

# **Building Sector Circularity**

by: Eden Brukman, SF Environment

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# Building Material Management in San Francisco



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Mission of the Department of the Environment:  
to provide solutions that advance climate protection  
and enhance quality of life for all San Franciscans





# A 'Think-And-Do' Tank for Sustainability



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# Collaboration Across Program Areas



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# 2006 C&D Debris Recovery Ordinance



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## It's the Law

You must  
recycle all  
**Construction  
and  
Demolition**  
waste material



**SF Environment**  
Our home. Our city. Our planet.  
A Department of the City and County of San Francisco



No Construction & Demolition  
Material to Landfills!





# Current (Design), C&D Practices Still Lead to Landfill



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25%

(\*excludes "Alternative Daily Cover")



# 2018 C40 Advancing Toward Zero Waste Declaration



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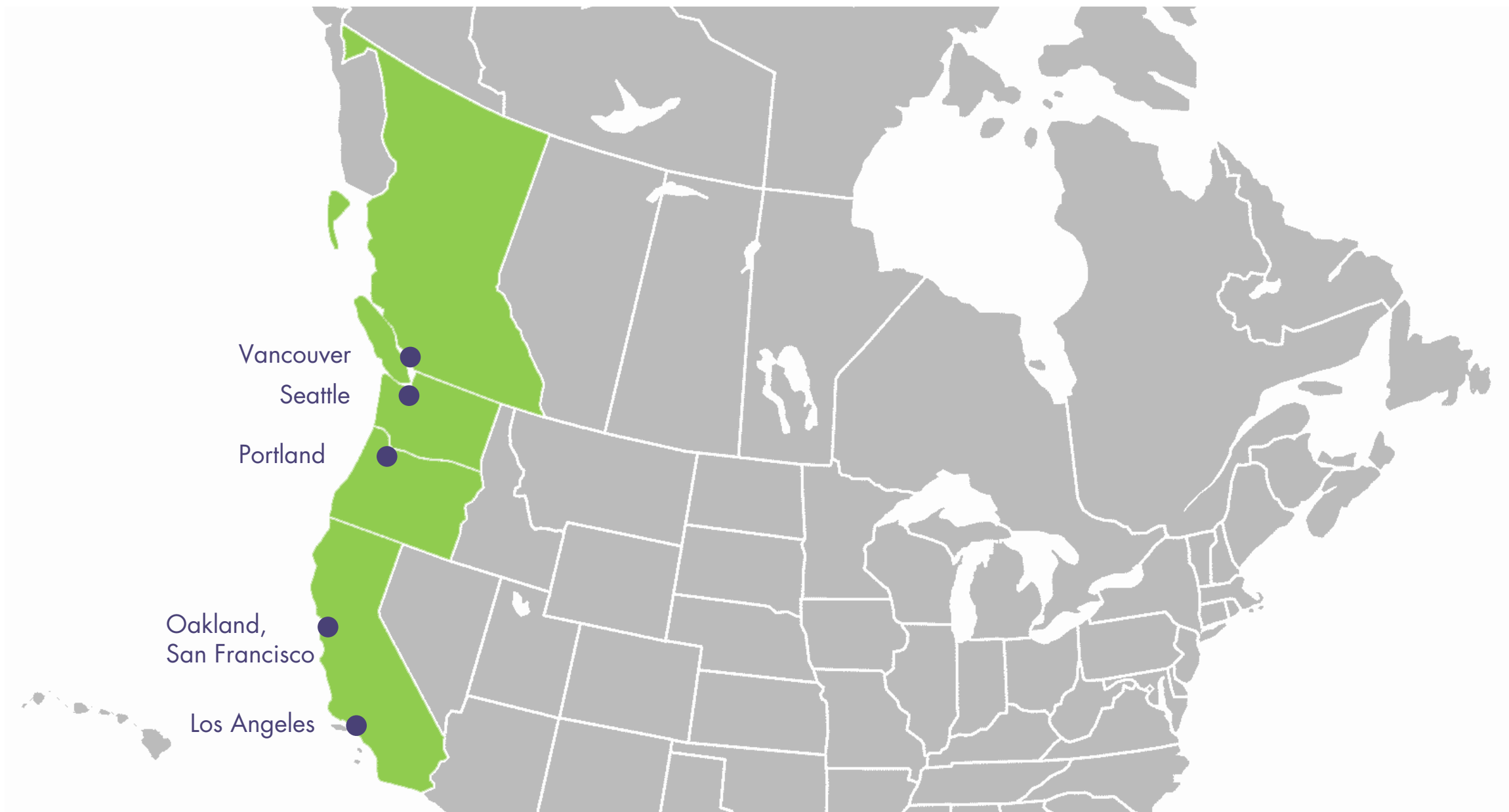




# COP 26: PCC Low Carbon Construction Task Force



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# 2021 C40 Clean Construction Declaration



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METRICS



Photo: Doors Unhinged

SOURCING



Photo: Cummins, Inc.

PROCESS



RPC.1-1

METRICS

2024-2026: Reduce embodied carbon 10%+ per project (3+ product categories/building assembly types)

RPC.1-4

SOURCING

By 2025: Require deconstruction of buildings and increase the source separation of specific materials

RPC.1-6

PROCESS

By 2025: Expand and cultivate regional building material reuse markets that support workforce development, small business enterprises, and entrepreneurial innovation.

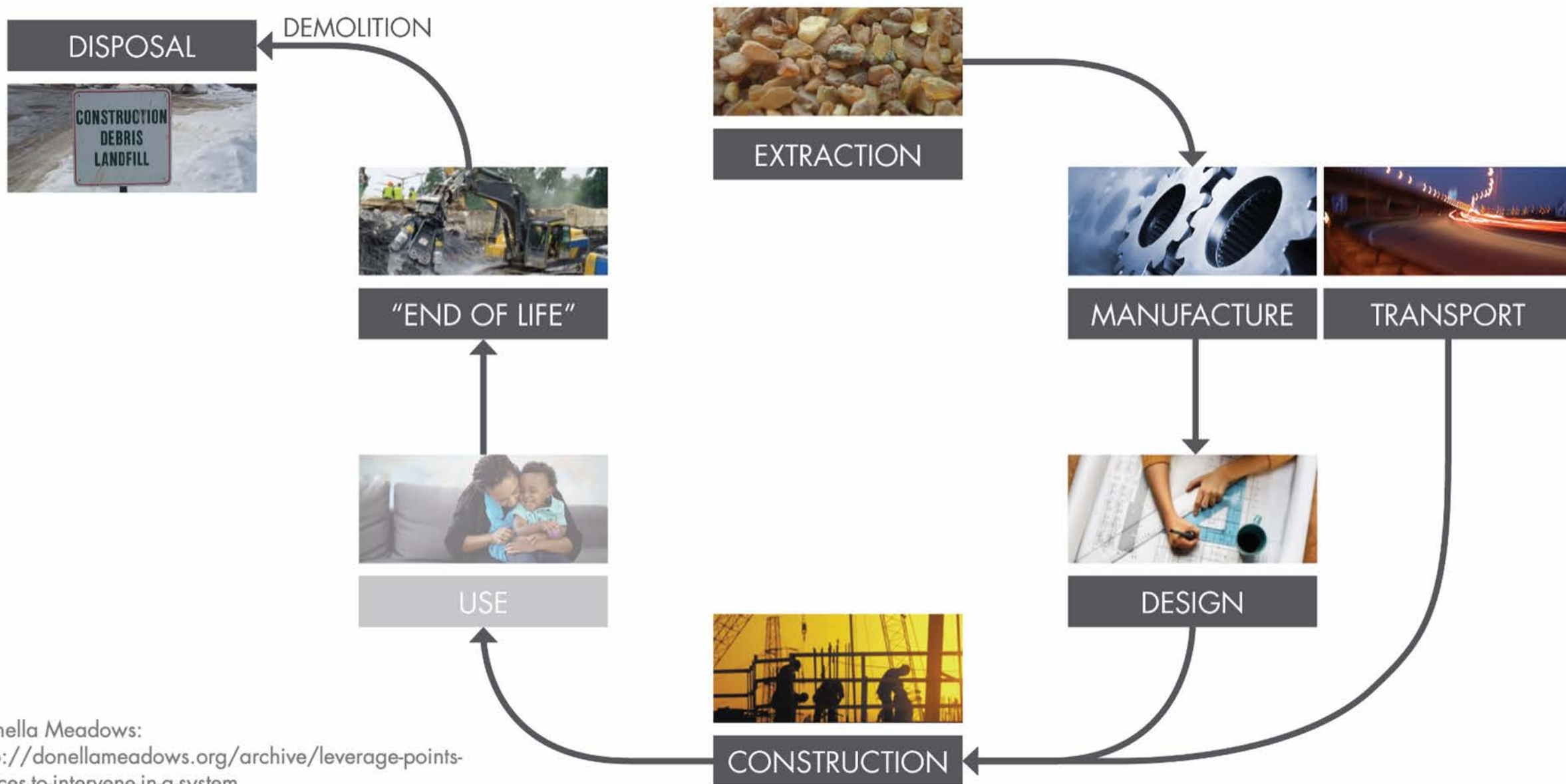
See All Climate Action Plan Strategies: [SFClimatAction.org](https://SFClimatAction.org)



