materials matter

Portland Metro Region Master Recyclers

May 2024

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Materials



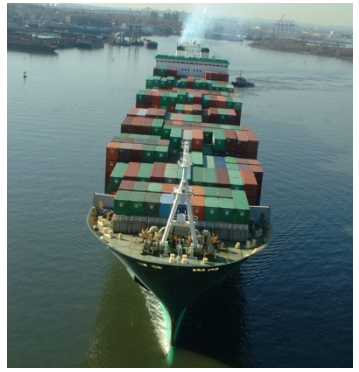




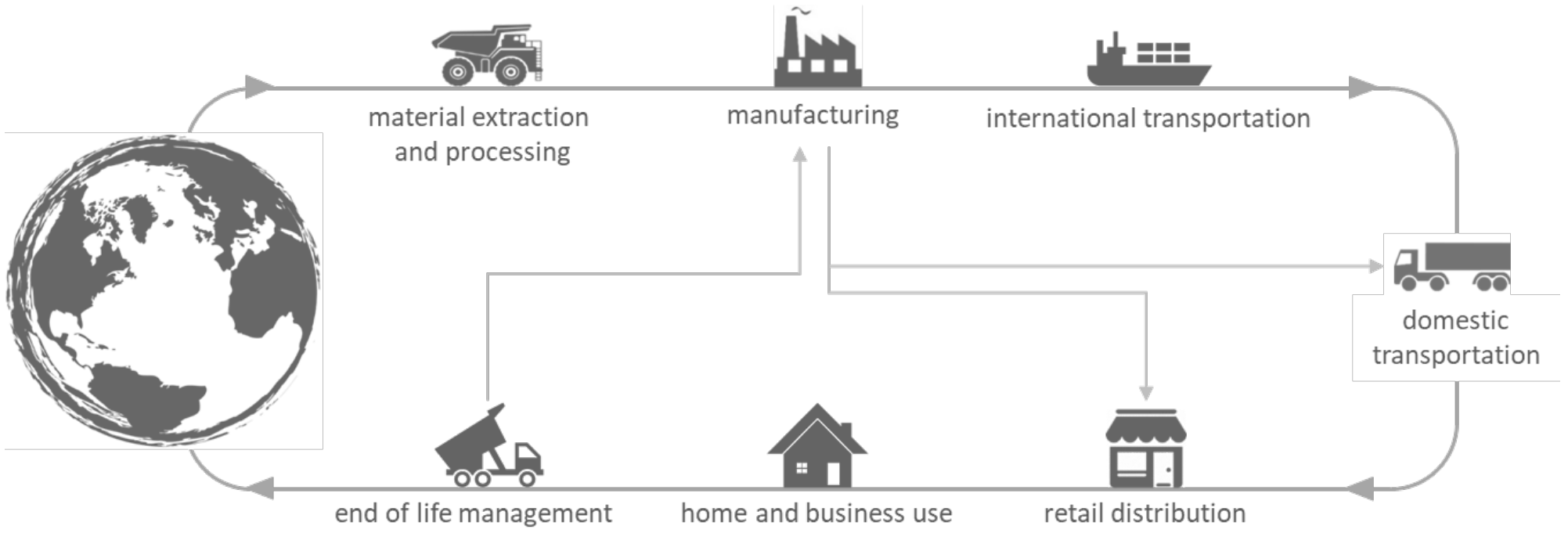


Materials

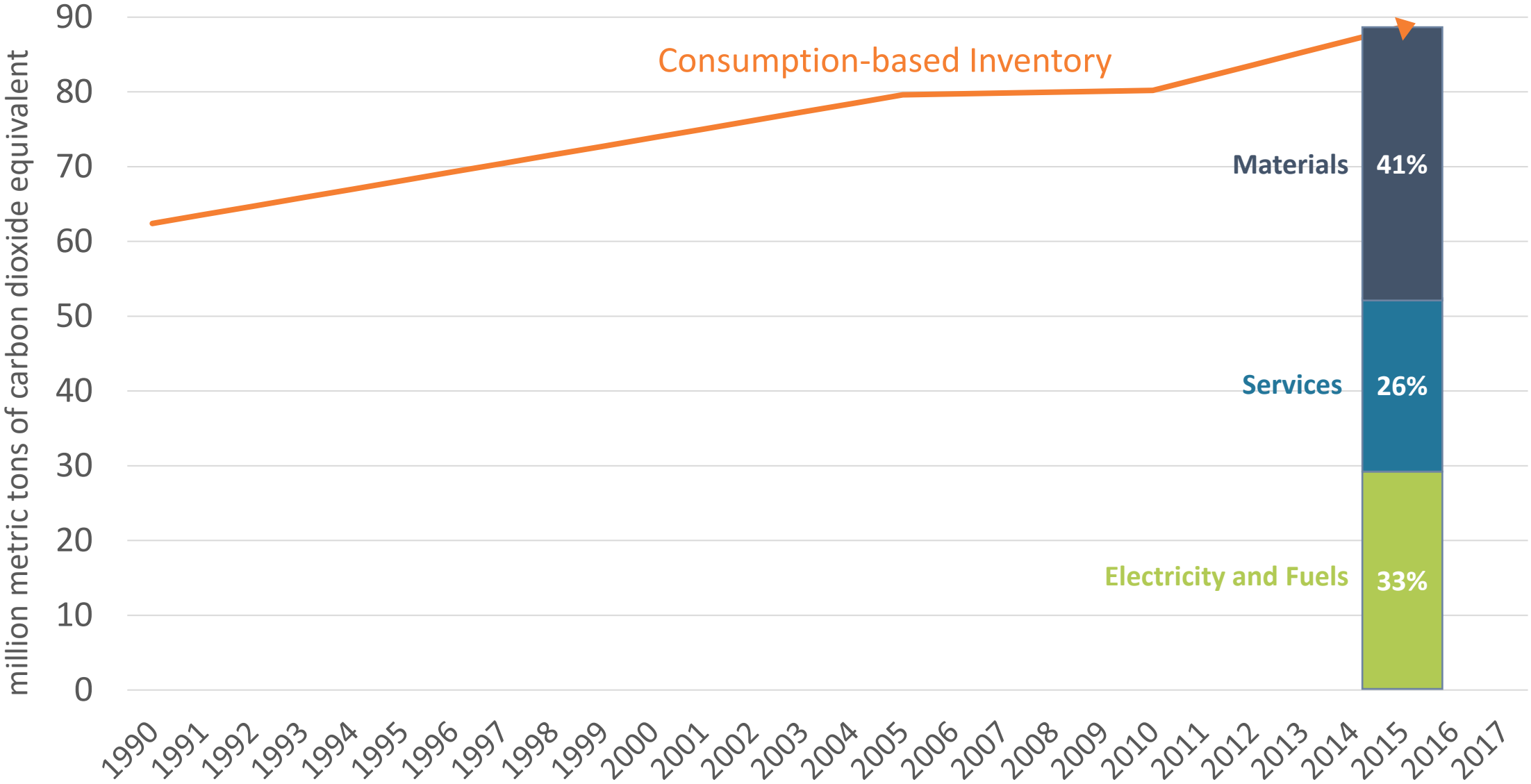
- Use is increasing, both here and abroad
  - Our economy is tied to global materials markets
- We're increasingly dependent on non-renewable materials
  - With dependence comes economic and geo-political risks
- Rapid rise in material use has led to serious environmental effects



