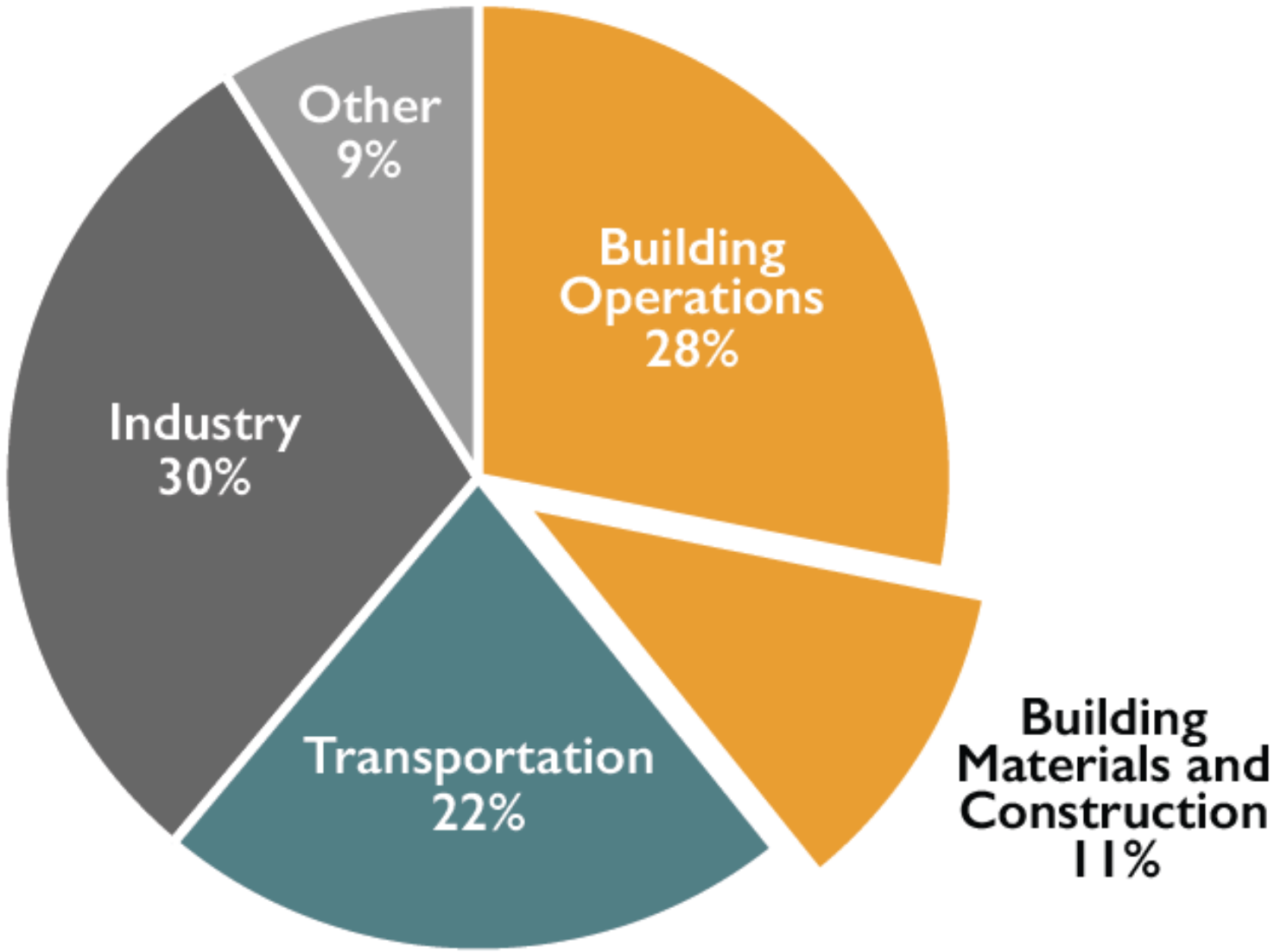
Great Lakes Circular Materials Roundtable: Building Materials

