Carbon Leadership Forum

Regional Hub Policy Series

Embodied Carbon & Deconstruction & Reuse Policies

Overview

This Presentation

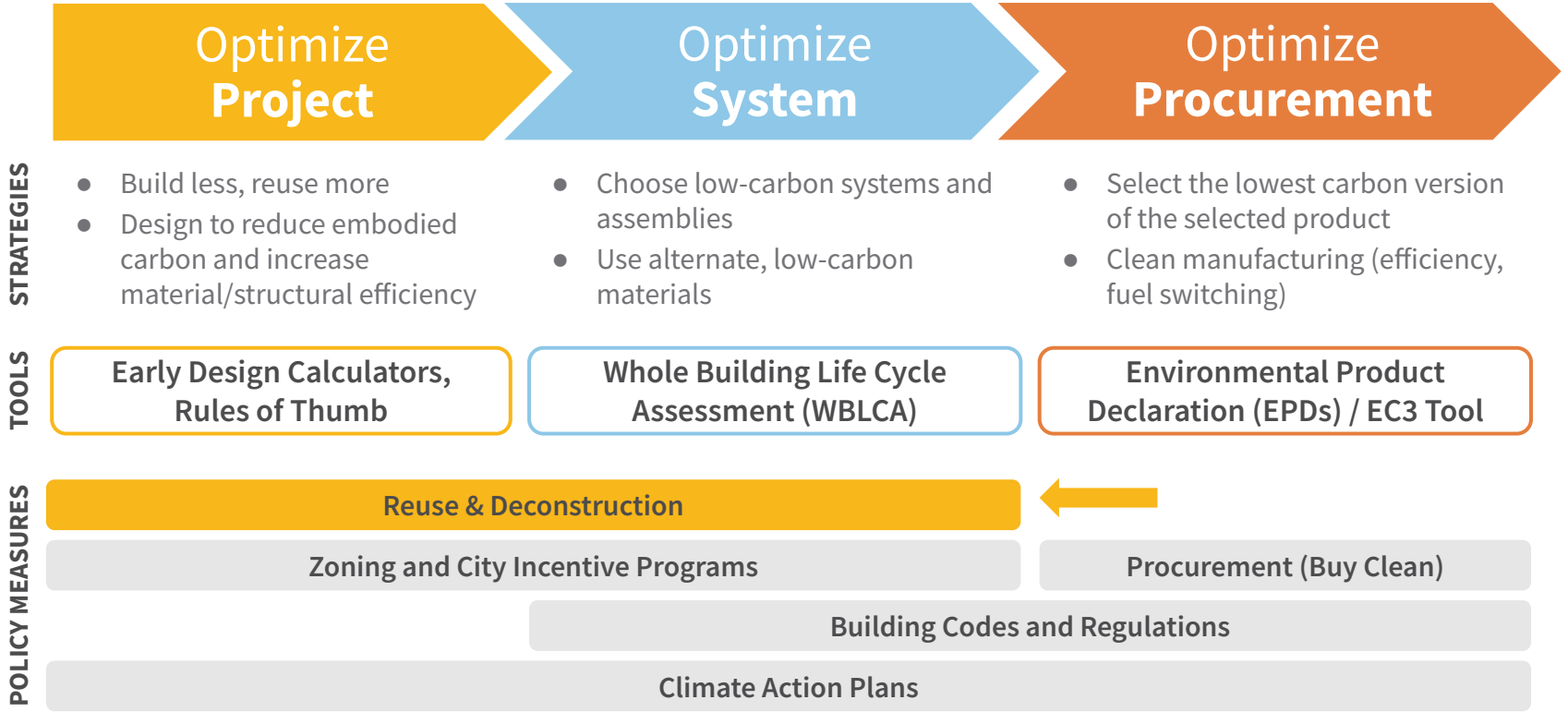
1. Reuse & Embodied Carbon
2. Policy Opportunities
3. Case Studies
4. Development Process and Stakeholders

Thanks to the CLF Regional Hub Policy Leads for feedback and review of this series.