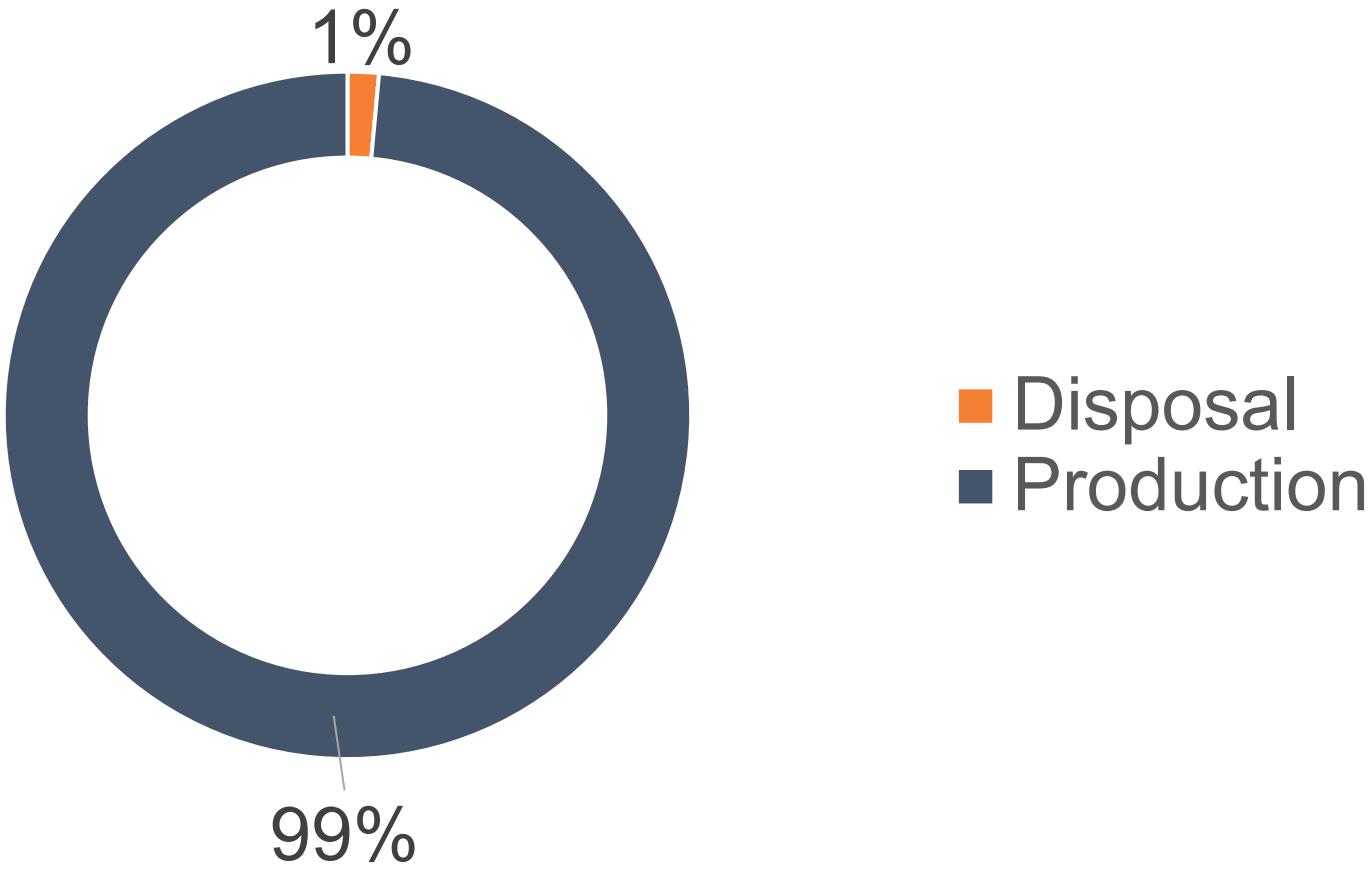
the “life cycle” of materials



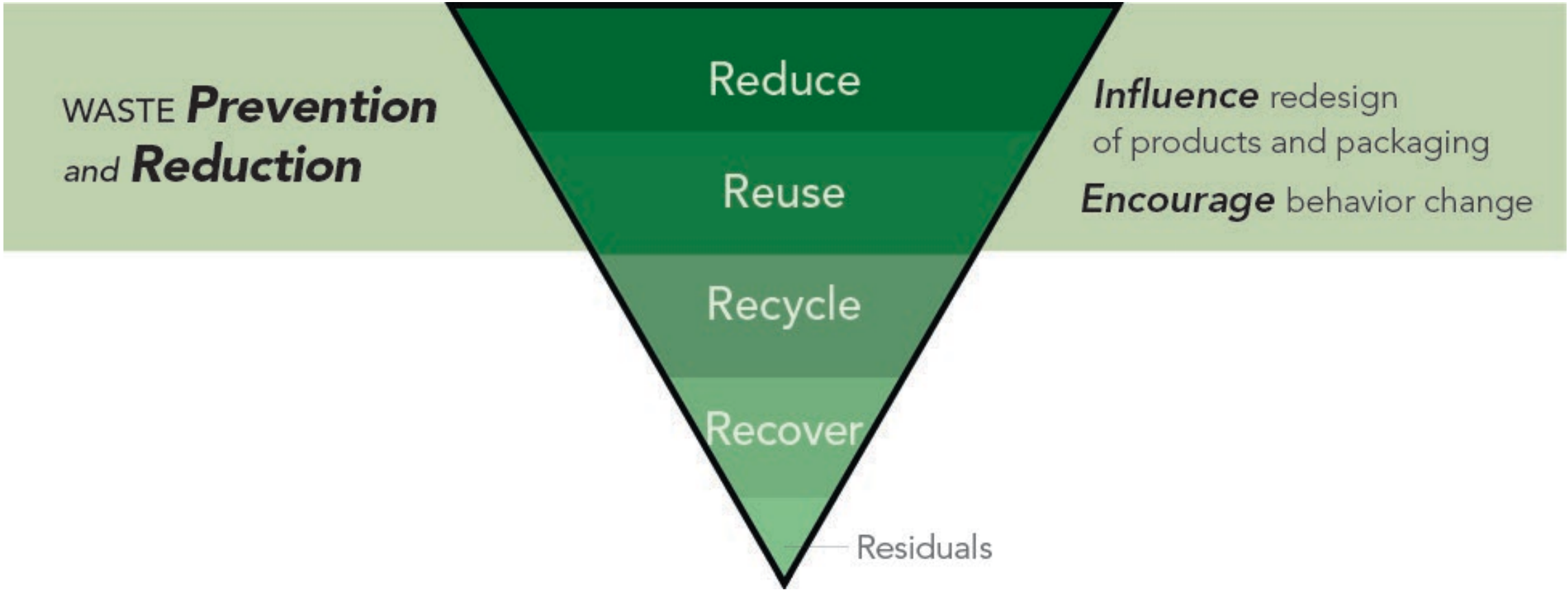
Oregon's greenhouse gas emissions 1990 – 2015



Oregon's 2015 consumption-based GHG emissions – materials only



an abbreviated tour of the “waste management hierarchy”



Energy and Greenhouse Gas Benefits of Recycling

- Recycling in Oregon in 2019 saved ~32 trillion BTUs of energy
  - ~3.2% of total statewide use
  - Equivalent of ~270 million gallons of gasoline
- Recovery in Oregon in 2019 reduced greenhouse gas emissions by ~3.3 million metric tons of CO2e
  - ~5% of total statewide emissions
  - Equivalent of ~700,000 “average” passenger cars
  - Most benefits are upstream, not downstream