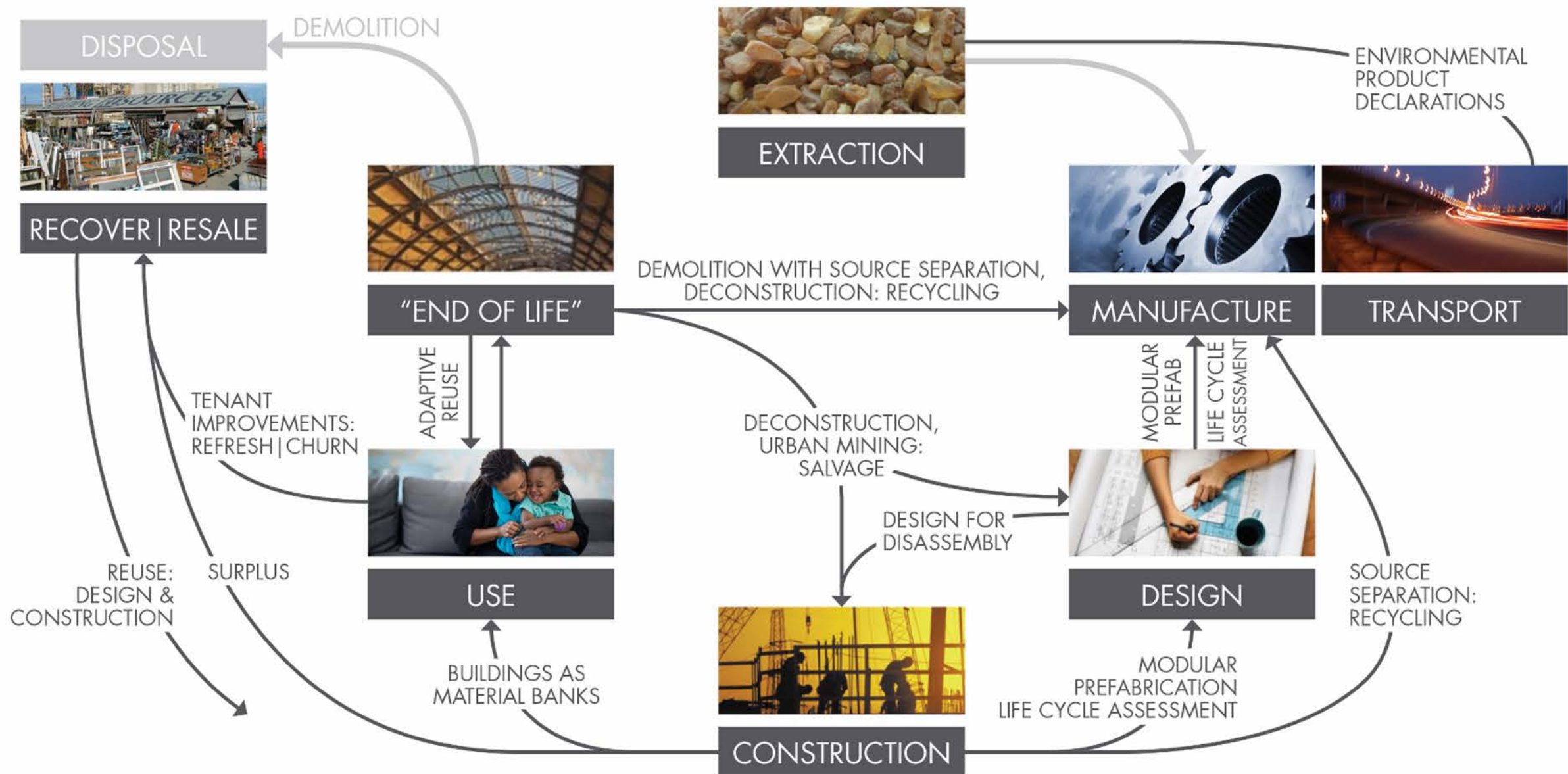
# Places to Intervene in a System \*



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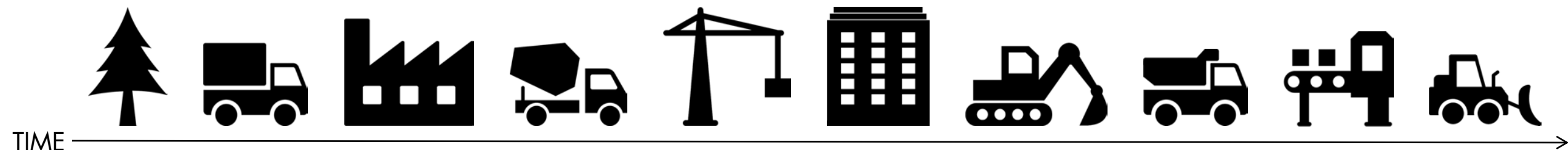
\* Donella Meadows:  
<http://donellameadows.org/archive/leverage-points-places-to-intervene-in-a-system>





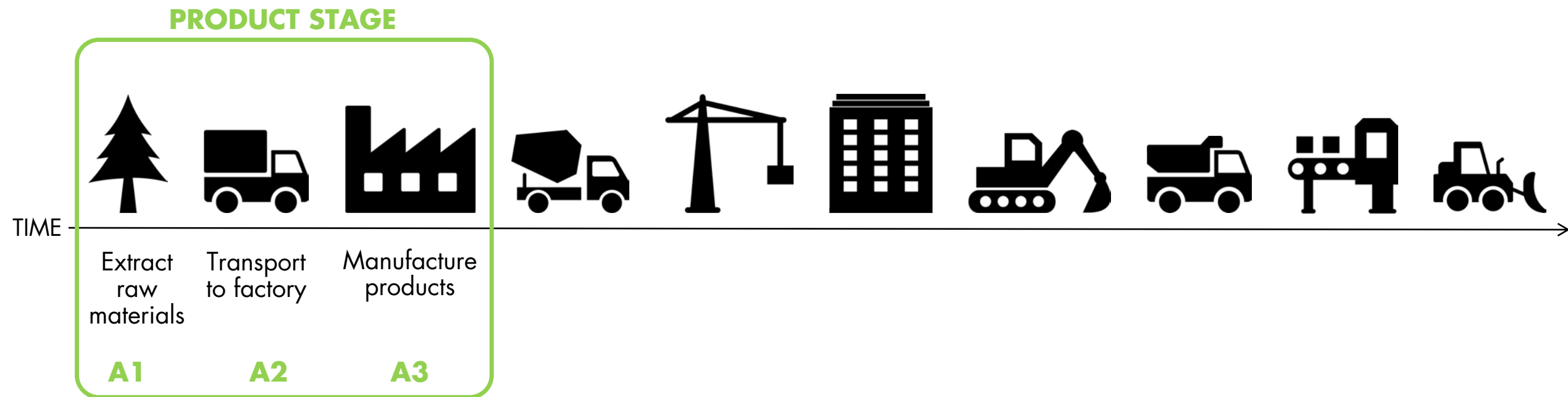


*The sum impact of all the greenhouse gas emissions attributed to materials throughout their life cycle.*





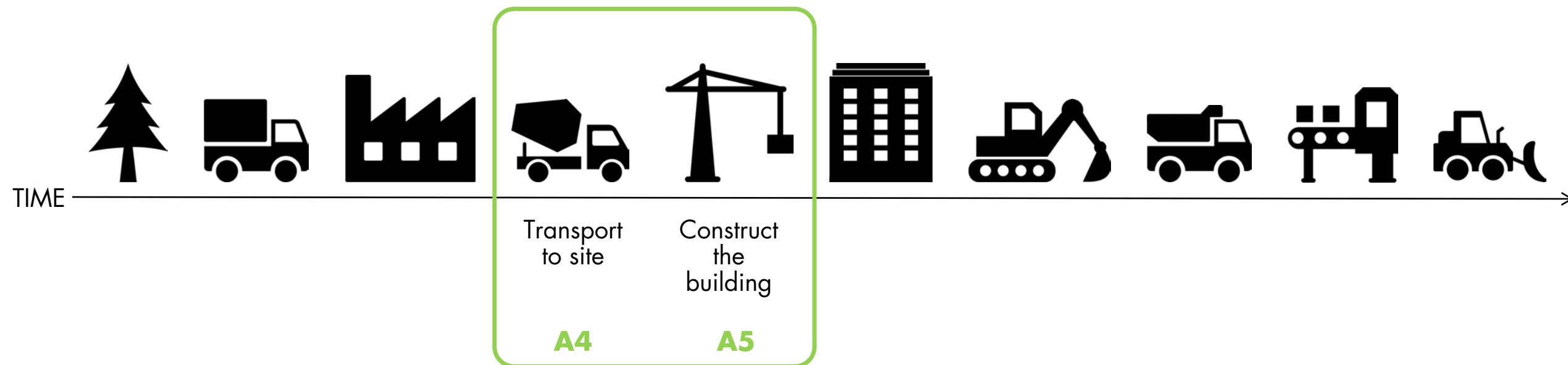
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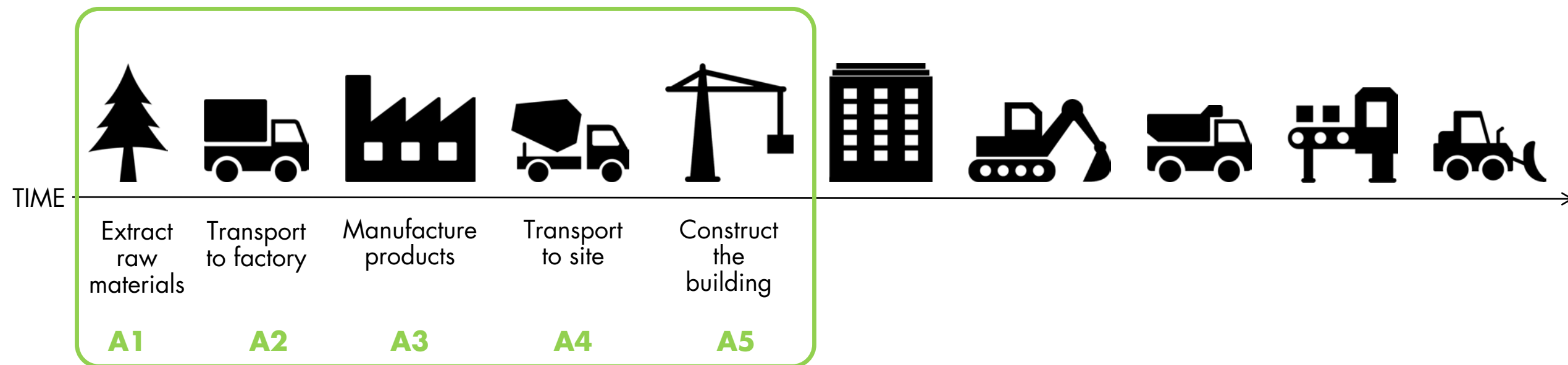
## CONSTRUCTION PROCESS STAGE