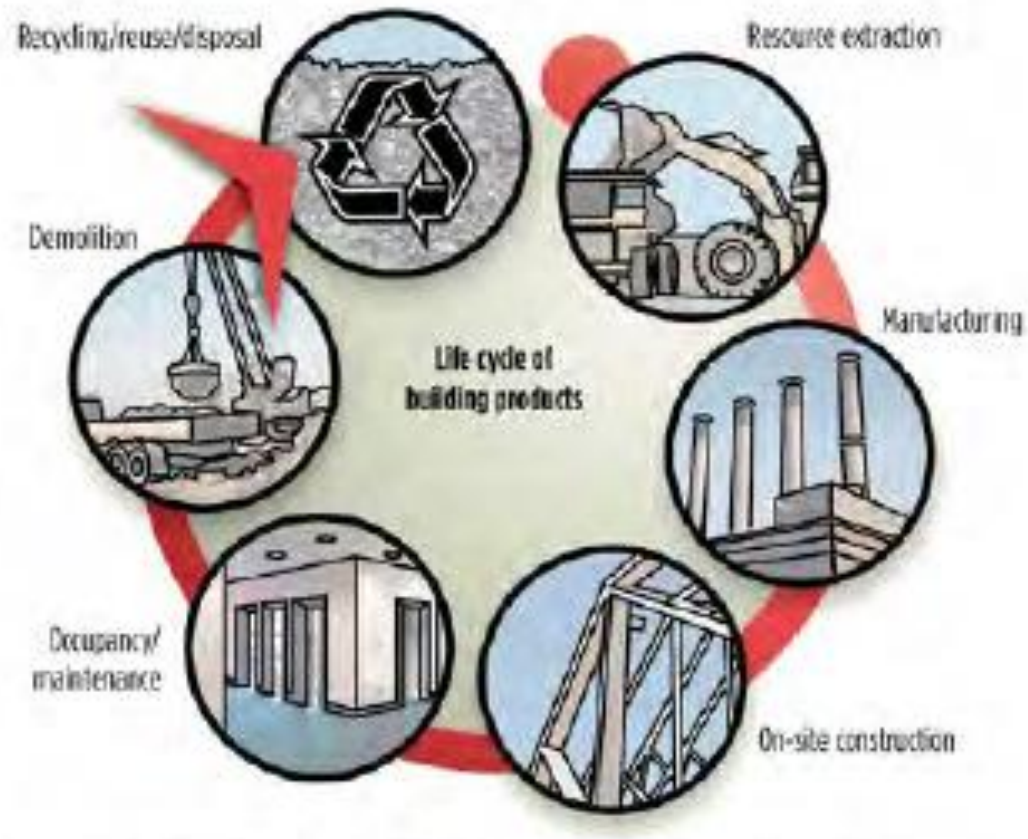
7.27.21

Jan Culbertson, FAIA

Global CO_2 Emissions by Sector



Embodied Carbon

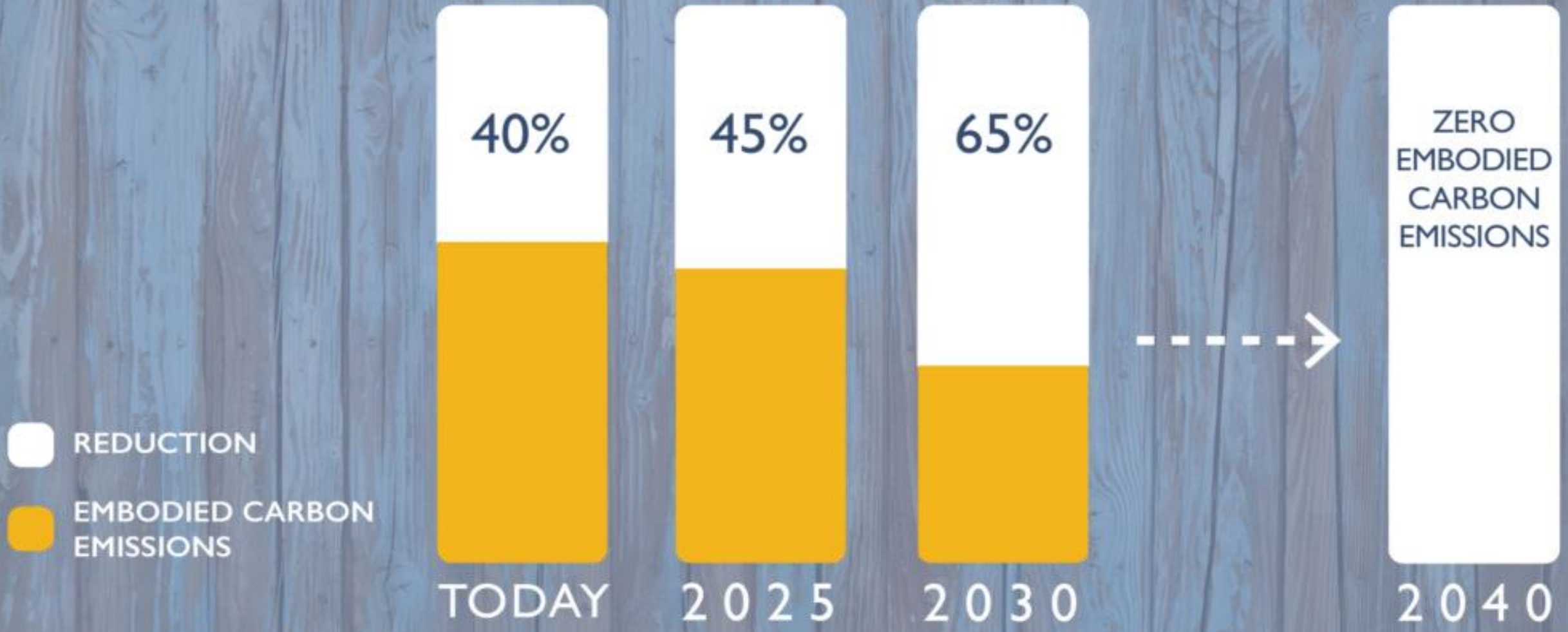


Life Cycle Assessments