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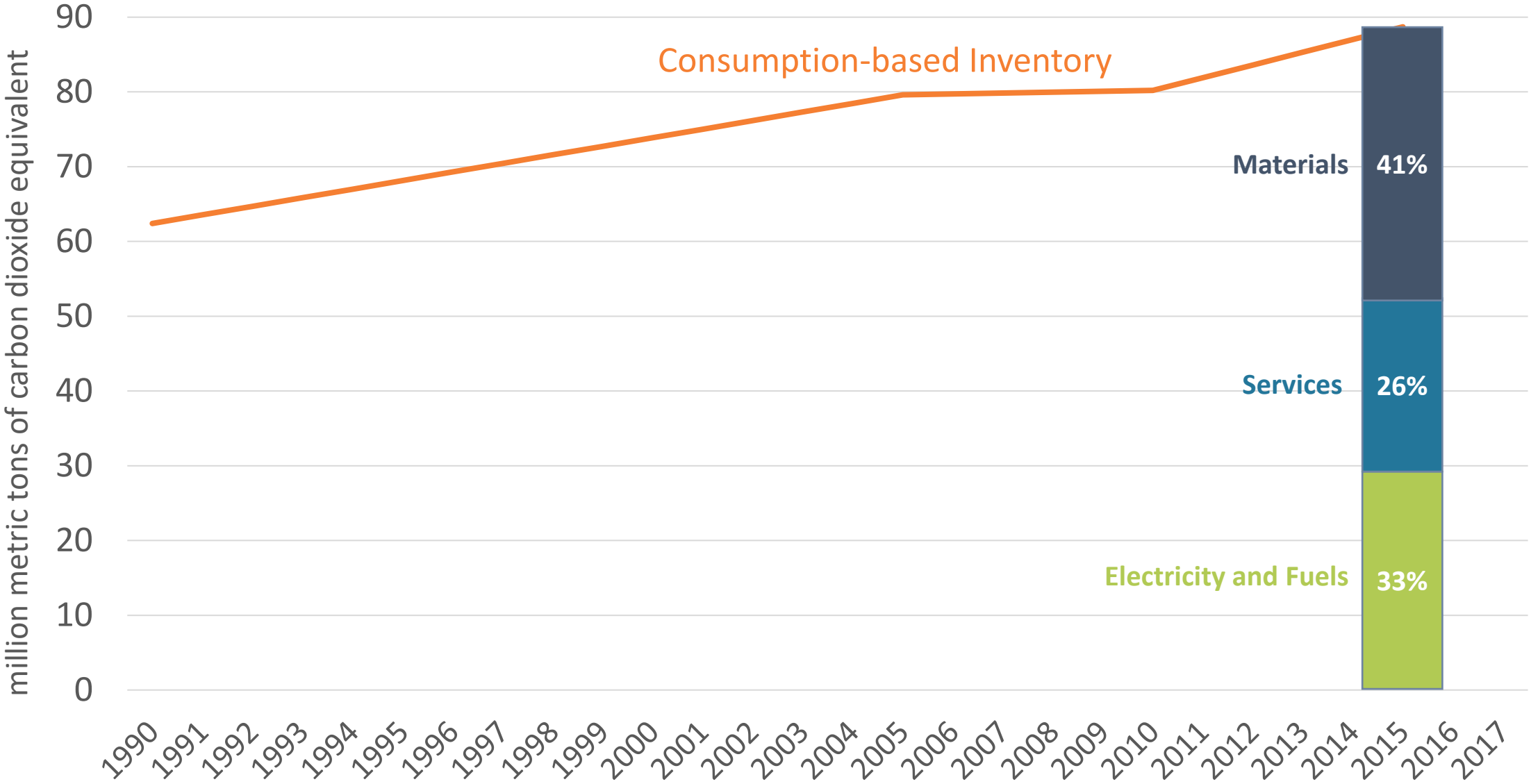

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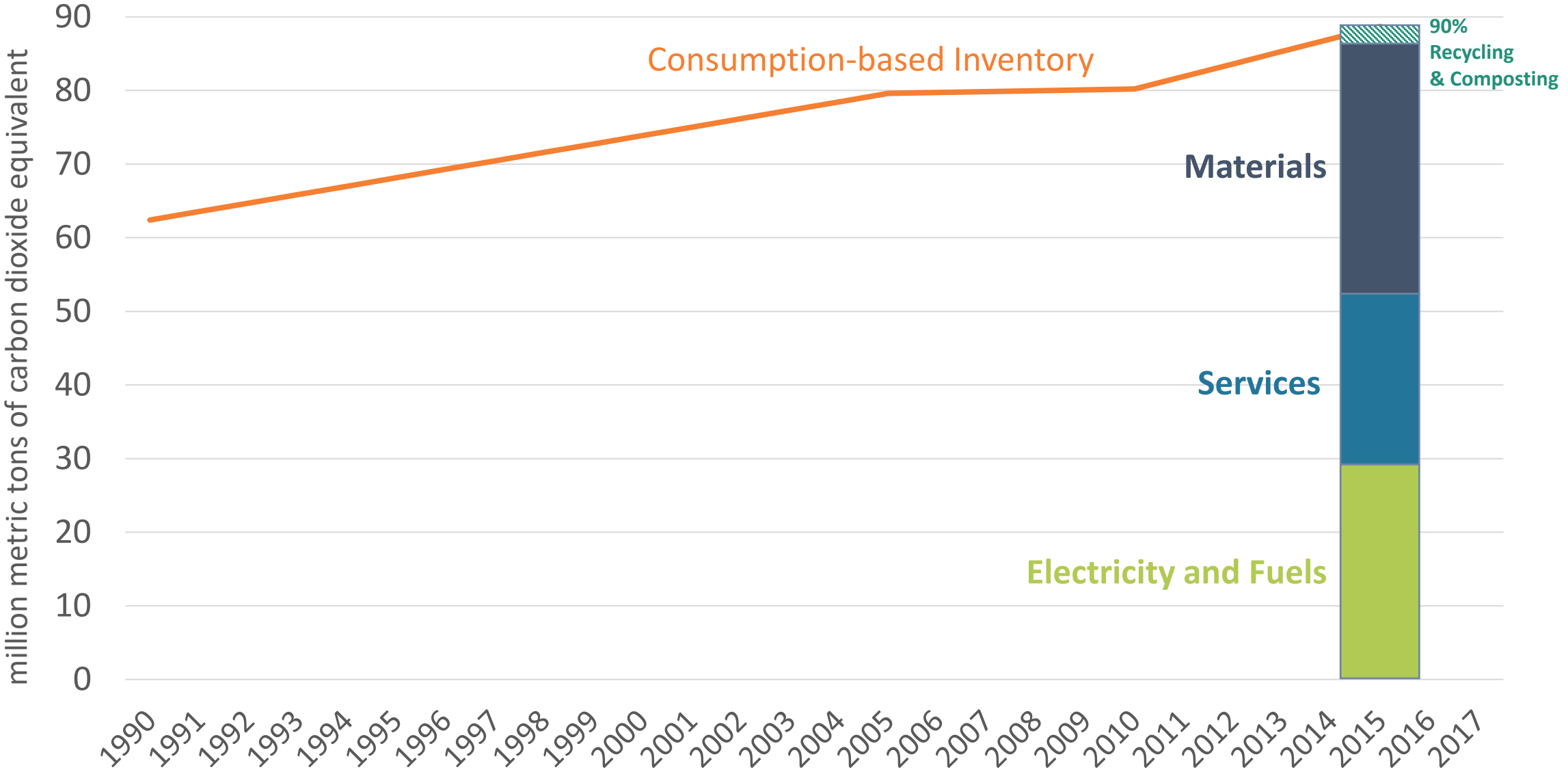
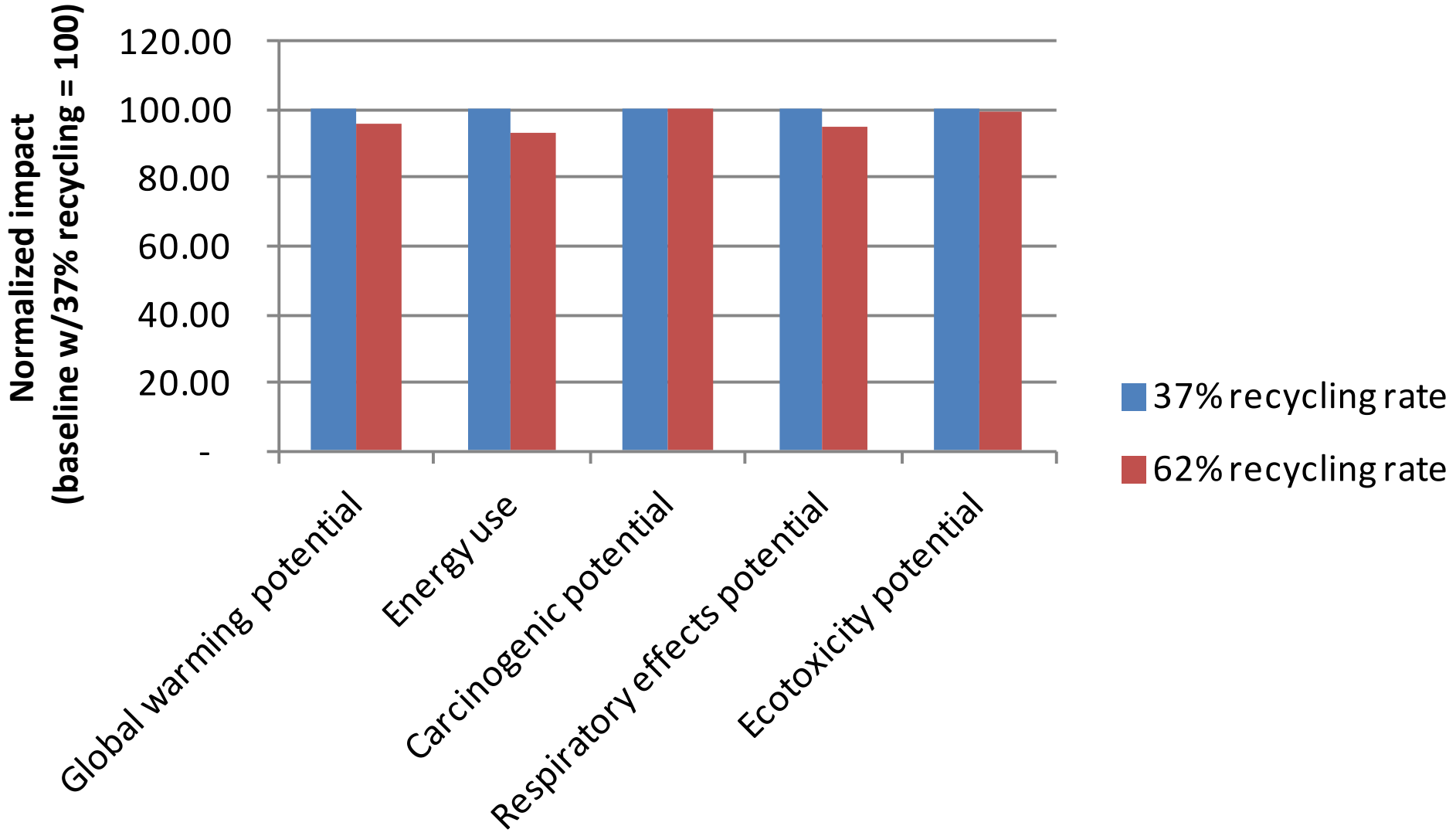