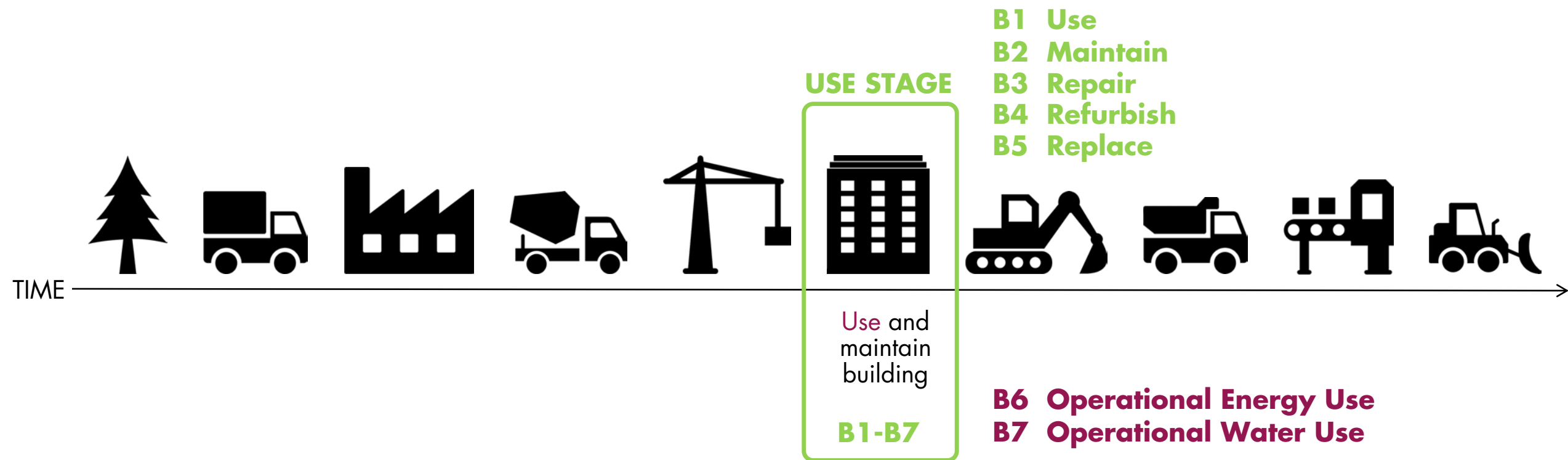
*The sum impact of all the greenhouse gas emissions attributed to materials throughout their life cycle.*

## "UPFRONT CARBON"



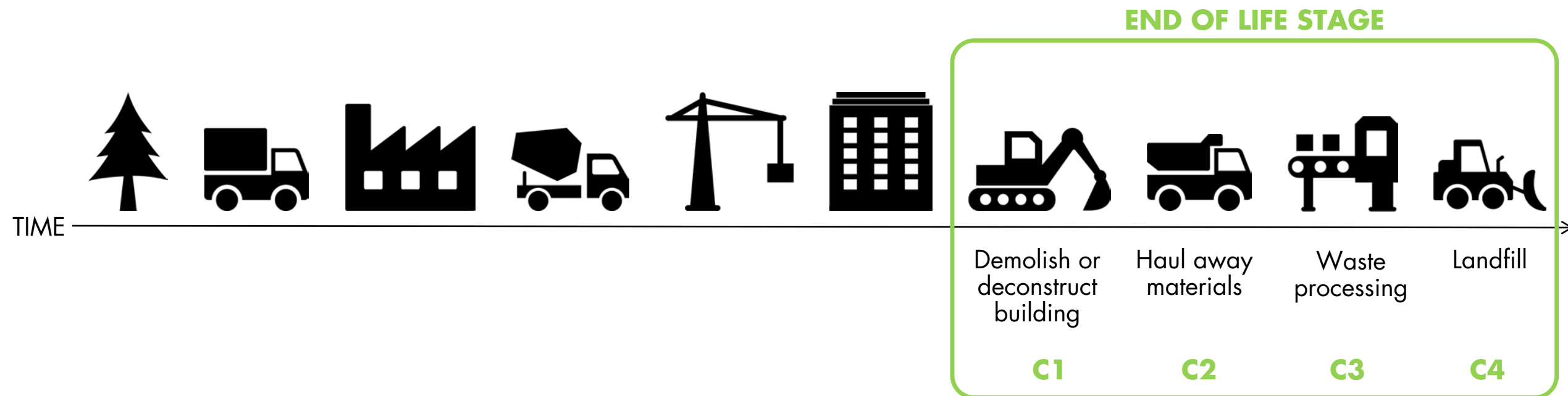


*The sum impact of all the greenhouse gas emissions attributed to materials throughout their life cycle.*





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# Embodied Carbon: Beyond the Building Lifecycle



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**D REUSE | RECOVER | RECYCLE**