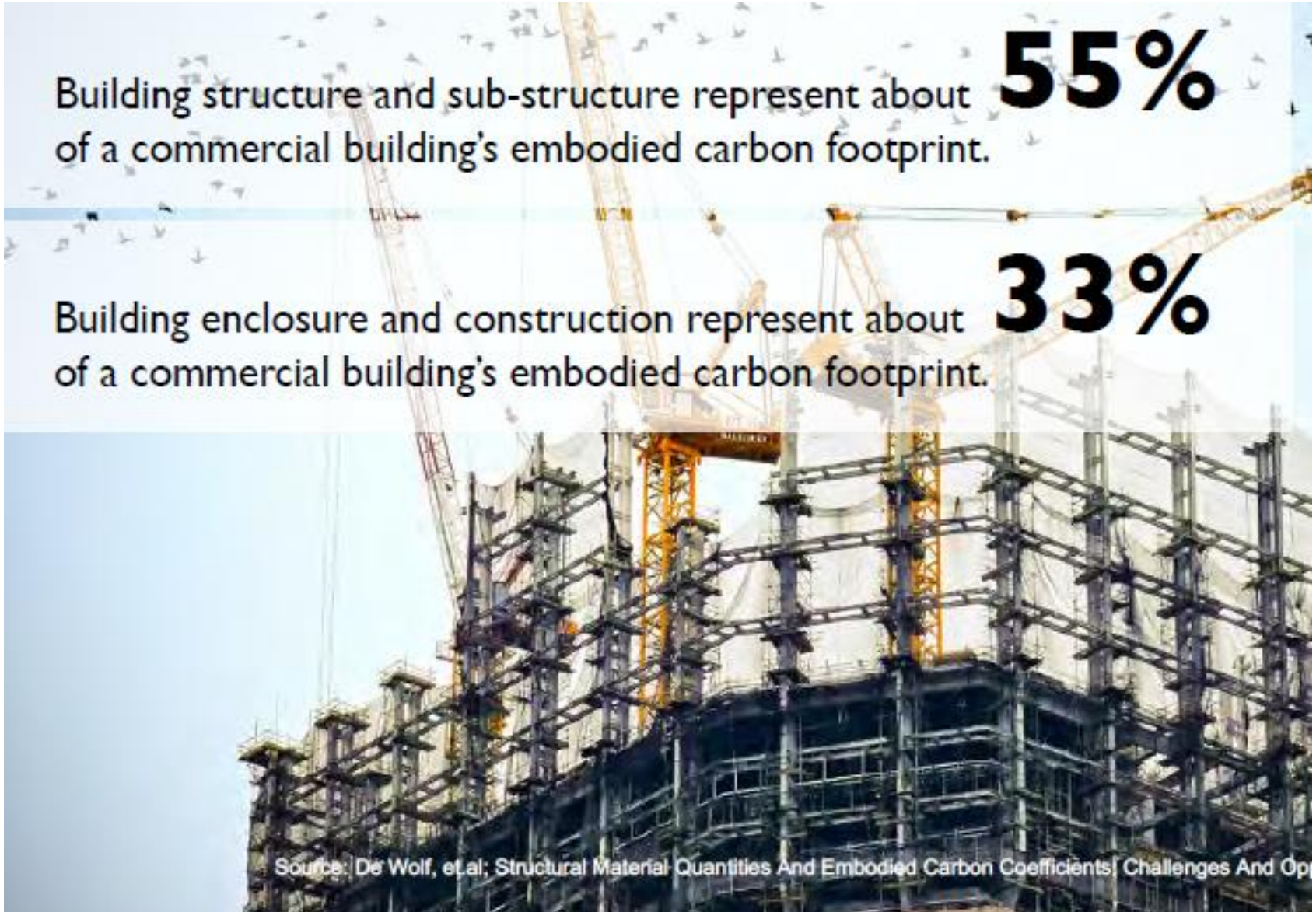
Environmental Product Declarations

THE 2030 CHALLENGE FOR EMBODIED CARBON

Buildings, Infrastructure, and Materials