Additional solutions: drinking water example



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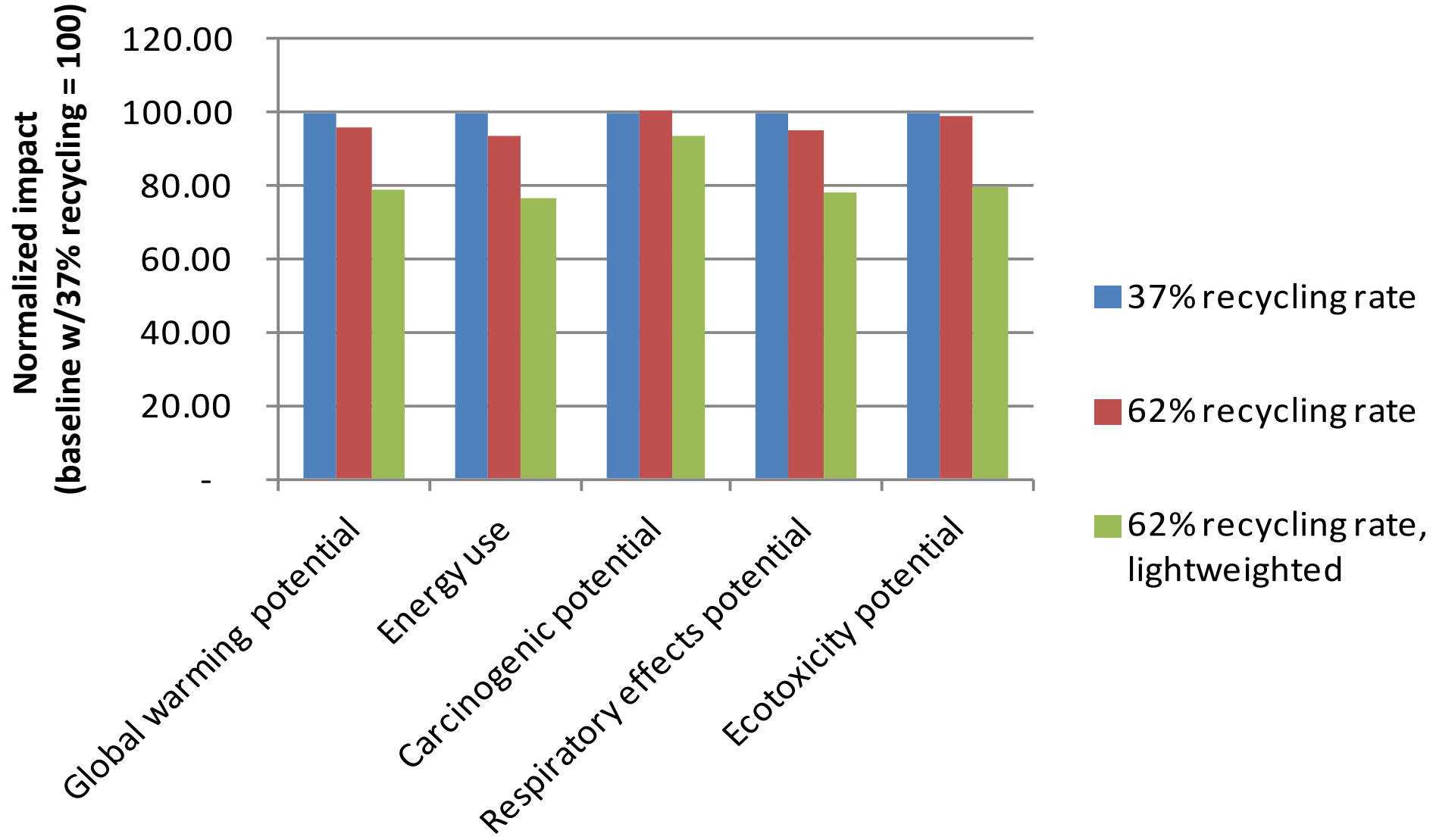

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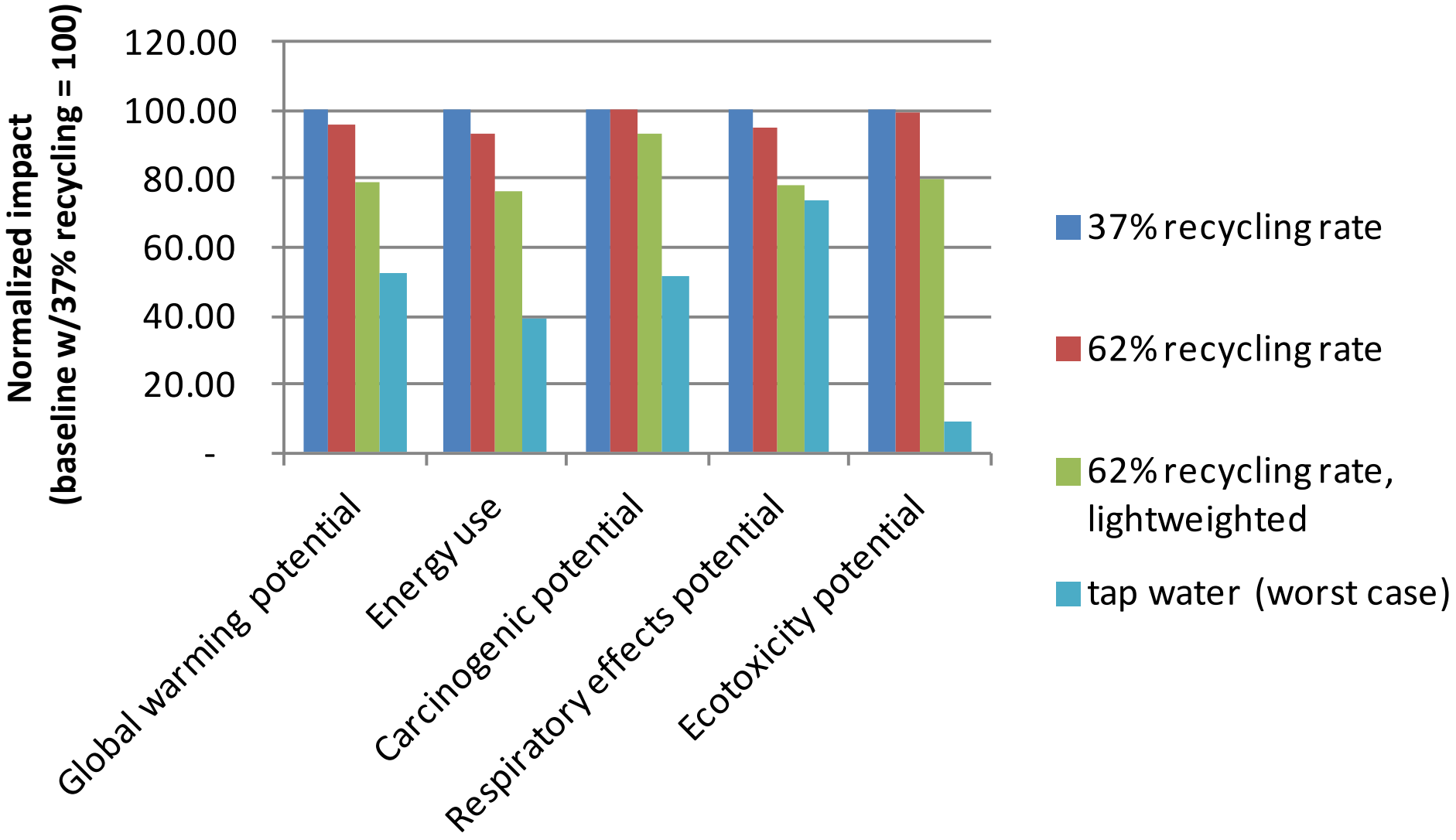