Policy Introductory Series

1. Introduction to the Embodied Carbon Policy Landscape
2. Climate Action Plans
3. Procurement Policy
4. Building Codes
5. City Zoning and Incentive Programs
6. **Reuse and Deconstruction**

Matching Policy Opportunities with Embodied Carbon Reduction Strategies



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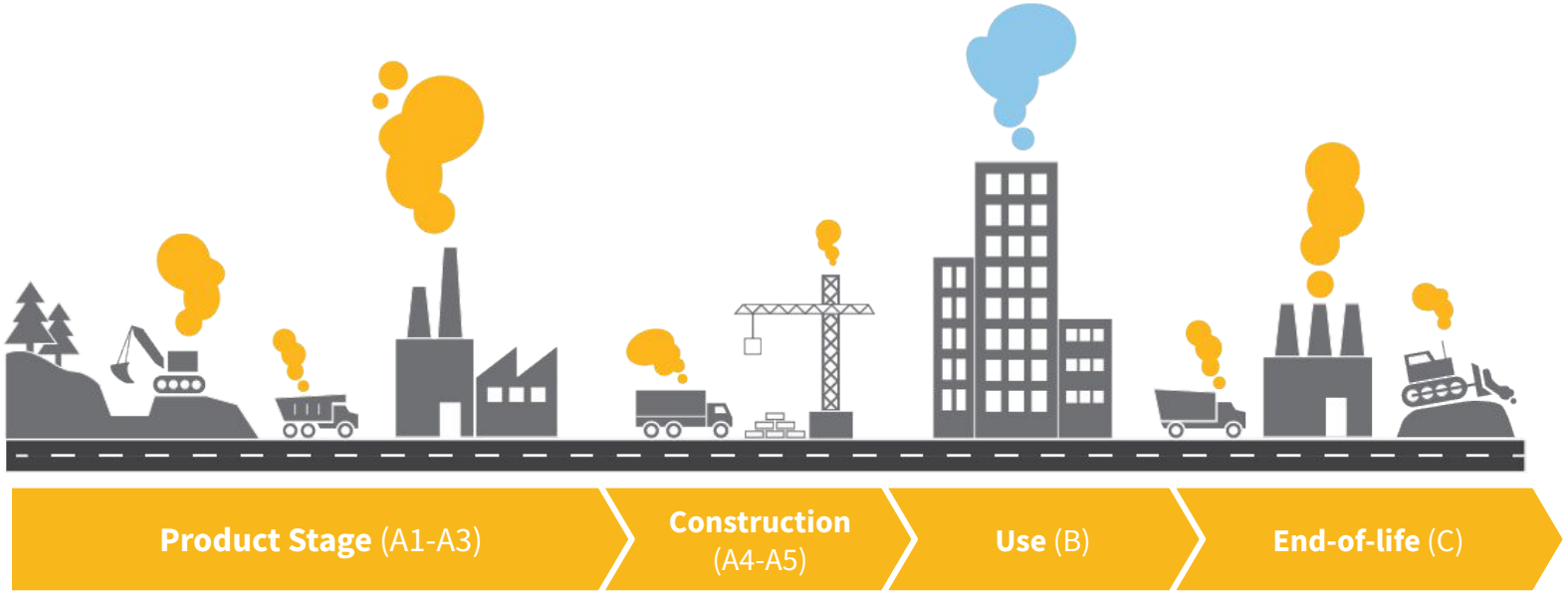
Reuse & Embodied Carbon

Why Reuse?



