.1 credits and the circular economy

<table>
<thead>
<tr>
<th><strong>New construction (NC)</strong></th>
<th><strong>Commercial interiors (CI)</strong></th>
<th><strong>Existing buildings: O&amp;M (EBOM)</strong></th>
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</thead>
<tbody>
<tr>
<td>NC MR: Prerequisite: Construction and demolition waste management planning</td>
<td>CI MR: Building life-cycle impact reduction</td>
<td>EBOM MR: Prerequisite: Purchasing Policy</td>
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<td></td>
<td>EBOM MR: Prerequisite: Facility maintenance and renovations Policy</td>
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<td>NC MR: Building product disclosure and optimization – sourcing of raw materials</td>
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Design for disassembly

Sample strategies

- Design for disassembly
- Buildings as material banks (BAMB)
- Material passports

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

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

Sourcing credit; EPD credit
C&D waste management credit
Recycled content disclosure; safe and circular
Circular design
ZWTL manufacturing
EPD credit material ingredients
Joint use of facilities; adaptive reuse
Sourcing: salvaged materials, EPR
Refurbished and remanufactured
Closed-loop, product as service
RAW: salvaged materials, EPR
Recycled content disclosure; safe and circular
Circular design
ZWTL manufacturing
EPD credit material ingredients
Joint use of facilities; adaptive reuse
Sourcing: salvaged materials, EPR
Refurbished and remanufactured
Closed-loop, product as service
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

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!
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.:

<table>
<thead>
<tr>
<th>Region</th>
<th>Founded 1990 in UK, global application</th>
<th>Founded 2003 in Australia, adopted in Australia, New Zealand and South Africa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpose</td>
<td>Sustainability assessment method based on built environment lifecycle analysis; covers new construction, in-use and refurbishment projects.</td>
<td>Sustainability assessment of communities, new construction, performance and interiors</td>
</tr>
<tr>
<td>Sample circularity-concepts</td>
<td>• 5.0 Management &gt; 02 Life cycle cost and service life planning; 03 Responsible construction practices</td>
<td>• Design &amp; as-built &gt; Materials &gt; Life Cycle Impacts &gt; B. Prescriptive Pathway – Life Cycle Impacts &gt; 19B.3 Building Reuse</td>
</tr>
<tr>
<td></td>
<td>• 11.0 Waste &gt; 02 Recycled aggregates; 06 Functional adaptability</td>
<td>• Sustainable Products &gt; 21.1 Product Transparency and Sustainability &gt; A. Reused Products, B. Recycled Products, C. EPDs</td>
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| Founded 2003 to provide certification in U.S. and Canada | 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 | • 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 |
|                 |                                                                        | • 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 |
| Founded 2005 in Singapore to drive green construction in the country | Green building assessment for new construction and existing buildings for a wide range of applications | |

Circularity recognition in green building requirements globally (2)
What can you do to create more Circular Procurement?
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

**FACILITY- OR SITE-LEVEL:**
- Zero Waste to Landfill / Waste Diversion (UL ECVP 2799)
- Byproduct Synergy (UL ECVP 2990)

**PRODUCT-LEVEL:**
- Certified rebuilt and remanufactured (UL safety certifications)
- Recyclability (UL ECVP 2789)
- Recycled Content (UL ECVP 2809)

This graphic is adapted from Building Services Design Consulting Engineer
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
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.
Company case studies, customer profiles, blogs, white papers, press releases, webinars:

- Waste diversion webinar with Walmart: https://ul.wistia.com/medias/m2nbom4tlw

Circular Economy

- UL Circular Economy Page: http://circular.ul.com/circular-economy/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

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