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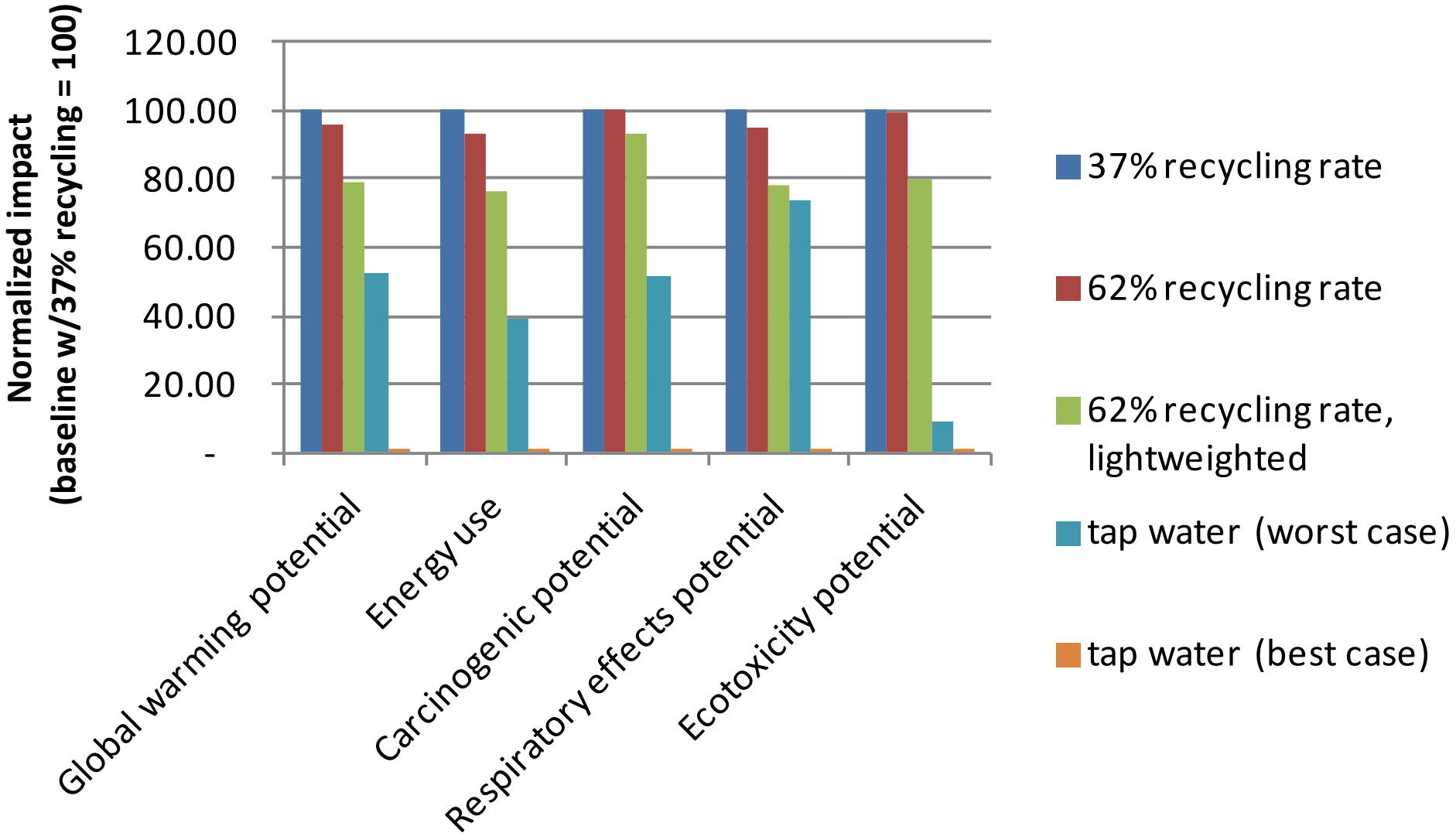


“Zero Waste”

- Commonly interpreted to require a totally recyclable or compostable waste stream.

EPA's coffee packaging analysis

Coffee Packaging (11.5 oz product)	Recyclable postconsumer?	Energy Consumption (MJ/11.5 oz.)	CO2 eq Emissions (lbs/11.5 oz)	MSW Waste Generated (lbs./ 100,000 oz. of product)
	Steel can – yes Plastic lid – no	4.21	0.33	1,305
	Plastic container – yes Plastic lid - no	5.18	0.17	847
	Flexible pouch - no	1.14	0.04	176

material attributes and life cycle impacts

[attributes]

biobased content

recycled content

recyclable

compostable

[impacts]