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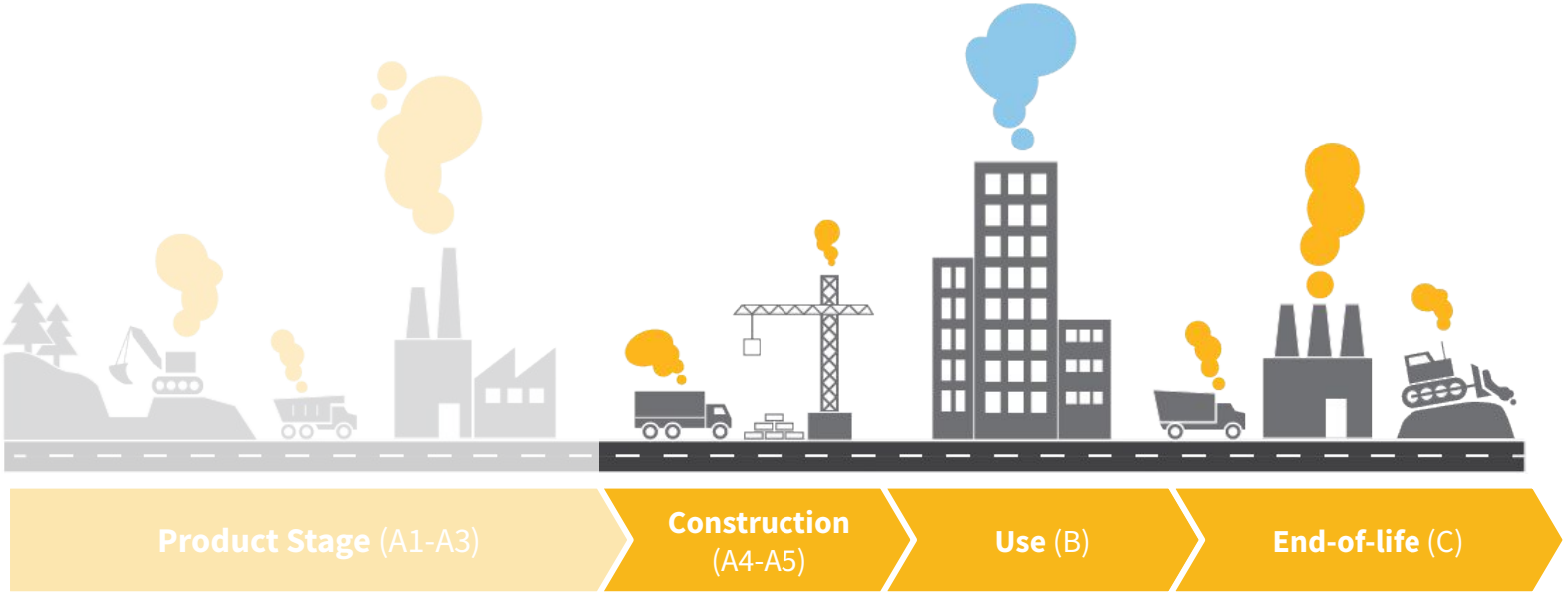
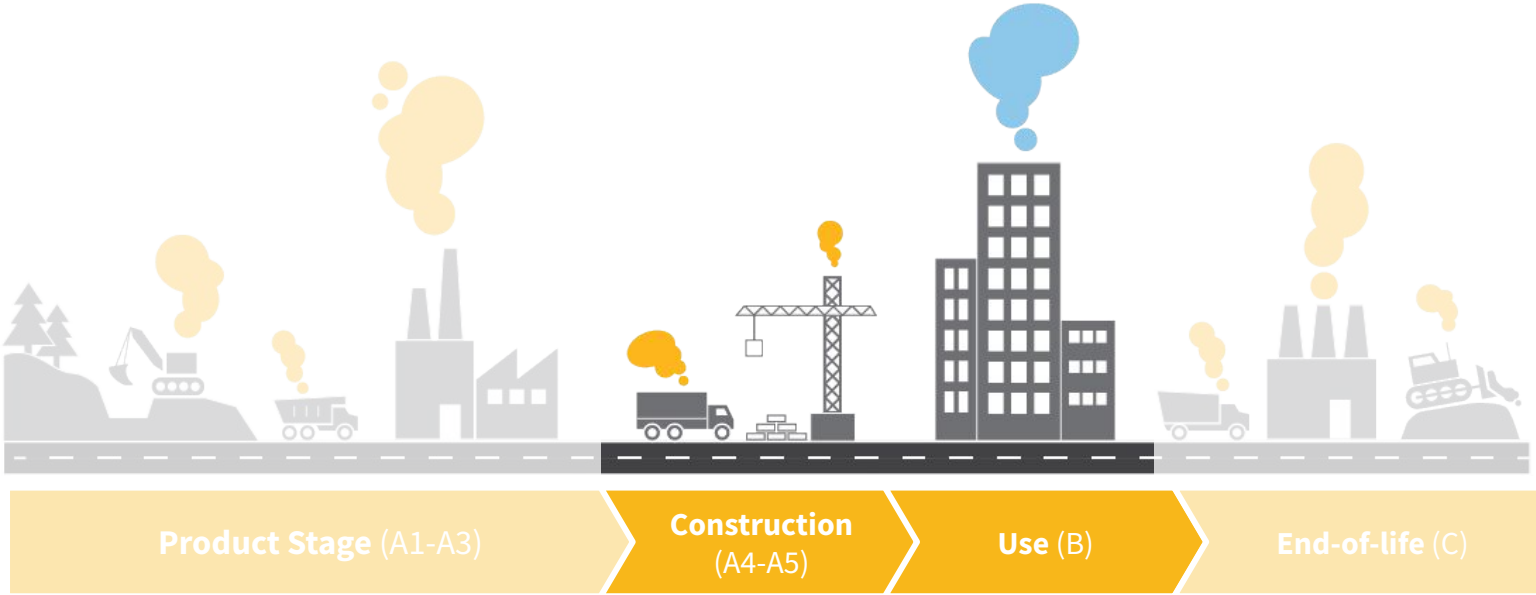