Photo: GreenLynx



Photo: GreenLynx

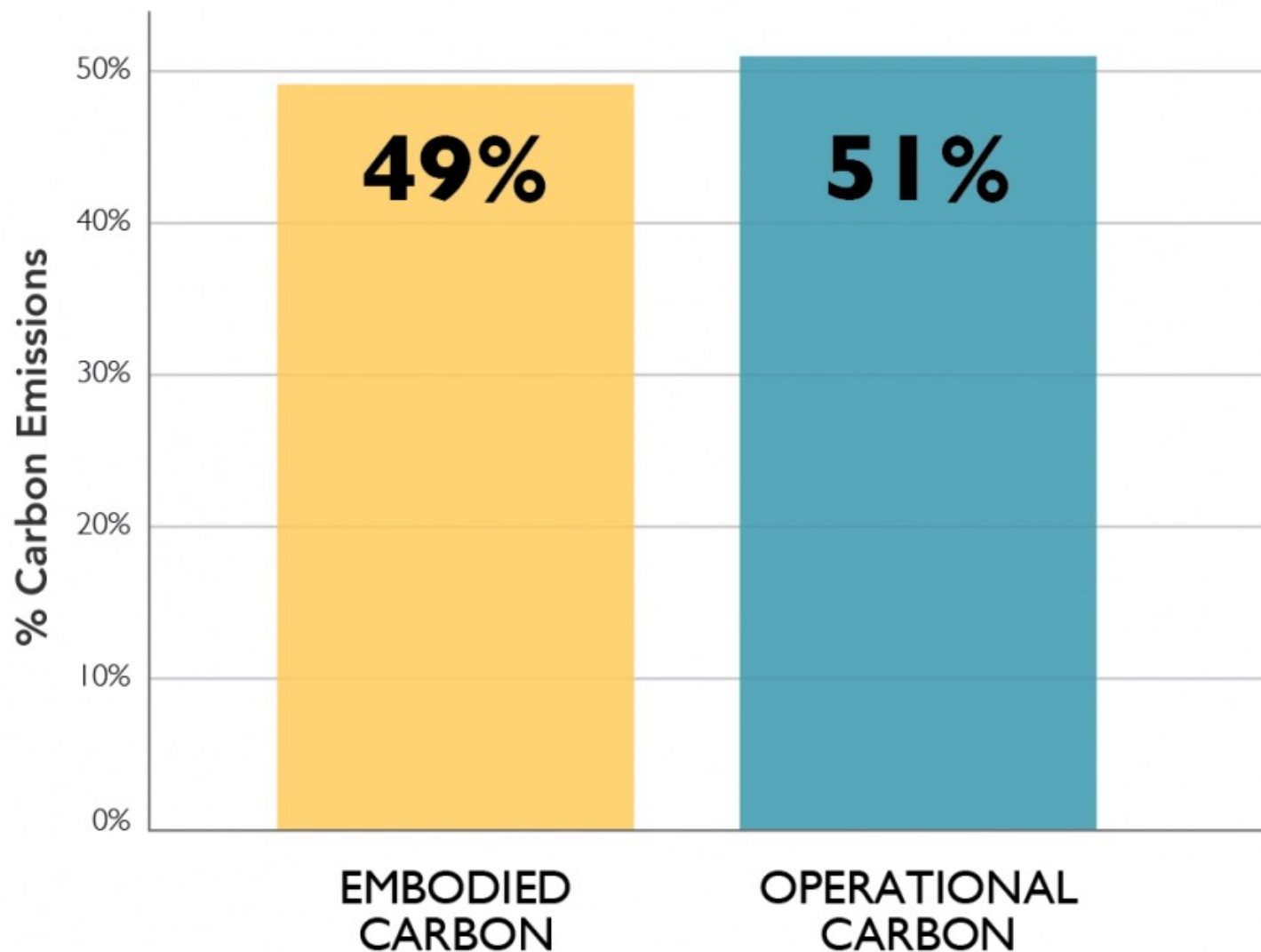


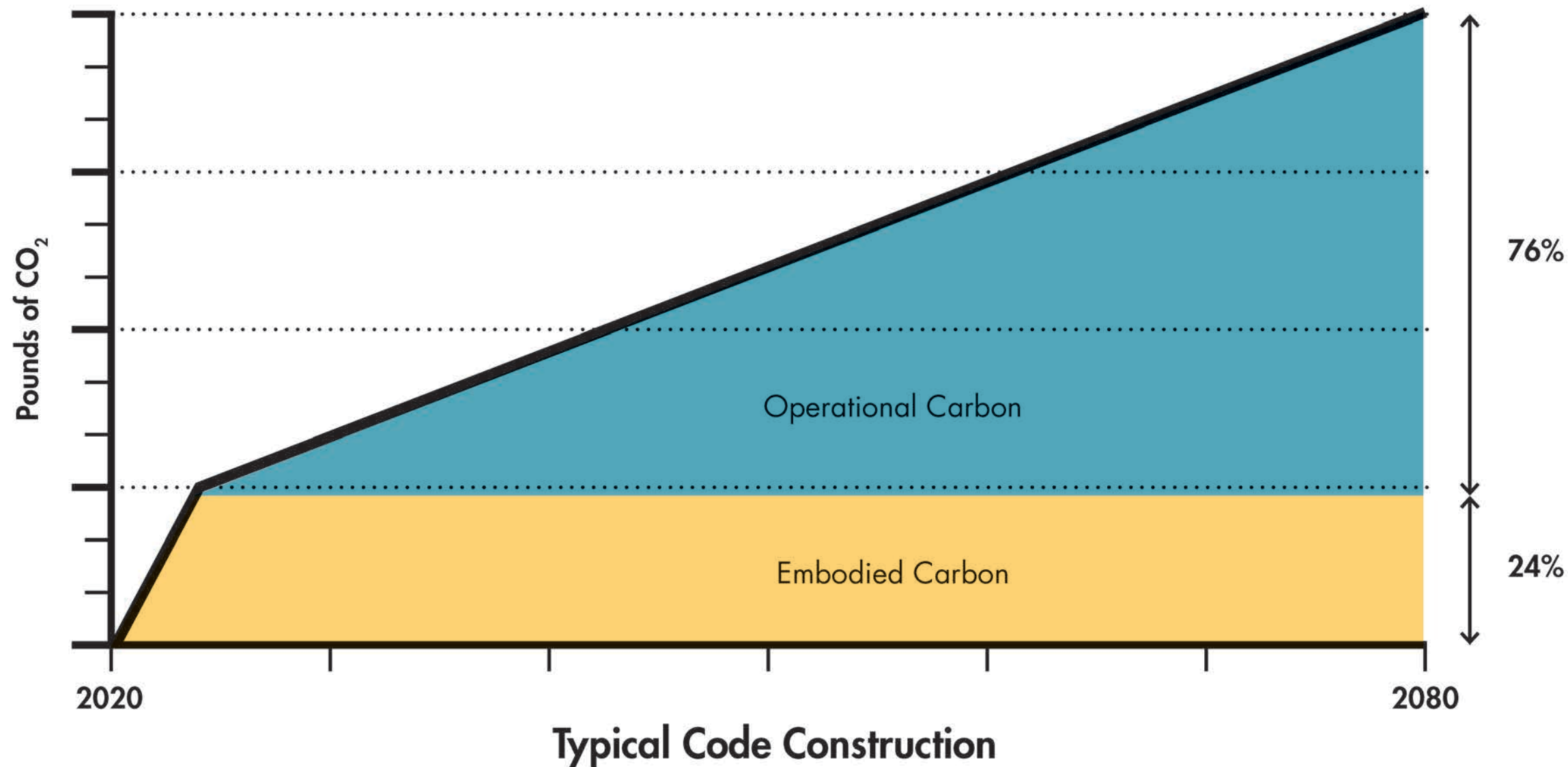


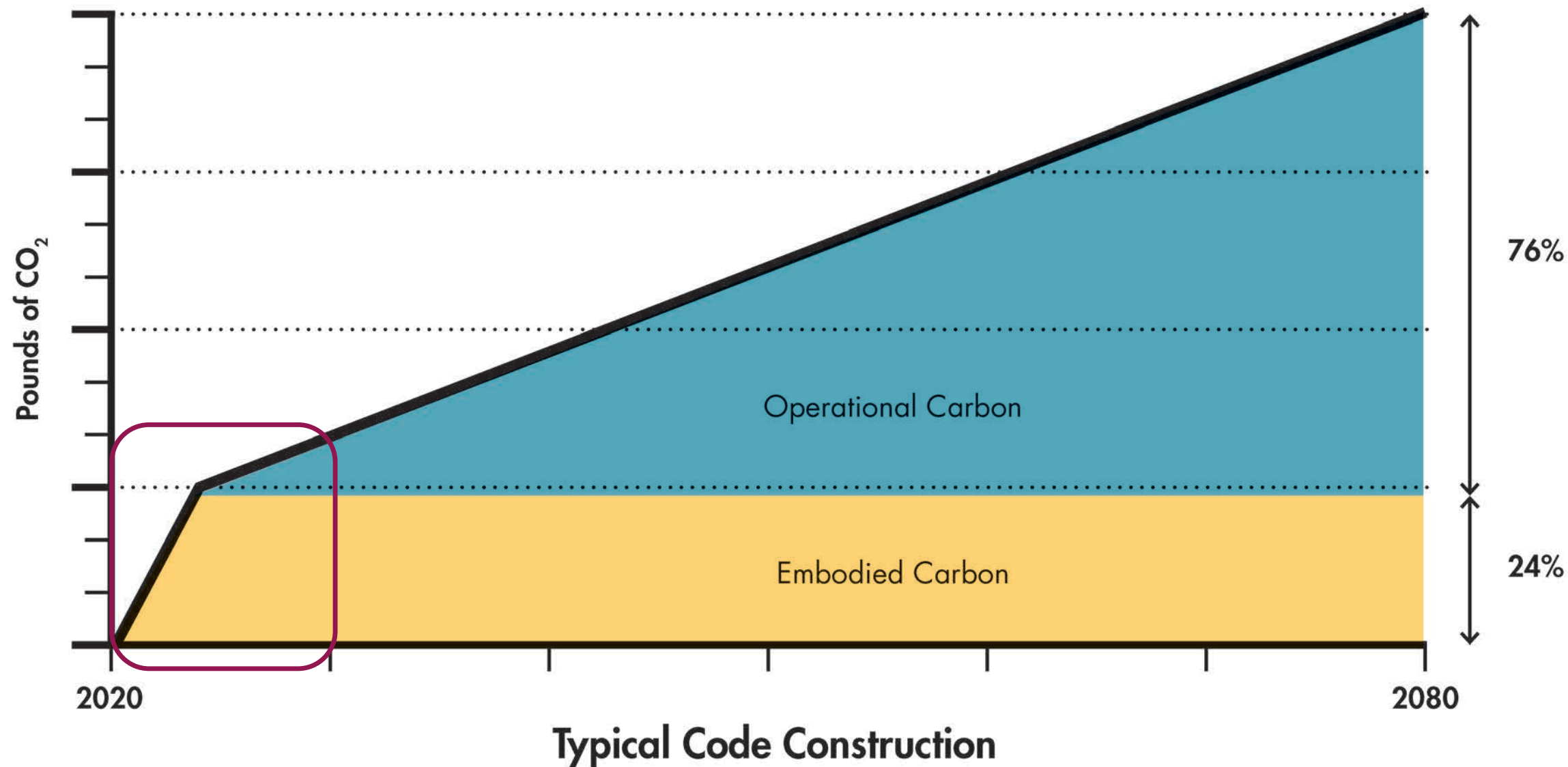
# Total Carbon Emissions of Global New Construction