cumulative energy demand

freshwater consumption

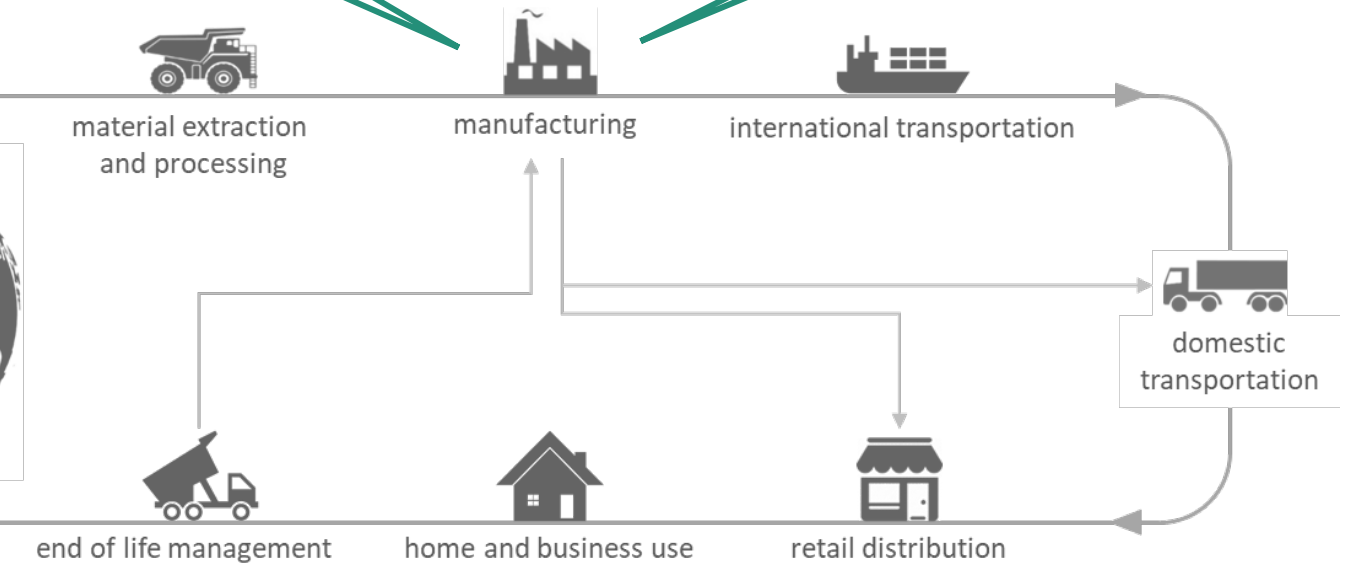
global warming potential

ozone depletion

human health

aquatic toxicity

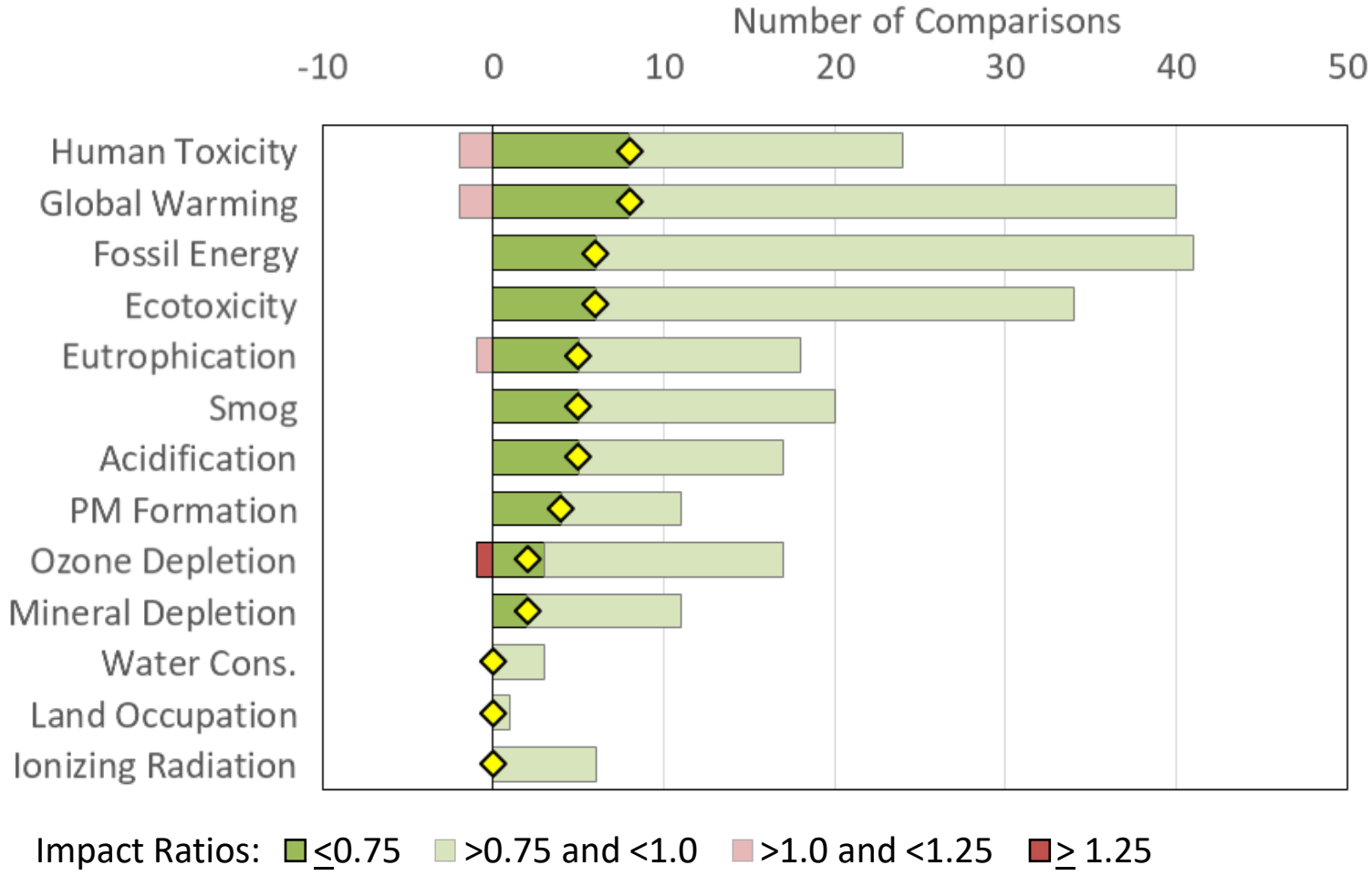
eutrophication…



research question

How well (and when) do popular material attributes correlate with reduced environmental impacts?

comparing *same* material packaging with higher recycled content vs. lower recycled content