Fewer New Materials

Why Reuse?



Fewer New Materials + Less Waste

Different Types of Actions

- **Building reuse:** (‘adaptive’ reuse) of an entire building or a portion (structure/envelope)
- **Material/product reuse:** (reuse of individual salvaged/surplus materials)
- **Deconstruction / Salvage:** the systematic dismantling of a structure that prioritizes salvage of materials for reuse, enabling future material reuse (‘buildings as material banks’)
- **Design for disassembly:** design of buildings to facilitate future change and the eventual dismantlement (in part or whole) for recovery of systems, components and materials
- **Government led programs** to support for market development
- **Investment in** existing communities, historic buildings, high priority development areas
- **Links to economic development, local economy:** jobs and businesses, Zero Waste principles

Calculating the Embodied Carbon Benefits of Reuse

Select Tools

- WBLCA tools (Tally, OneClickLCA, etc.) can exclude A1-A3 GWP for reused components
- **C.A.R.E. Tool** *(in development)* to quantify the trade-offs between retrofit and new build (includes operational energy tradeoffs) www.znccollaboration.org/care

Salvage/Deconstruction:

- Example: *Deconstruction vs. Demolition: An evaluation of carbon and energy impacts from deconstructed homes in the City of Portland* (Nunes, Palmeri, and Love 2019)

Source: Carbon Avoided: the Retrofit Calculator (C.A.R.E.)

Deconstruction and Workforce Development

Job Creation

- Increased demand for repair and reuse workers
  - Requires more skilled contractors than demolition
- Jobs in deconstruction and removing materials
- Also in: transportation, storage, refurbishing, and reselling of materials

Pexels, 2016

Deconstruction and Workforce Development

New markets, reuse warehouses, local community hubs

- Connect with others
- Provide training on refurbishing/reuse
- Sales of salvaged materials

Source: Cincinnati Refined, 2022

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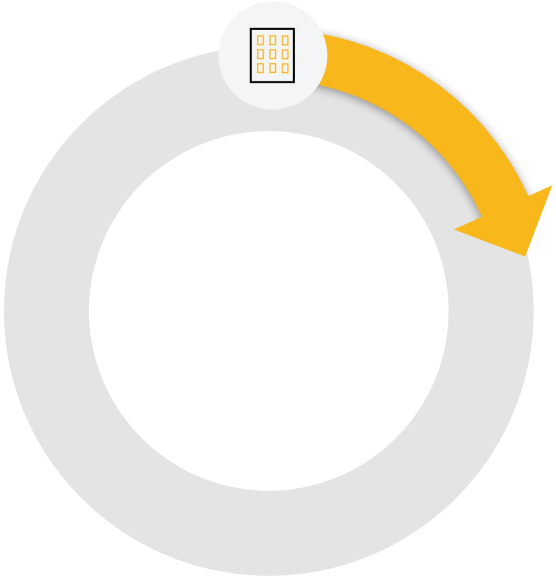
Policy Opportunities to Influence Reuse