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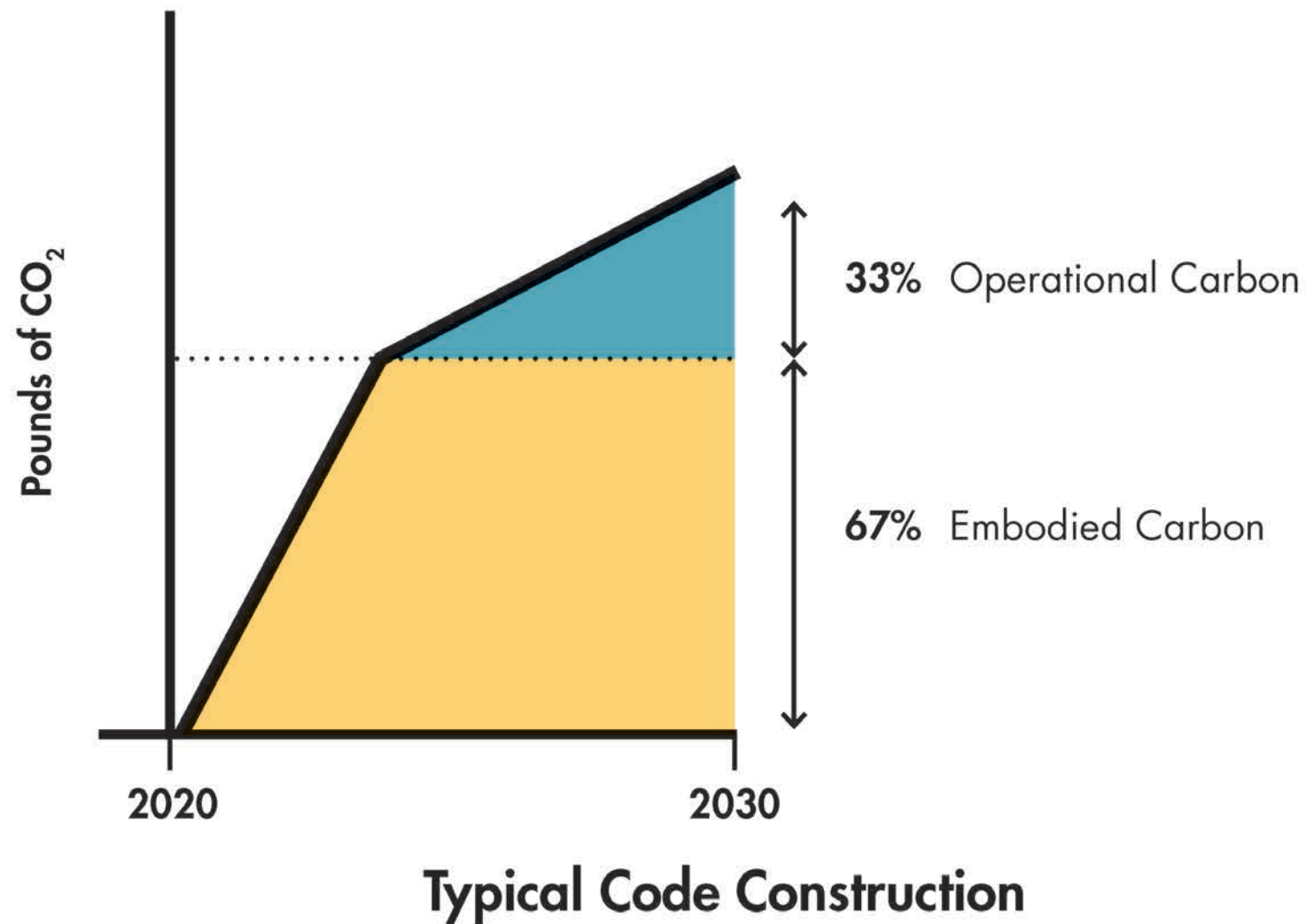




Photo: Les Chatfield

Photo: dunktanktechnician



# Material Reuse



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# Infrastructure to Support Policy & Programs



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## NETWORK OF SUPPLIERS AND RECEIVERS



## VIRTUAL INVENTORY/ASSET MANAGEMENT



## PHYSICAL 'LAYDOWN' SPACE



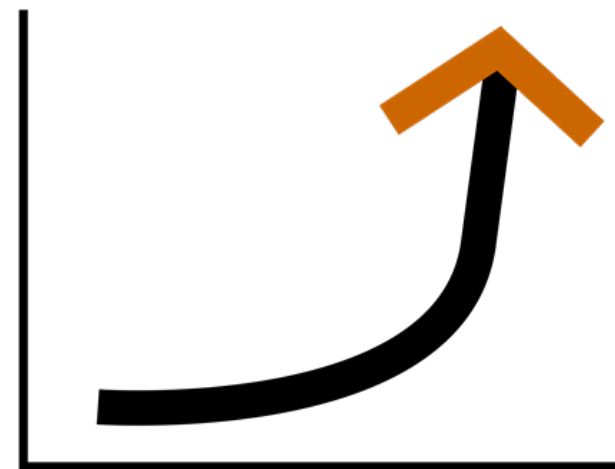
## Environmental Impact

Reduce Carbon  
Reduce Waste  
Protect Resources



## Ecosystem of Circular Enterprises

Create jobs in  
deconstruction, warehousing,  
remanufacturing, and resale



## Scale Up Quickly!

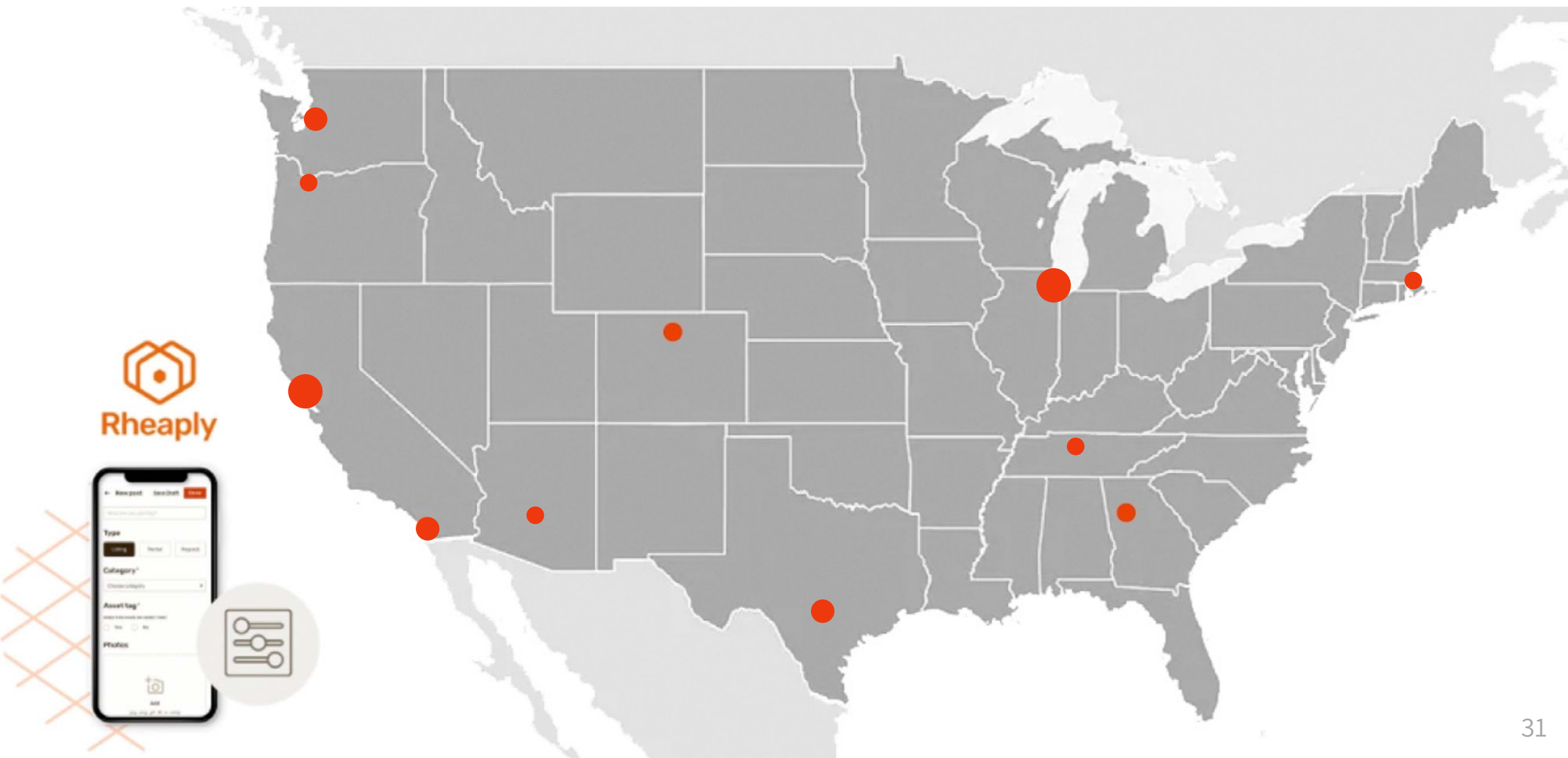
Be a viable strategy  
to reach climate  
and carbon goals



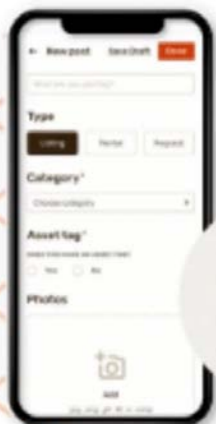
# Online Exchange (& Development Partnerships)