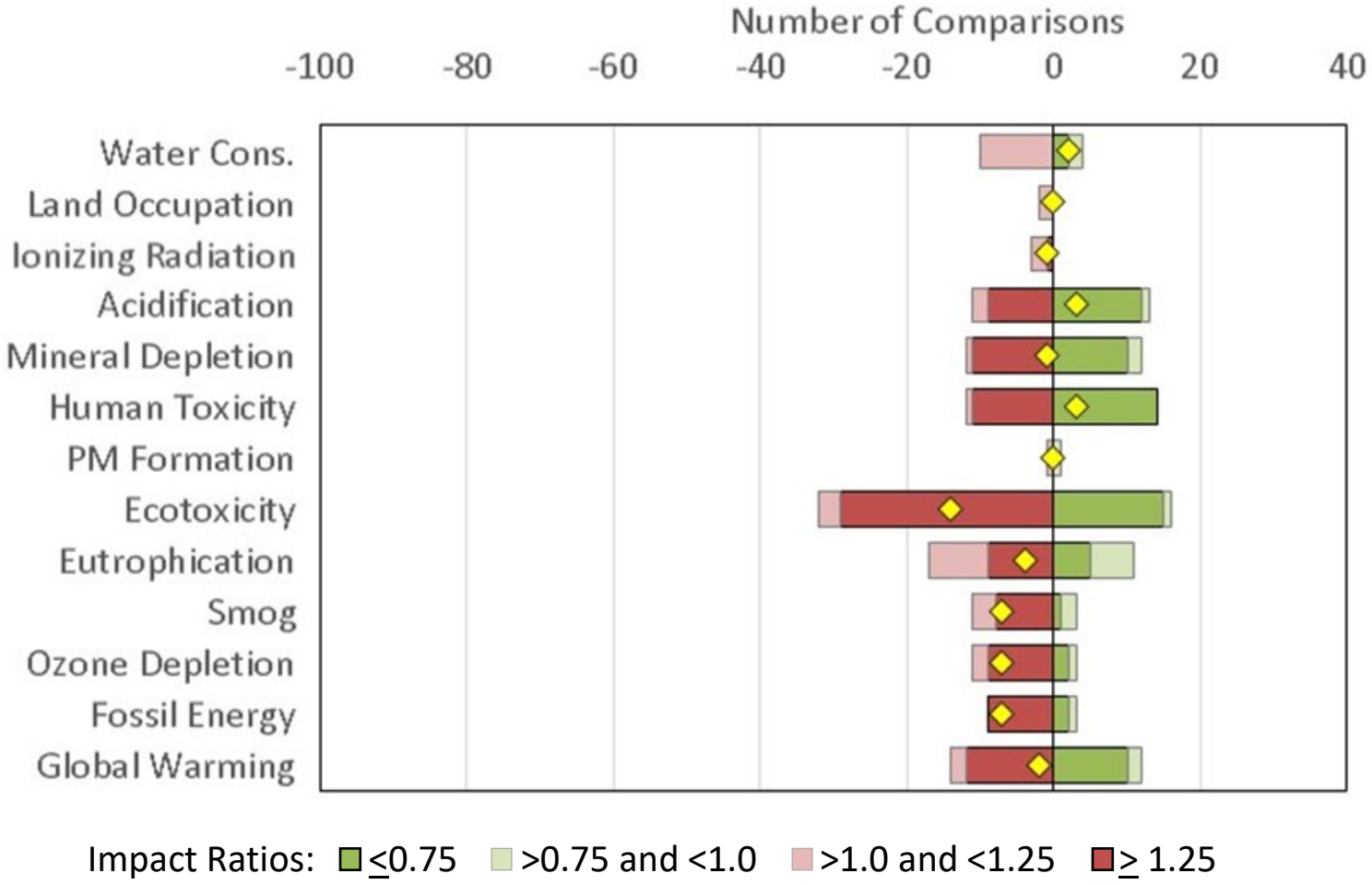


example: recycled content across different materials

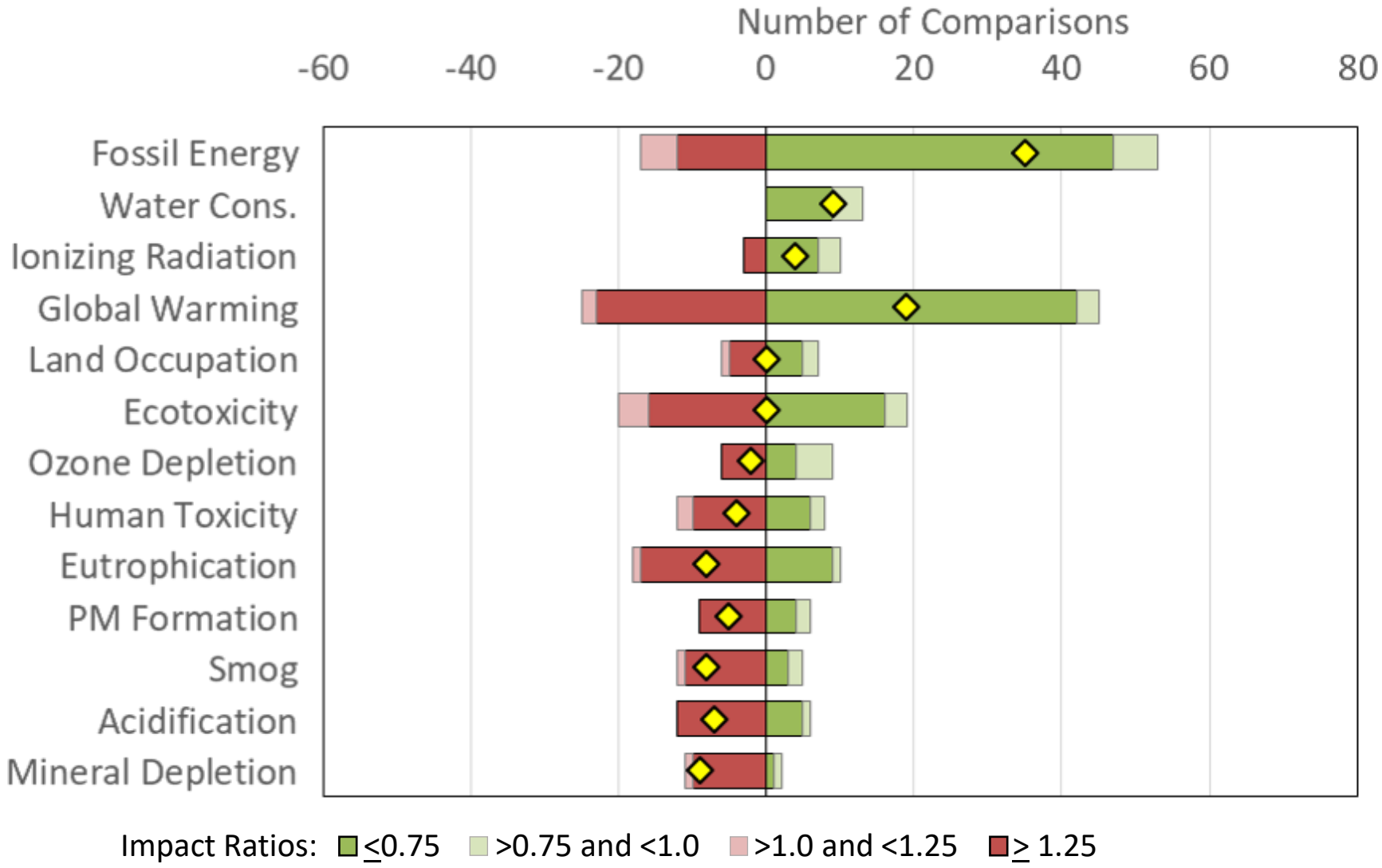
steel container
with recycled content

laminate container
without recycled content

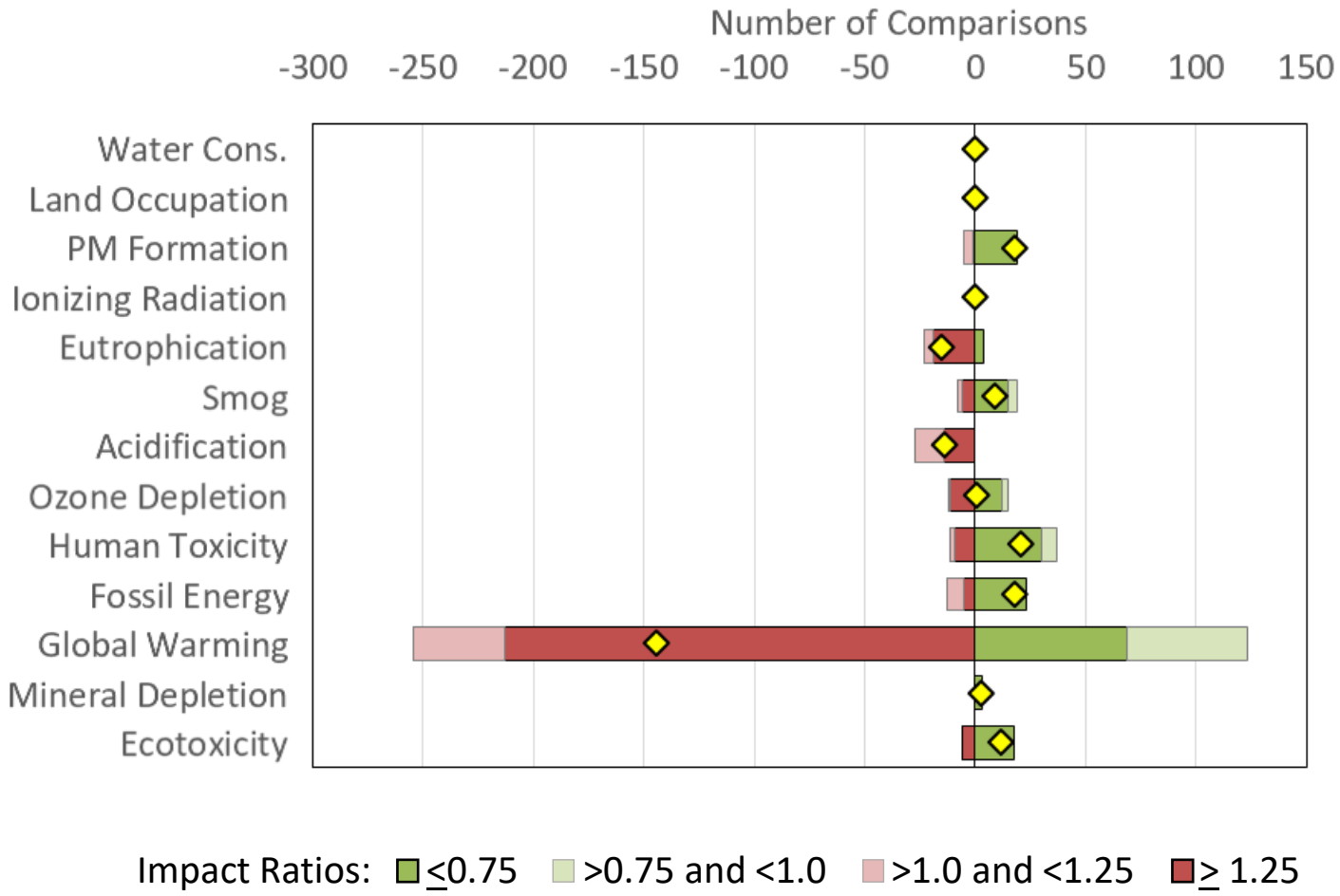
comparing *different* materials based on recycled content