Opportunities for Policy and Government-led Programs

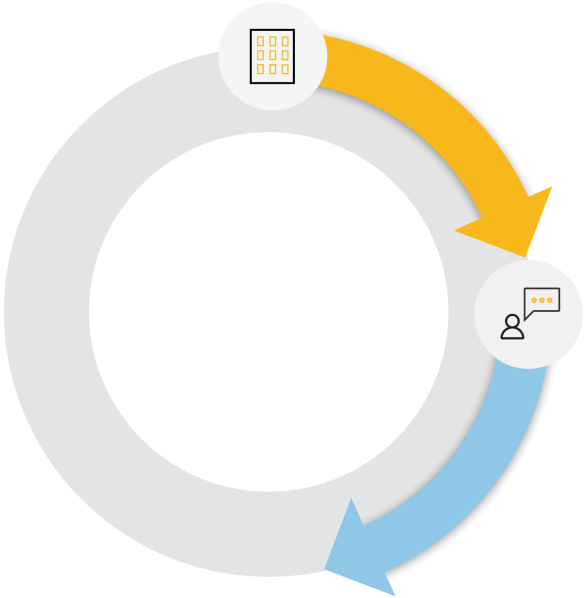


Site Selection & Building Design

- Choosing an existing building to re-use or add on-to, rather than tearing down and building new, sufficiency measures

Related Policy Precedent: Los Angeles Adaptive Reuse Ordinance

Opportunities for Policy and Government-led Programs



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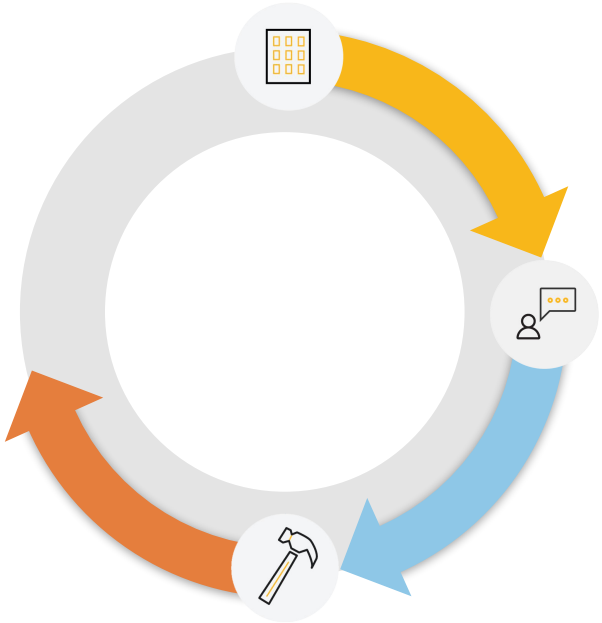
- Choosing an existing building to re-use or add on-to, rather than tearing down and building new, sufficiency measures

Material Selection and Construction Details

- Specifying existing/salvaged materials and material longevity
- Using design for disassembly principles

Related Precedent: LEEDv4 BD+C Credits: Building Life-Cycle Impact Reduction (Option 3) or Sourcing of Raw Materials (Option 2) Credits

Opportunities for Policy and Government-led Programs



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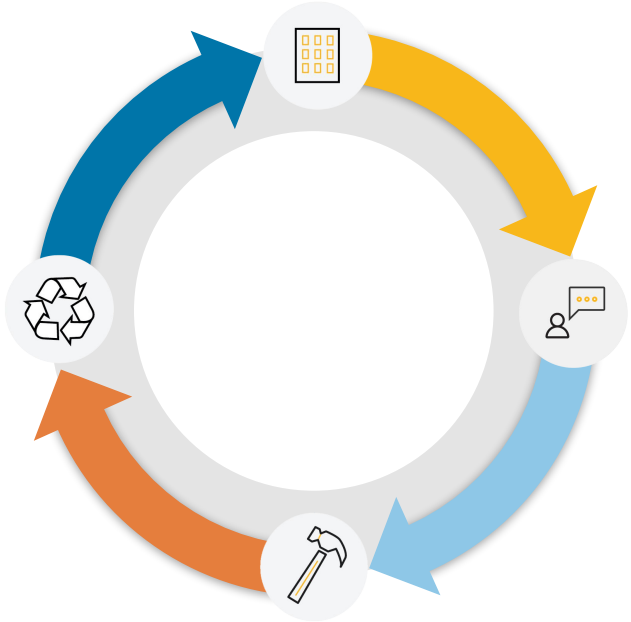
Deconstruction & On-site construction waste diversion

- Deconstruction and salvage (rather than demolition)
- Landfill diversion of surplus materials/construction waste

Related Policy: Portland Deconstruction of Buildings Law; Palo Alto Deconstruction Ordinance

Opportunities for Policy and Government-led Programs



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Material Reuse Markets and Storage