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Rheaply





# Repurposing Infrastructure: The B.R.I.C.



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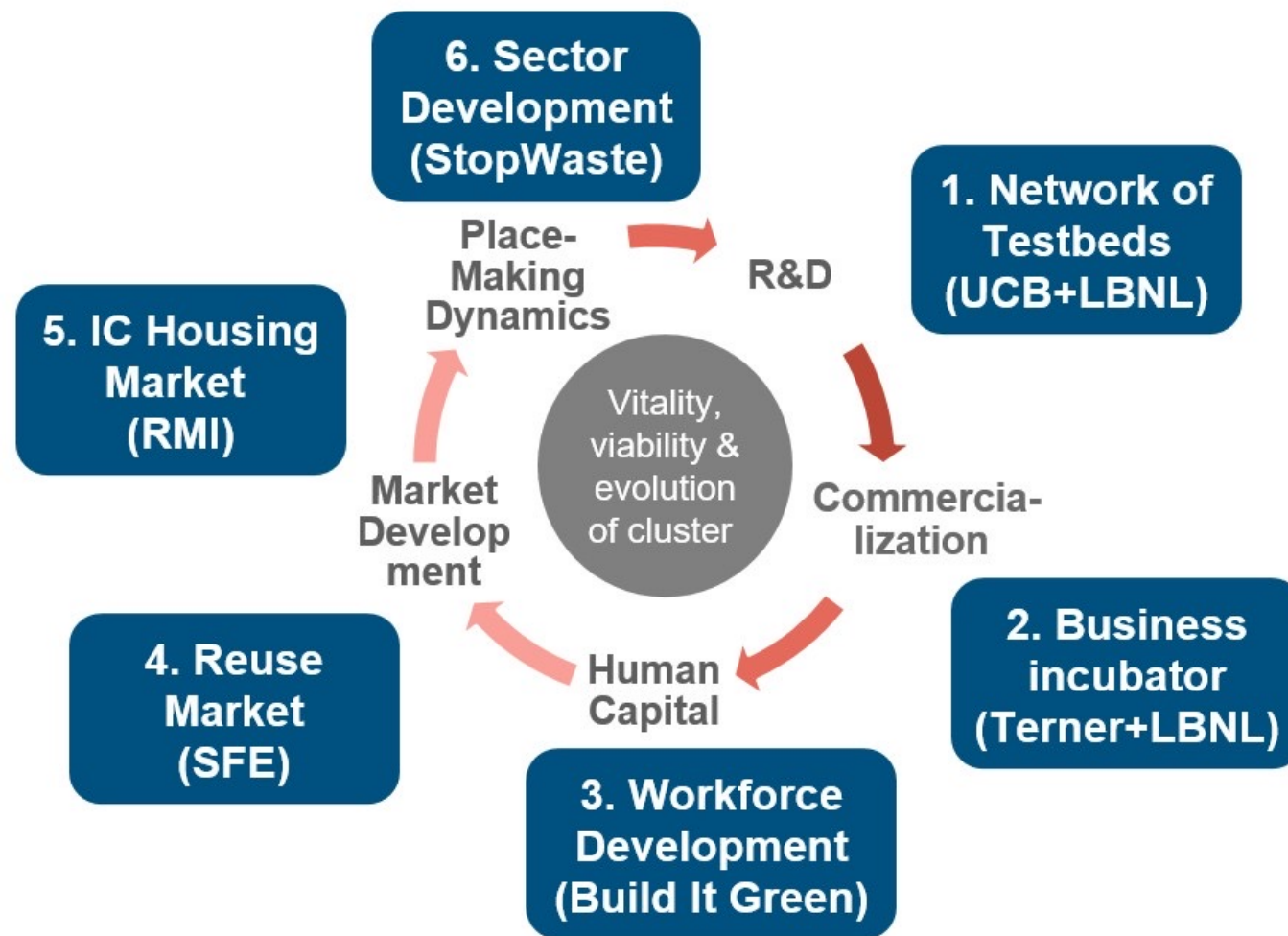




# Build Back Better Regional Challenge Finalists!



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# Deconstruction



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PHASE 1



PHASE 2



PHASE 3



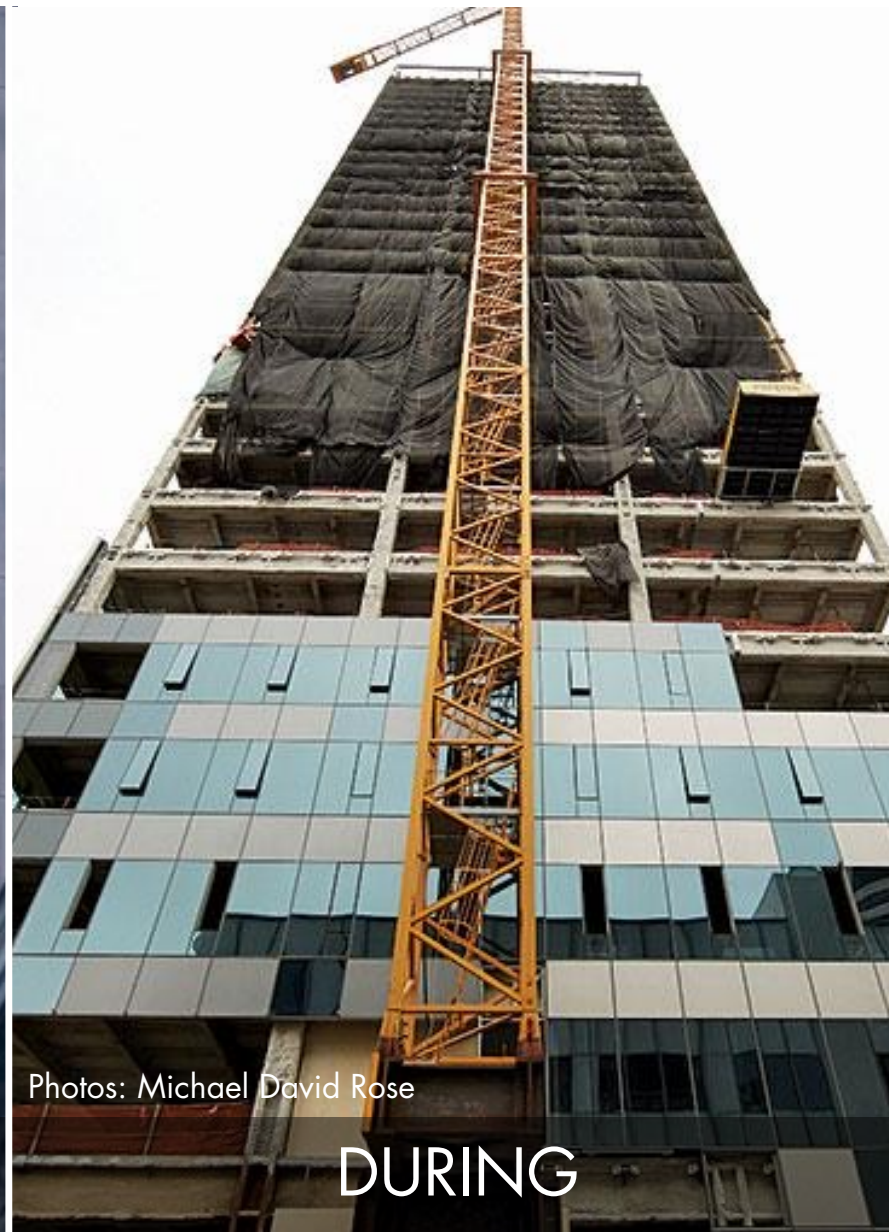
# Adaptive Reuse



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BEFORE



Photos: Michael David Rose

DURING



AFTER



# Source Separation



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# Refresh Activities



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# Construction Surplus & Material Redistribution

