

**The greenest building is...  
one that is already built.**  
– Carl Elefante<sup>1</sup>

## Designing for a Circular Economy Reduce, Reuse, Deconstruct, Recycle

In 2018, it is estimated that more than 600 million tons of Construction and Demolition waste was generated in the United States, which accounts for significantly more than other municipal trash sources.<sup>2</sup> This waste from both ends of a building's life accounts for a good deal of its embodied carbon. With great problems, comes great opportunity and responsibility to do better by the communities we live in and the planet we have inherited.

A Circular Economy describes a building industry where construction waste is recycled, remanufactured or reused to make new buildings, thus reducing the total new raw materials needed and reducing the amount of waste going to landfills. With many municipalities and building certification processes requiring construction waste recycling procedures, this circular future is closer than ever before.<sup>3</sup>

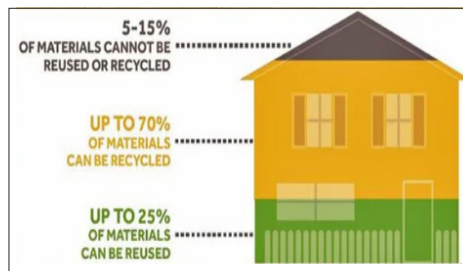
**“The transition to a circular construction economy represents the possibility to unlock billions of dollars of unrealized economic activity, introduce thousands of new green jobs, divert millions of tons of waste, and prevent 75% of embodied carbon emissions.”<sup>4</sup>**

<sup>1</sup> <https://carlelefante.com/>

<sup>2</sup> <https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/construction-and-demolition-debris-material>

<sup>3</sup> <https://sustainableconsumption.usdn.org/initiatives-list/encouraging-and-mandating-building-deconstruction>

<sup>4</sup> <https://labs.aap.cornell.edu/ccl/whitepaper>



<https://www.secondchanceinc.org/deconstruction/what-is-deconstruction/>

### Reduce

Can you adjust the scope of the project to use less materials overall?

### Reuse

Can you reuse existing structures or materials in place?

### Deconstruct

Can you take the building apart more gently to recover reusable materials?

### Recycle

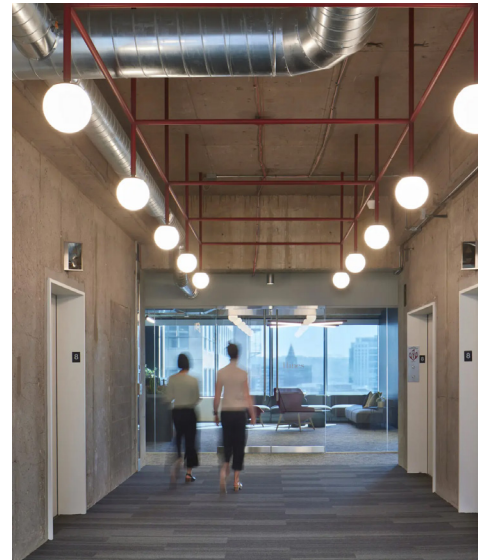
What you can't reuse as is, can it be remanufactured or recycled?



**Hines Seattle Headquarters**  
LMN Architects, Seattle, WA

When designing Hines Seattle Headquarters, LMN focused on reusing all they could within the existing office space, including the walls and flooring and bringing in salvaged or reused materials where they could to create a modern office space that reduces the potential embodied carbon by 65%.

<https://lmnarchitects.com/project/hines-seattle-headquarters>



## Deconstruction over Demolition

Choosing deconstruction instead of typical demolition allows for more careful consideration of what materials can be diverted from landfills to be reused or recycled. This diversion from landfill can be significant and materials may be able to be resold to recoup some of the costs of labor.

### Methods:

- Talk with your finish manufacturers to determine if the existing materials are ones that can be reclaimed and recycled.
- Design for deconstruction in mind using bolted connections or non-adhesive solutions
- Work with a local resale or salvage store for materials they can resell including doors, flooring, hardware, lighting, etc.

Examples of Reuse Centers:

- Boston, MA - <https://www.bostonbuildingresources.com/reuse-center>
- Boulder, CO - <https://resourcecentral.org/materialsreuse/>
- Portland, OR - <https://www.rebuildingcenter.org/>
- Florida - <https://swix.ws/resources/Building-Material-Reuse-Centers/>

## Building with Reused Materials

When starting a project that may need some demolition, determine if any of the materials can be reused in the new work. For example, in this project by Goody Clancy at Cornell University, when the existing solid wood doors were to be replaced in this historic residence hall, the doors were salvaged to be used as accent wall paneling and locations for donor and commemorative information.



Goody Clancy

Alternatively working with a Reuse center or contractor, find local salvaged materials that can be reused for your project.

If a new material is best suited to the job, look for materials that contain a high percentage of recycled content or natural materials.

## Methods for Tracking Progress

The Framework for Design Excellence's principles for Designing for Resources<sup>6</sup> and Designing for Change<sup>7</sup> encourage reducing the amount of new materials, reusing materials where possible and designing projects in a way that will either reuse what is there or will allow for easy deconstruction or adaption in the future.

### Tools, Resources, & Books

Carbon Avoided Retrofit Estimator (CARE) Tool and other Life Cycle Analysis tools allow you to compare carbon impacts of reuse and building new.

<https://www.caretool.org/>

BEAM Estimator looks at the carbon impact of material selections

<https://www.buildersforclimateaction.org/beam-estimator.html>

Urban Sustainability Directors Network Sustainable Consumption Toolkit has tools and guides for advancing waste management policies in your local area

<https://sustainableconsumption.usdn.org/>

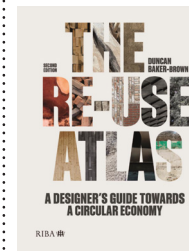
## Designing for a Circular Economy

### What's Next?

Understanding the finite amount of resources available and the sheer volume of waste accumulated annually, the path to a healthier and more regenerative built environment that helps the communities and the ecosystems it is part of, includes a circular economy of reuse and adaptation.

Architects have a unique and powerful role in the selection of materials and the reuse of buildings. Advocating for a more mindful and deliberate approach to how every project utilizes the available resources, provides you with the opportunity to save your client money, reduce the overall waste generated and support more circularity moving forward in the building industry.

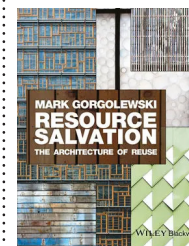
Stay tuned for future editions of Climate Corner focused more on Regenerative Design.



### The Re-use Atlas: A Designer's Guide Towards a Circular Economy

by Duncan Baker-Brown

<https://www.ribabooks.com/the-re-use-atlas-a-designers-guide-towards-a-circular-economy-9781914124129>



### Resource Salvation: The Architecture of Reuse

by Mark Gorgolewski

<https://www.wiley.com/en-us/Resource+Salvation%3A+The+Architecture+of+Reuse-p-9781118928776>

<sup>6</sup> <https://www.aia.org/design-excellence/aia-framework-for-design-excellence/resources>

<sup>7</sup> <https://www.aia.org/design-excellence/aia-framework-for-design-excellence/change>