- Warehouses for material storage between uses
- Online platforms to enable designers and contractors to identify available materials

Related Precedents: Houston Reuse Warehouse; Rheaply

Tracking the Growing Reuse Policy/Resource Ecosystem

REUSE

Suppliers of salvaged, used or refabricated building materials

DECONSTRUCTION

Organizations that offer services to salvage, soft-strip, or deconstruct

NETWORK / RESOURCES

National member organizations, digital platforms, and materials databases

REMANUFACTURING / RECYCLING

Manufacturer take-back programs, fabricators, and targeted recycling

HAULING / WAREHOUSING

Entities supporting the logistics of moving and storing products

GOVERNMENT / PUBLIC AGENCY

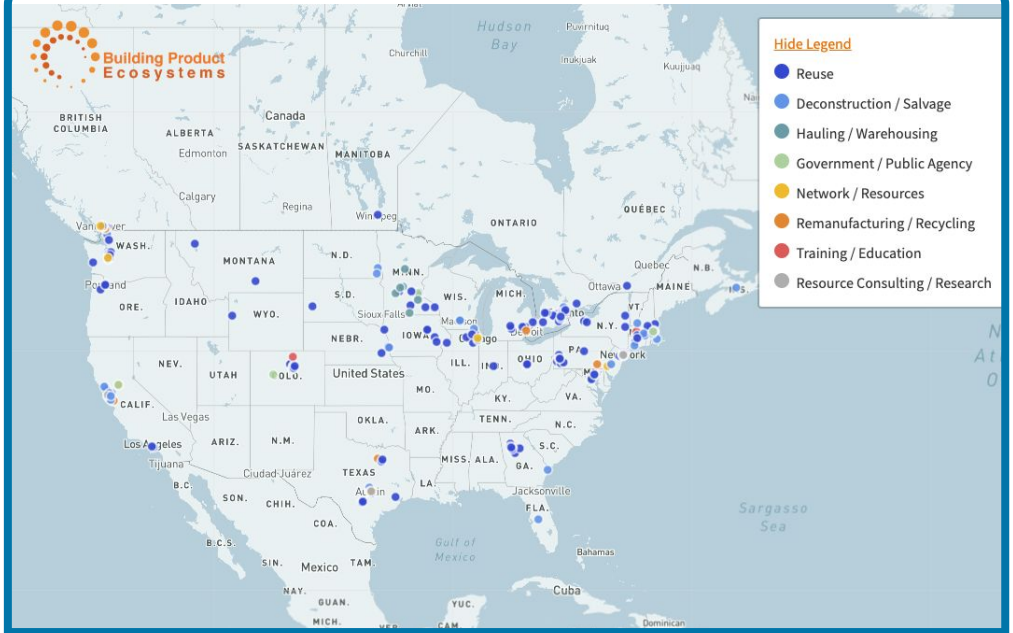
Examples of jurisdictions with policies or enabling infrastructure in place

TRAINING / EDUCATION

Workforce development in the field and programs in academic institutions

CONSULTING / RESEARCH

Resource experts specializing in material reuse or circular economy



Check out the **All for Reuse** Ecosystem Map Here:
https://www.allforreuse.org/ecosystem-map

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Case Studies

Policy Precedents Building Reuse

Case Study: Los Angeles Adaptive Reuse Ordinance

Development incentives for adaptive reuse:

- Mezzanines
- Density bonuses
- Reduction in off-street parking requirements
- Other regulatory exemptions