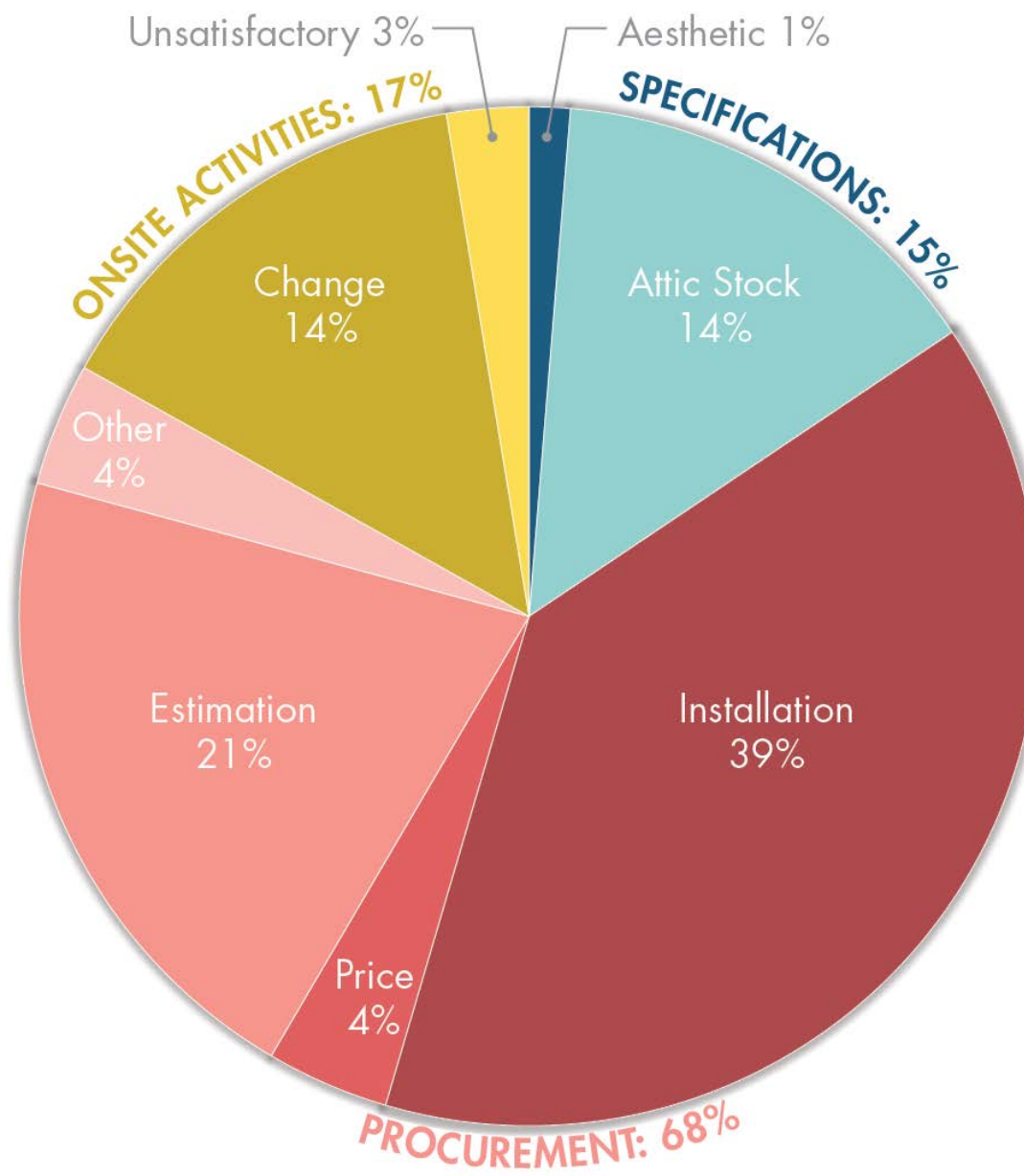


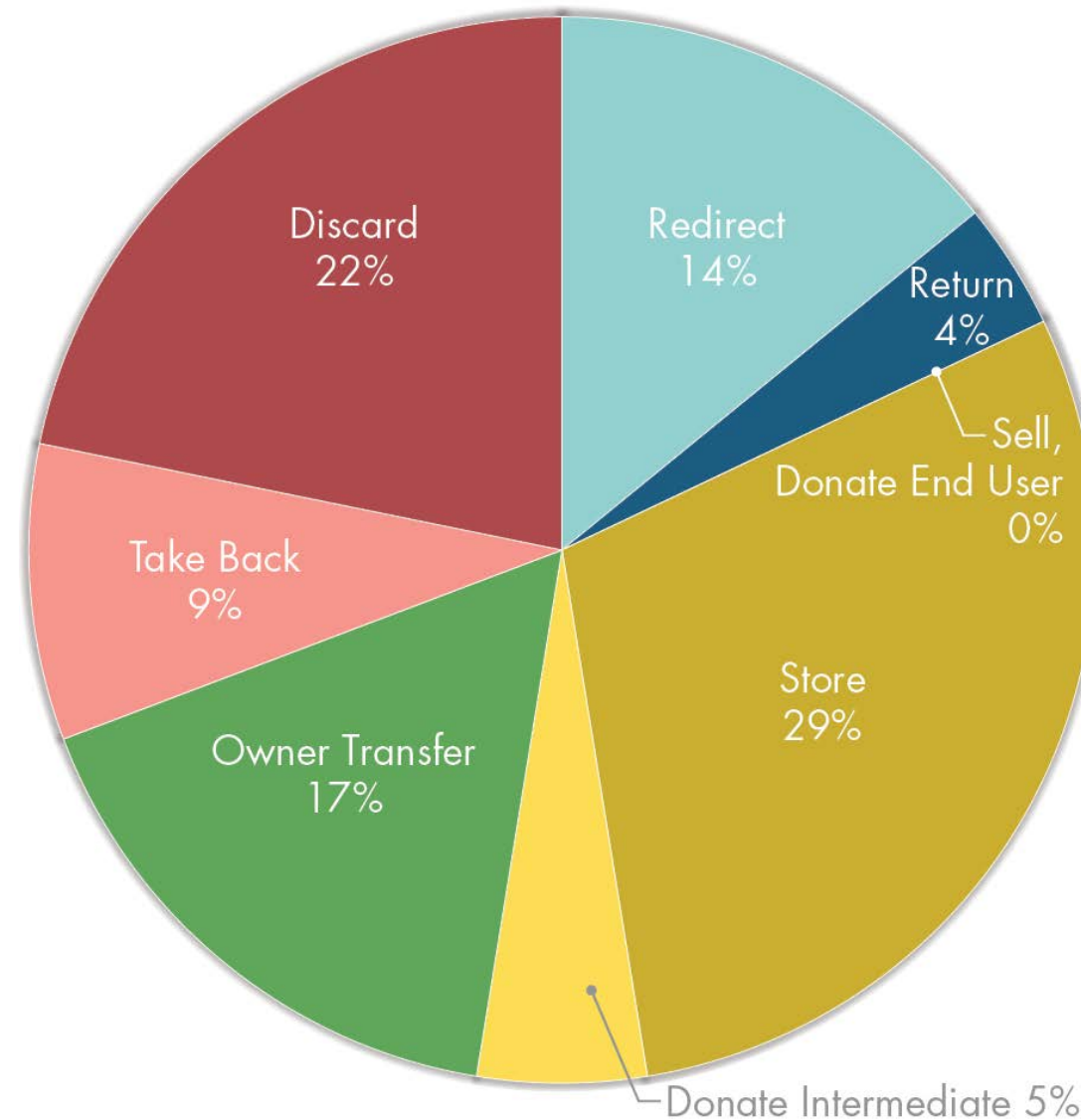
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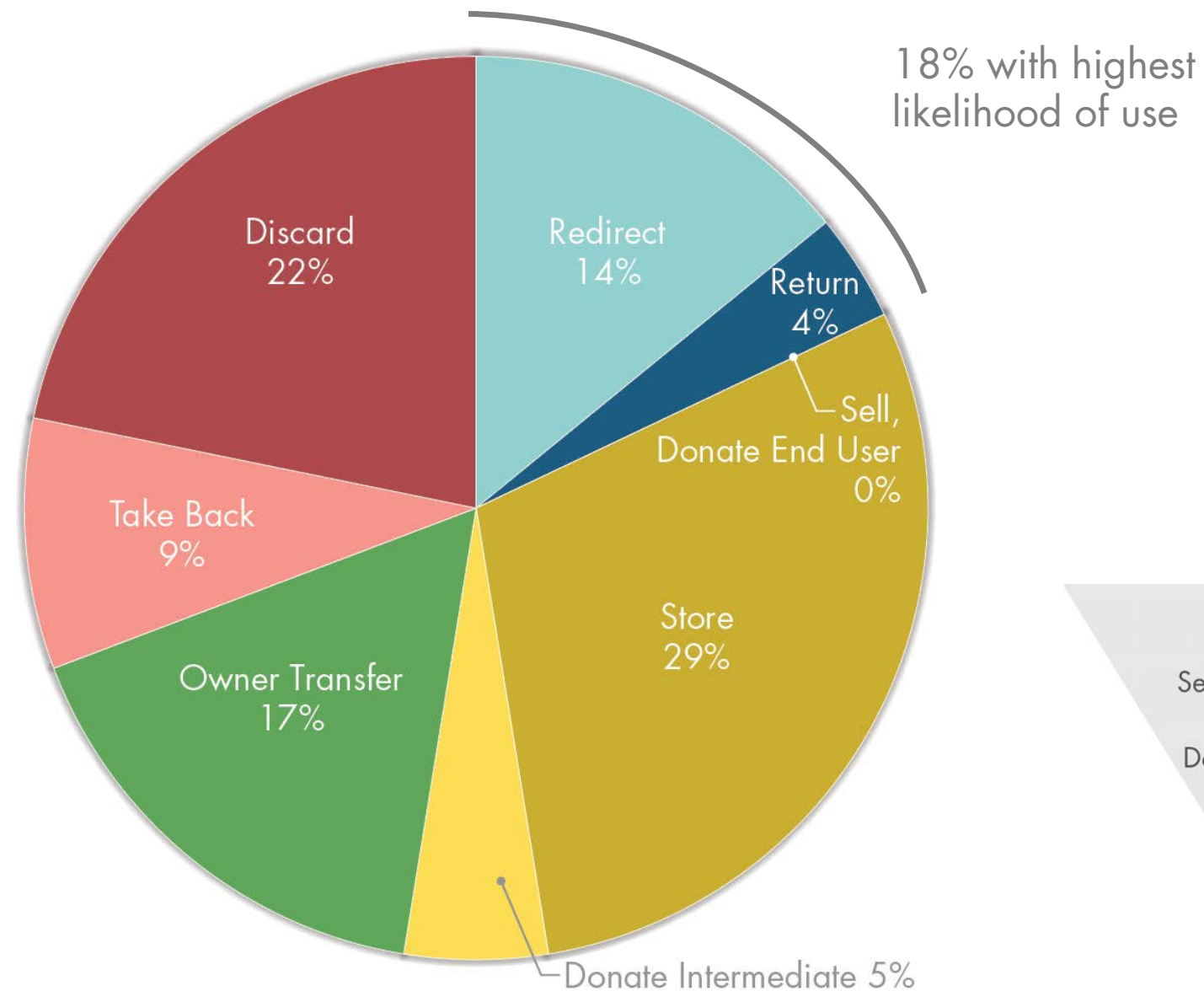