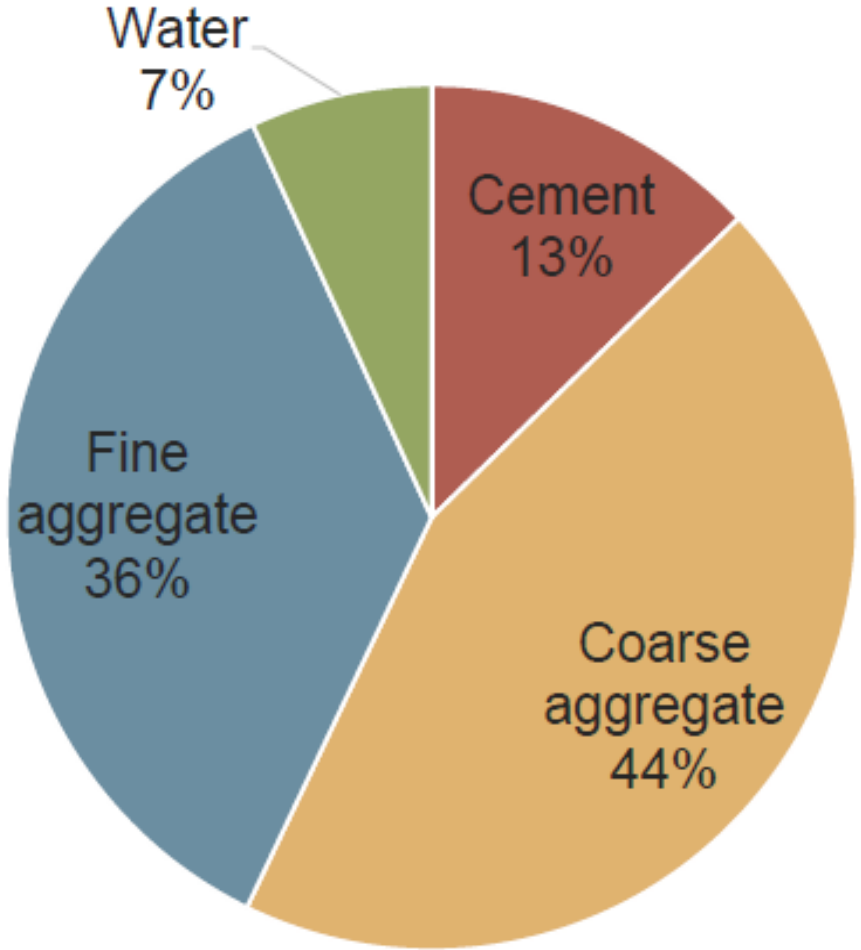
Embodied Carbon Strategies



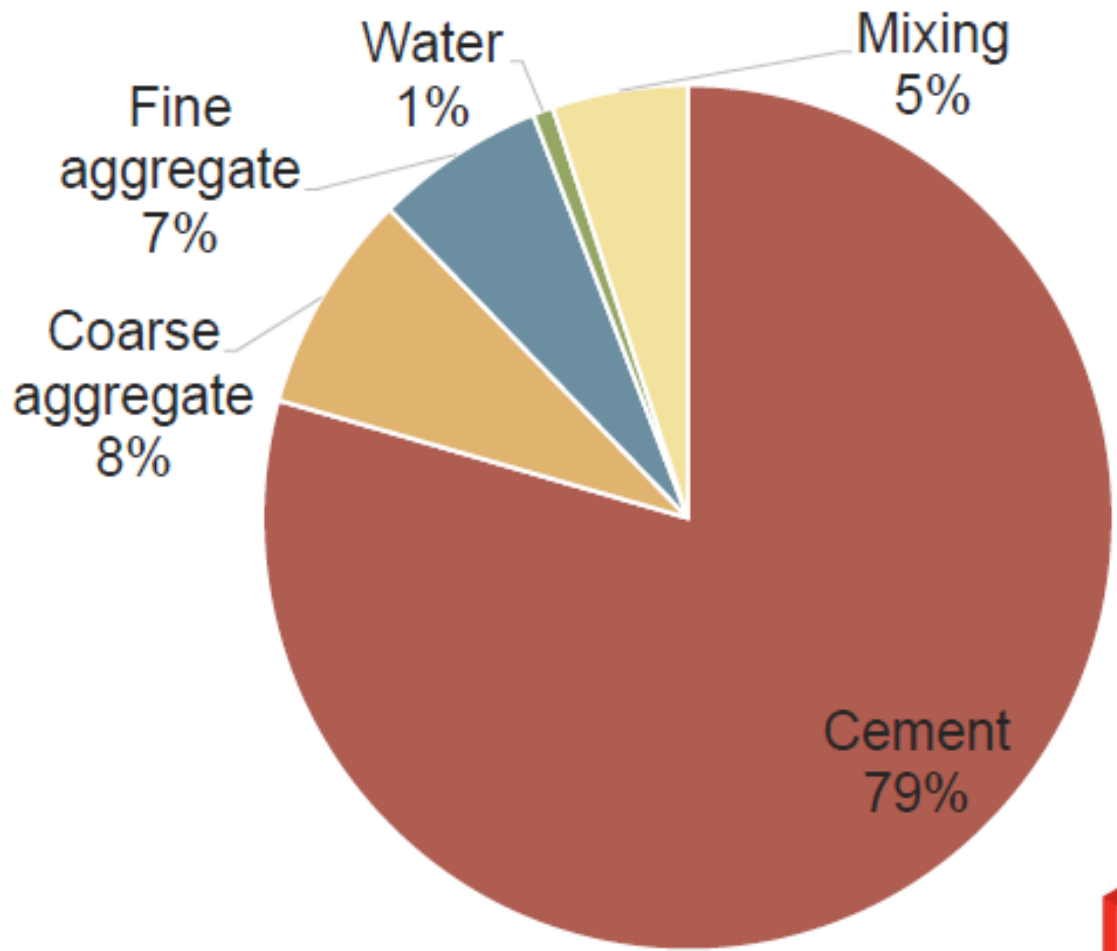
Start with:

Concrete
Steel

Constituent contribution by **mass**



Constituent contribution by **GHG emissions**

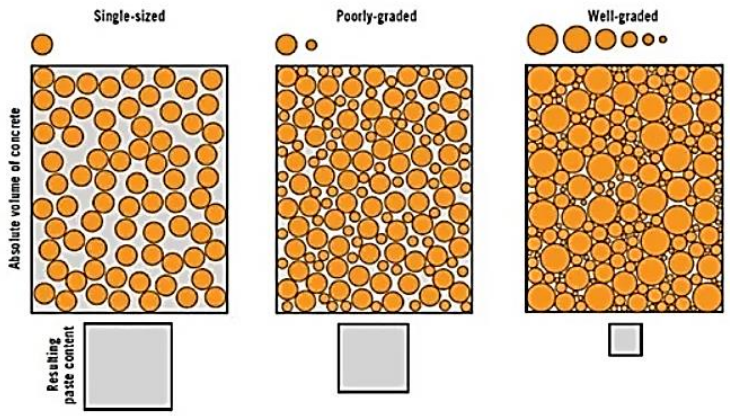


3000 psi mixture with no SCMs

ANN ARBOR 2030 DISTRICT®

Low Embodied Carbon Concrete Task Force 37% reduction now:

1) Reduce Cement
2) Use Portland Limestone Cement
3) Use Well Graded Aggregate
4) Add Supplementary Cementitious Materials



A LOT of savings

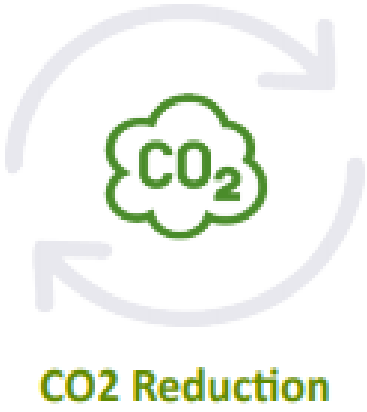
- Appx. 3000 CYD in a ten-story building
- 40% cement replacement would save this building 375000 kg CO2
- Equivalent to a car circling the earth 38 times!
- Equivalent to powering a mid-sized city of 100,000 people for 11 hours!

VIEW FROM CORNER OF MAIN ST. & WILLIAM ST.

Source: Mlive

Evolve to use Recycled Materials

Ground Glass Pozzolan can be produced from 100% post-consumer glass, harvested and processed regionally.



CO2 Reduction

Improved Concrete

Circular Economy

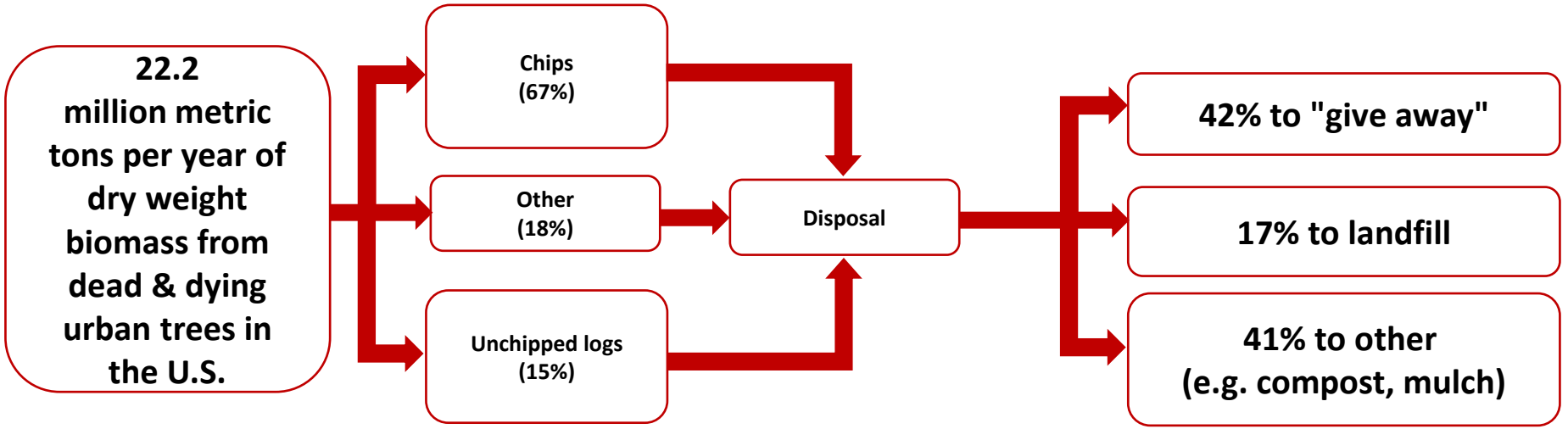
Safer Material

Evolve to Sequester Carbon

2 The opportunity to impact the climate with carbon-sequestered concrete is significant. With concrete second only to water in per-capita global usage at 3 tons each year, annual cement production accounting for 7% of global CO_2 emissions, concrete offers the potential to sequester gigatons of CO_2 annually.

MICHIGAN URBAN WOOD NETWORK

How Urban Trees are currently Processed
in
Ann Arbor & The Majority of The U.S.