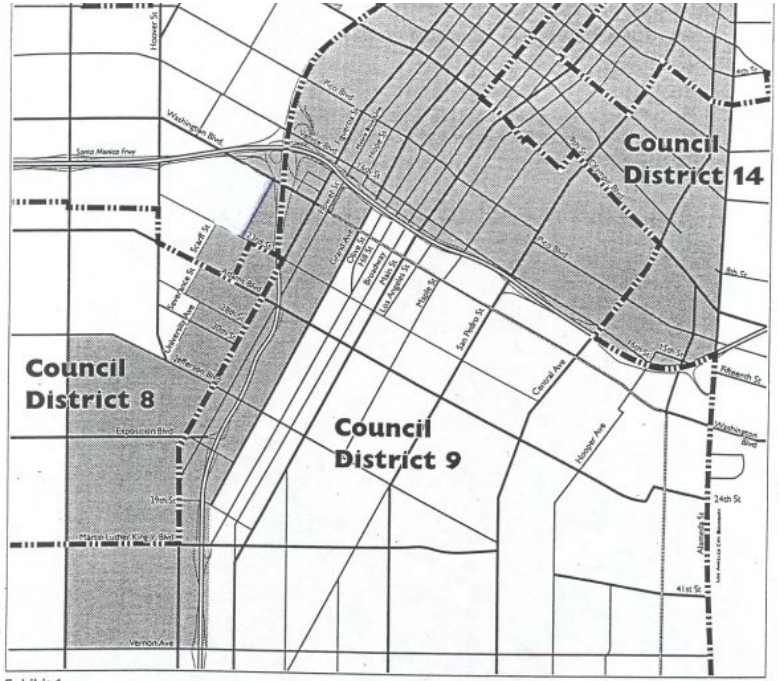


Exhibit 1
Project Area
Downtown Adaptive Reuse, Live/Work Ordinance

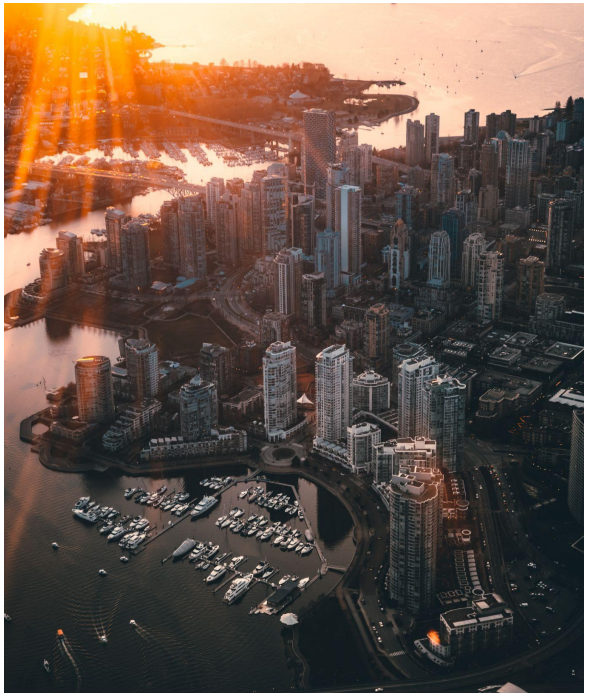
Policy Precedents Building Reuse

Case Study: City of Vancouver (B.C.) Green Building Rezoning Requirement

- Requires % reductions from a baseline (as verified by a WBLCA)
- Reuse can contribute to meeting % reduction

Case Study: City of Vancouver's (B.C.) Empty Homes Tax

- Encourages empty and underutilized properties to get back on the rental market



City of Vancouver (Pexels, 2019)

Policy Precedents Deconstruction and Salvage

Case Study: Portland Deconstruction of Buildings Law

As of 2020, all single-dwelling structures (houses and duplexes) in all zones must be fully deconstructed as opposed to mechanically demolished if:

- The structure was built in 1940 or earlier; or
- The structure is designated as a historic resource

Projects must use a city-published list of Certified Deconstruction Contractors to perform the deconstruction work.