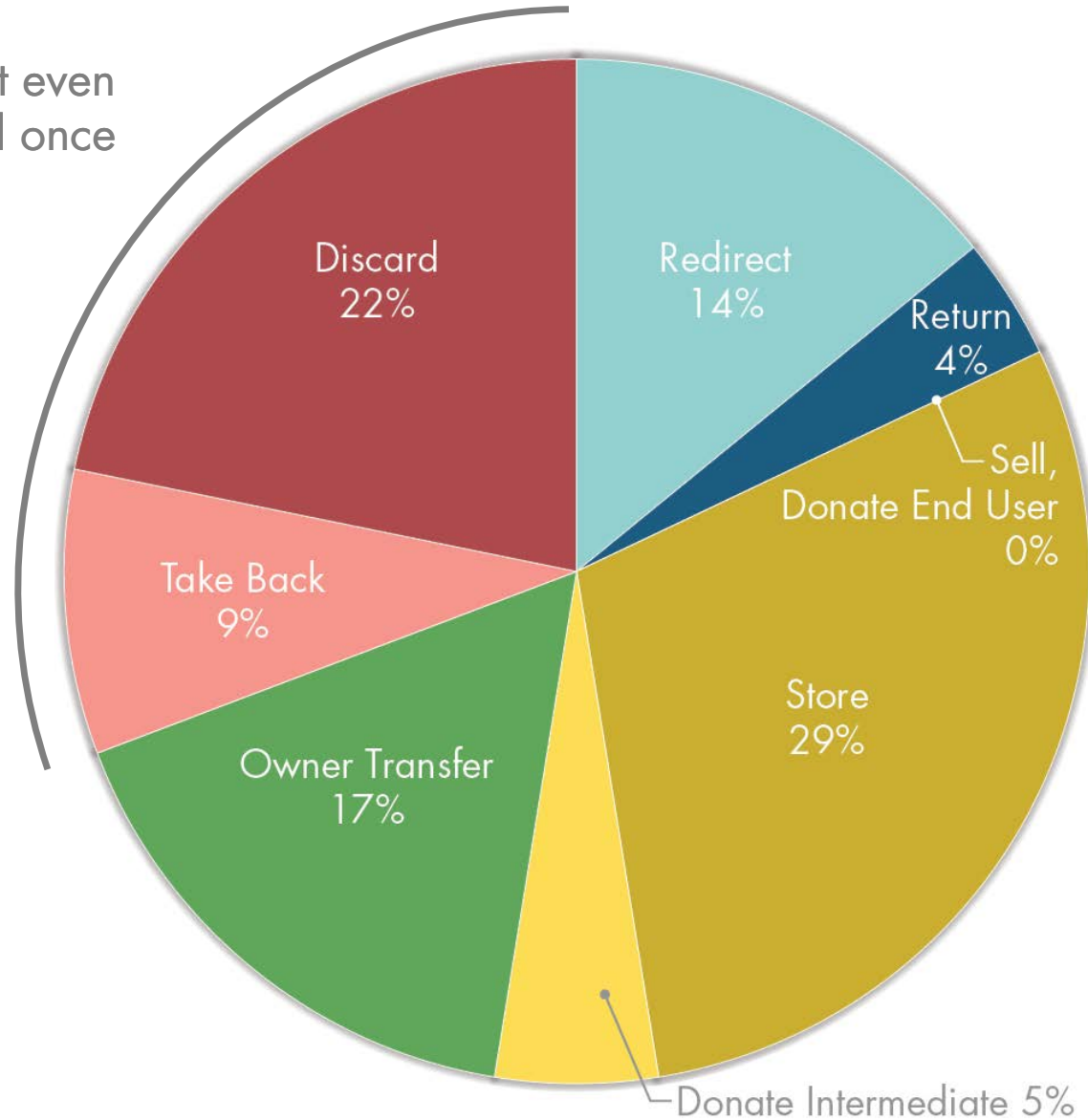
# Typical Reasons for Surplus







31% aren't even being used once





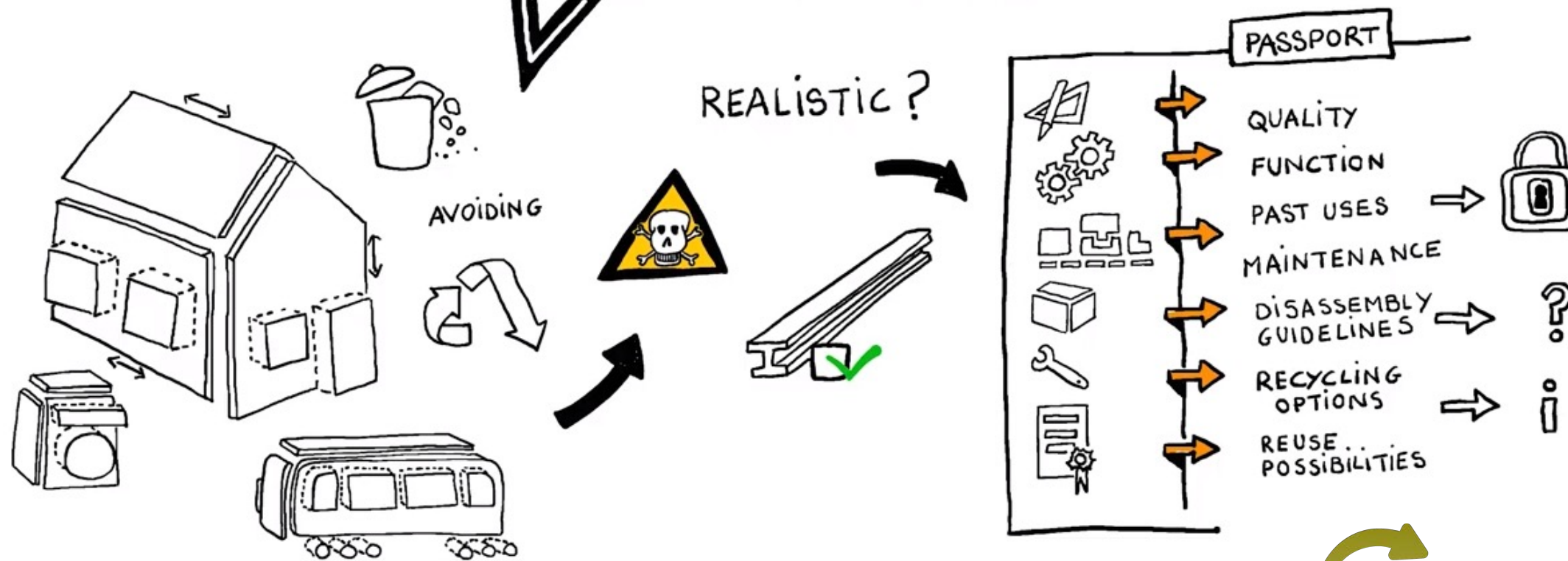


# Buildings As Material Banks



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LET'S **START** DESIGNING  
BUILDINGS IN A **REVERSIBLE** WAY





# Key Take Aways



- Strategies for circularity, zero waste, embodied carbon reductions, and climate action are all linked – and often one intervention can support multiple benefits.
- Choose your own adventure! Start with something familiar and see where it can take you.
- Partnerships are critical to success.
- There is rapid exploration and transformation happening in this space. Refer to existing examples for standardized solutions and easy wins.



# Resources



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- SF Environment Building Materials Management: <https://sfenvironment.org/bmm>
- SF Environment Construction and Demolition Policy, Forms, and Resources: <https://sfenvironment.org/construction-demolition-resources>
- C40 Advancing Toward Zero Waste Declaration: [www.c40.org/declarations/zero-waste](http://www.c40.org/declarations/zero-waste)
- C40 Clean Construction Declaration: [www.c40.org/declarations/clean-construction-declaration](http://www.c40.org/declarations/clean-construction-declaration)
- Pacific Coast Collaborative Low Carbon Construction Task Force: <https://pacificcoastcollaborative.org/22899-2>
- San Francisco 2021 Climate Action Plan: <https://SFClimatAction.org>
- Carbon Leadership Forum: <https://carbonleadershipforum.org>
- Embodied Carbon Reductions Strategies Checklist: <https://carbonleadershipforum.org/ec-checklist-template>
- Architecture 2030: <https://architecture2030.org>
- BuildReuse: [www.buildreuse.org](http://www.buildreuse.org)
- San Francisco Bay Area All For Reuse Alliance: [www.allforreuse.org/resources/workshop-kits-outputs](http://www.allforreuse.org/resources/workshop-kits-outputs)
- Bay Area Online Exchange: <https://rheaply.com/resources/news/city-of-san-francisco/>
- USEDA Build Back Better Regional Challenge: [www.stopwaste.org/about-stopwaste/news/stopwaste-coalition-wins-one-of-60-national-build-back-better-challenge-grants](http://www.stopwaste.org/about-stopwaste/news/stopwaste-coalition-wins-one-of-60-national-build-back-better-challenge-grants)
- Bay Area Deconstruction Work Group: [www.stopwaste.org/at-work/built-environment/construction-demolition-debris/bay-area-deconstruction-workgroup](http://www.stopwaste.org/at-work/built-environment/construction-demolition-debris/bay-area-deconstruction-workgroup)
- San Francisco Surplus Building Products Reduction and Redistribution Study: <https://bit.ly/sfsurplusstudy>
- King County Guide to Design For Disassembly: [https://kingcounty.gov/~media/depts/dnrp/solid-waste/green-building/documents/Design for Disassembly-guide.ashx](https://kingcounty.gov/~media/depts/dnrp/solid-waste/green-building/documents/Design%20for%20Disassembly-guide.ashx)
- Buildings As Material Banks: <https://www.bamb2020.eu>

# Questions?

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# Thank you



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