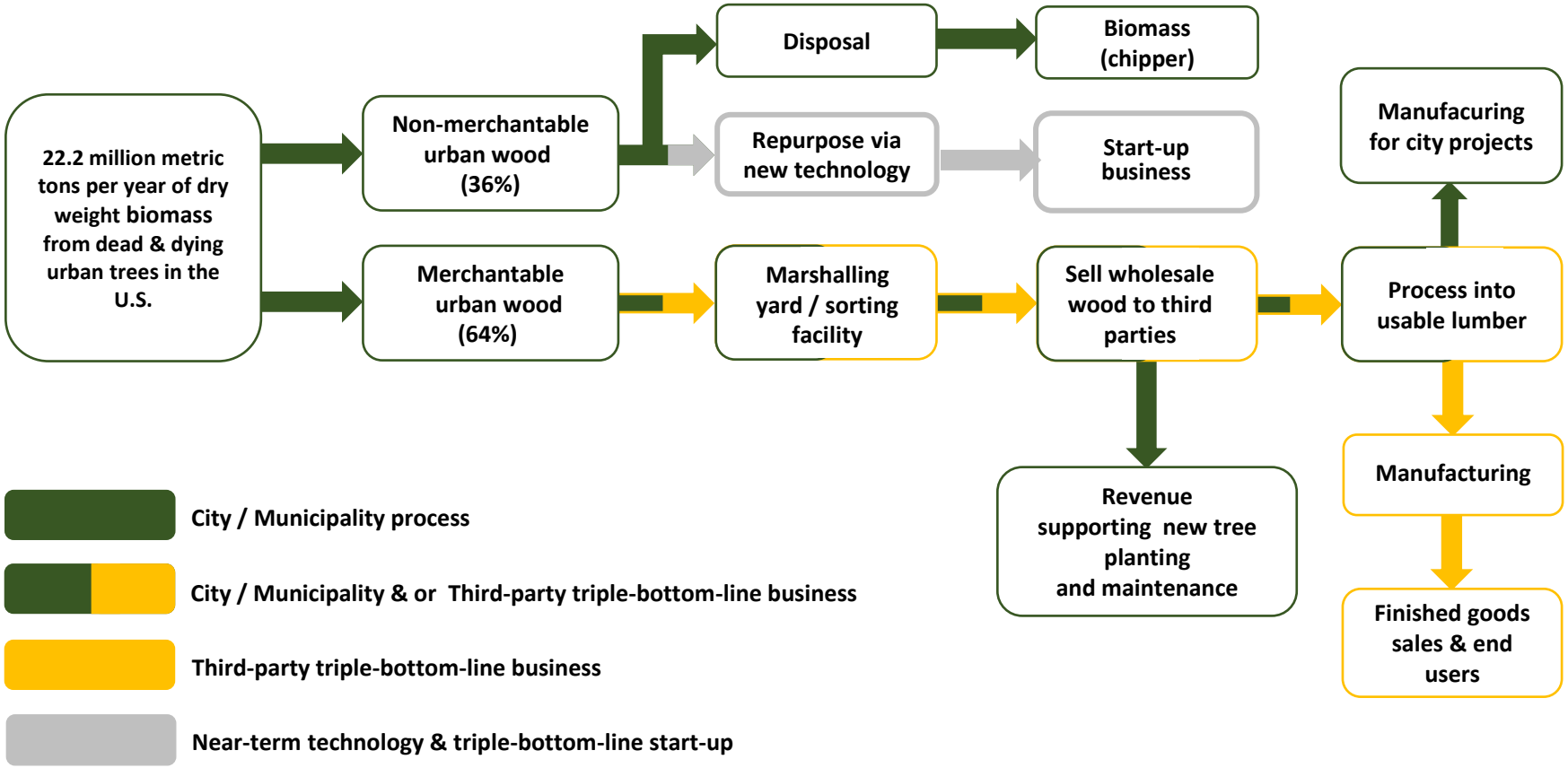


Current management of Ann Arbor and U.S. urban trees results in missed opportunities for long-term carbon storage and for the creation of a wood value stream

Source: ***Annual biomass loss and potential value of urban tree waste in the United States,*** **Nowak, 2019**

URBAN ASHES® TRICONOMY

Circular UrbanWood Triconomy
Or
"CUT" Model



Source: *Annual biomass loss and potential value of urban tree waste in the United States,* Nowak, 2019

Deconstruction

319 and 323 N Main St Ann Arbor

The CLF now has an extensive embodied carbon policy library!
https://carbonleadershipforum.org/clf-policy-toolkit/

Circular Carbon Network – transforming C02 waste into a resource https://circularcarbon.org/

BSA embodied carbon resources:
https://www.architects.org/embodied-carbon-in-buildings-conference/conference-resources