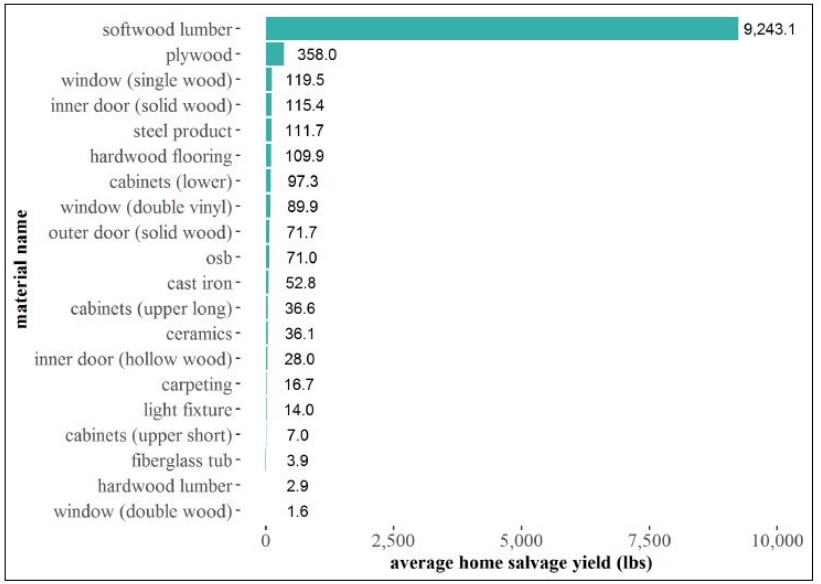


Figure 5: Quantity of materials salvaged from an average home

Source: Oregon DEQ Materials Management, "Deconstruction and Demolition" Study

Policy Precedents Deconstruction and Salvage

EU Taxonomy Regulation (draft criteria)

Prevents or reduces waste generation

- Including waste from extraction of minerals and construction and demolition of buildings

EU Construction Products Regulation (proposal)

Create a harmonised framework to assess and communicate environmental and climate performance of construction products

- New product requirements will ensure that the design and manufacture of construction products is based on state of the art to make these more durable, repairable, recyclable, easier to re-manufacture.
- Establish a construction products database and a Digital Products Passport to reduce admin burdens

Policy Precedents Material Reuse Markets and Storage

Case Study: Massachusetts DEEP
RecyclingWorks Blog

Guidance on how to develop a reuse plan, (timeline and budget), taking inventory, and identifying potential reuse outlets.

Case Study: Houston, TX REuse Warehouse

City-run warehouse that provides space for excess building materials

- Accepts material from individuals, supply companies, and builders.
- Freely available for reuse by any non-profit organization.

Additional related precedents: *Pennsylvania Recycling Market Center Incubator*

Houston, TX REuse Warehouse

Policy Precedents Byproducts into Materials Manufacturing

Case Study: Colorado Circular Economy Development Center

Establishes a Center which:

- Works with processors and manufacturers in the state to increase use of recycled content inputs
- Facilitates connections among recyclers, transporters, municipalities, higher education, etc.

Case Study: Washington Materials Marketplace

Free online marketplace developed by Department of Ecology

- Connects businesses, organizations, and entrepreneurs to develop and scale reuse and recycling market opportunities
- Supports BIPOC- and women-owned businesses

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Development Process and Stakeholders

Before embarking on an ordinance, understand local conditions:

- Public support?
- Local markets to absorb materials?
- Are demolitions publicly funded or privately funded?
- Are property values high or are property values depressed?
- Are there a large number of blighted/condemned properties in your city?
- Can private deconstructions use tax deductions to offset the additional costs?
- Plan to train labor force how to deconstruct?
- Data management
  - What information is already tracked or available to the city agencies?
  - What existing processes are used to gather information or approve projects and act as gates or bottlenecks?

Takeaways

Extending the life of a material or building avoids extraction and manufacturing emissions from creating a new one, saving embodied carbon

Policy instruments:

- Building Reuse
- Deconstruction and Salvage
- Material Reuse Markets and Storage
- Byproducts into Materials Manufacturing

Benefits:

- Environmental
- Economic
- Social

Thank you!

Policy Advantages and Co-benefits

- Avoid carbon emissions from **manufacturing new materials** for new construction
- Reduce the **environmental damage and community health impacts** from landfilling construction materials after demolition
- **Avoid environmental damage from new construction on greenfield** (i.e., previously undeveloped) sites by encouraging preservation and increased density in historic portions of cities
- **Preserve cultural resources and heritage**, providing economic and social co-benefits
- **Reduce local noise and pollution** from demolition activities (depending on the scope of adaptive reuse)
- Provide an opportunity for **energy retrofits** of outdated, inefficient, and high-emission MEP systems

Goals

- Avoiding embodied carbon from new materials
- Reduce local environmental and health impacts from construction waste
- Support new markets and jobs related to deconstruction and material reuse
- Support circular economy through design for disassembly and adaptability

+ Update policies that unintentionally prevent building/material reuse

Source: Pexels, 2020

Policy Precedents Material Reuse Markets and Storage

Case Study: San Francisco, CA Climate Action Plan

By 2025, create policy framework to expand and cultivate regional building material reuse markets

- Support workforce development
- Small businesses
- Entrepreneurial innovation

Case Study: Oakland Climate Action Plan

Actions to encourage reuse of building materials and establish physical spaces for repair economies.