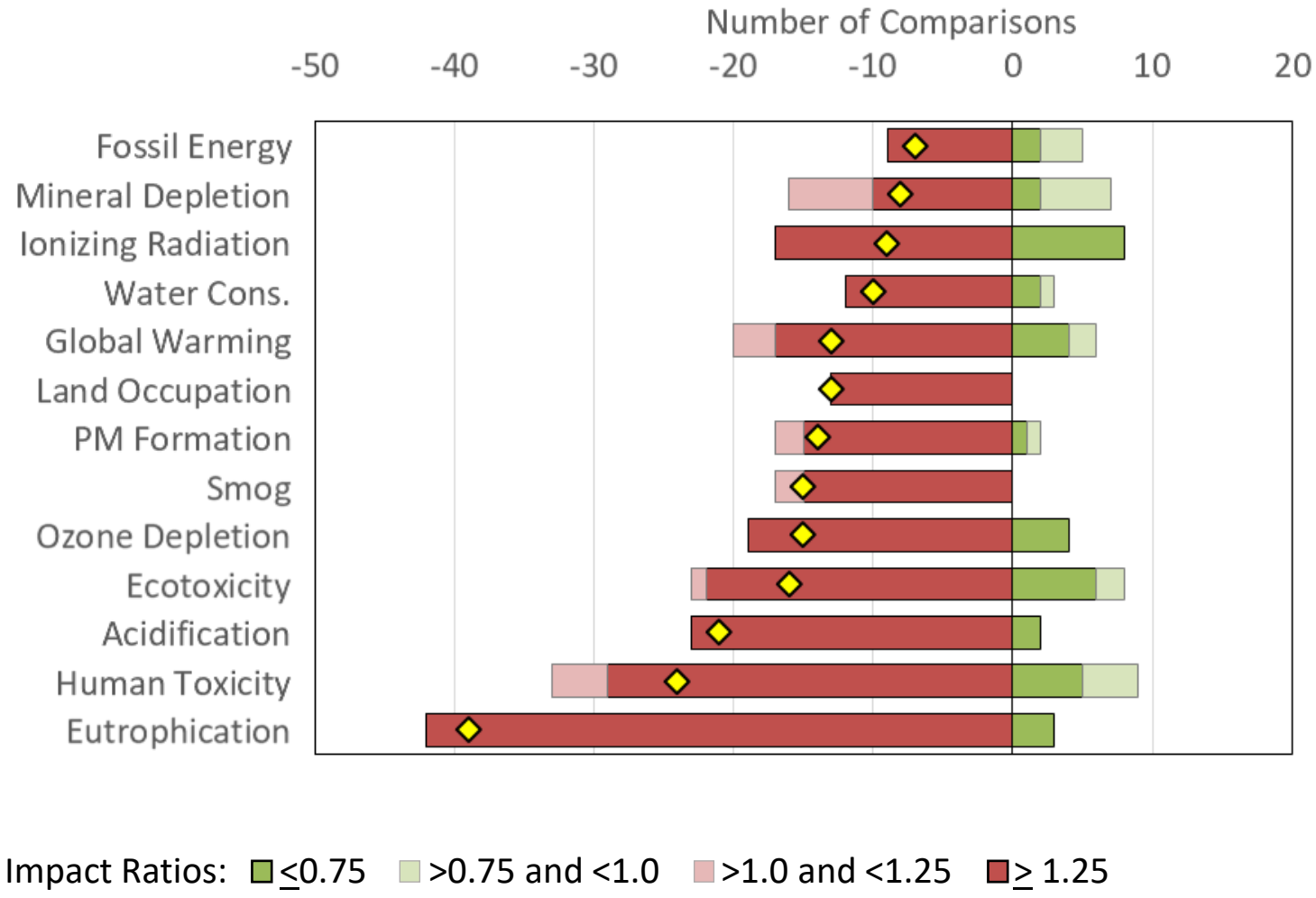
comparing different packages based on recyclability



compostable packaging vs. non- compostable packaging



compostable food serviceware vs. non- compostable food serviceware



Businesses (and governments) are listening . . .
. . . but are consumers (and residents) asking the right questions?

What might you advocate for instead?

- Durable
- Repairable
- Reusable
- Toxics disclosed . . . and better yet, eliminated
- Environmental impacts disclosed (life cycle perspective) . . . and reduced
- Appropriate government policy

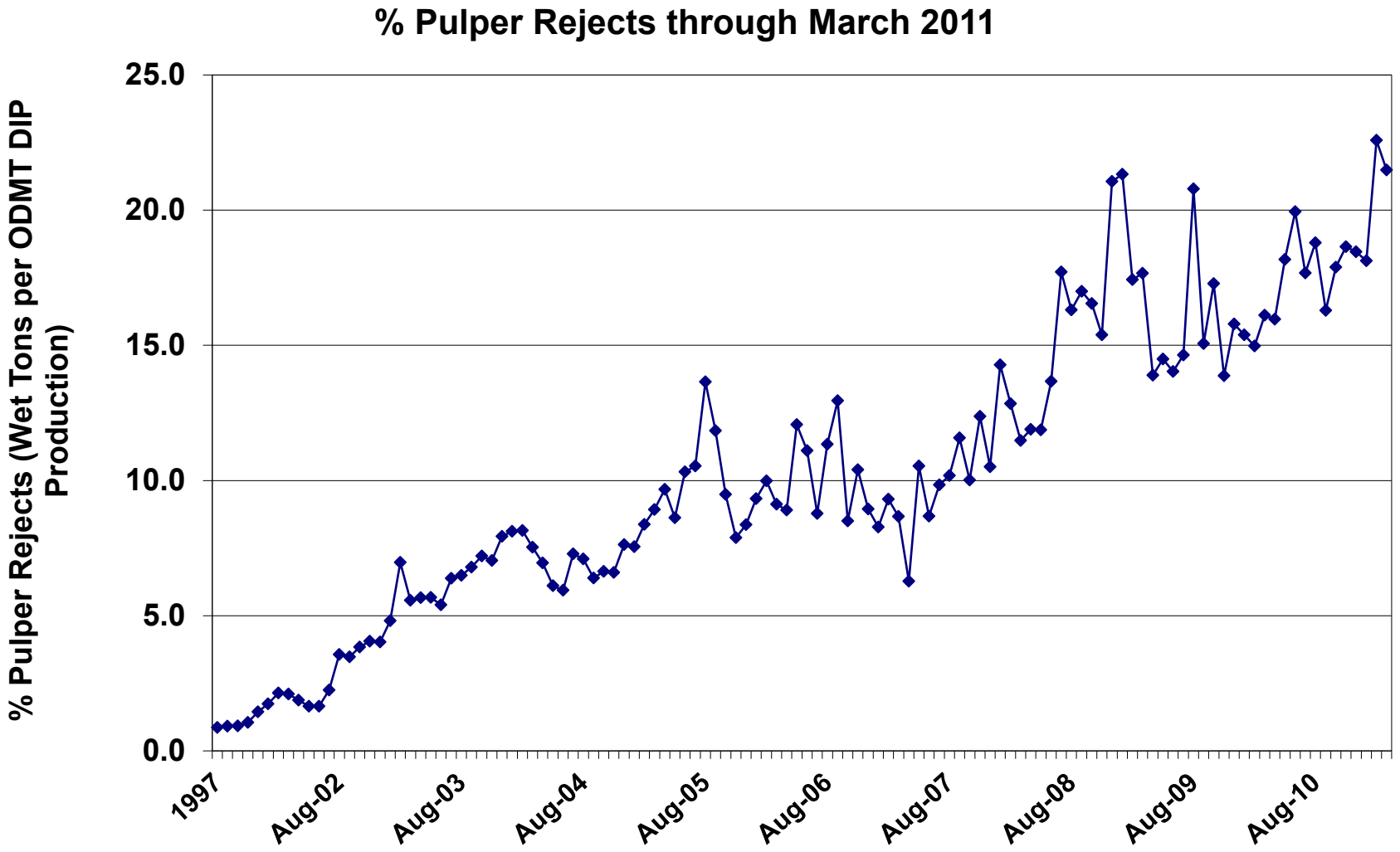
Don’t sweat the small stuff!

- One thing in your life that you can’t recycle? No viable reuse/repair option?
- Non-recyclable (and non-reusable) stuff belongs in the garbage . . . and that’s the best place for it

NORPAC, Longview

Confusion + Wishful Recycling = Contamination

NORPAC pulper rejects as suppliers switched to commingling and single-stream

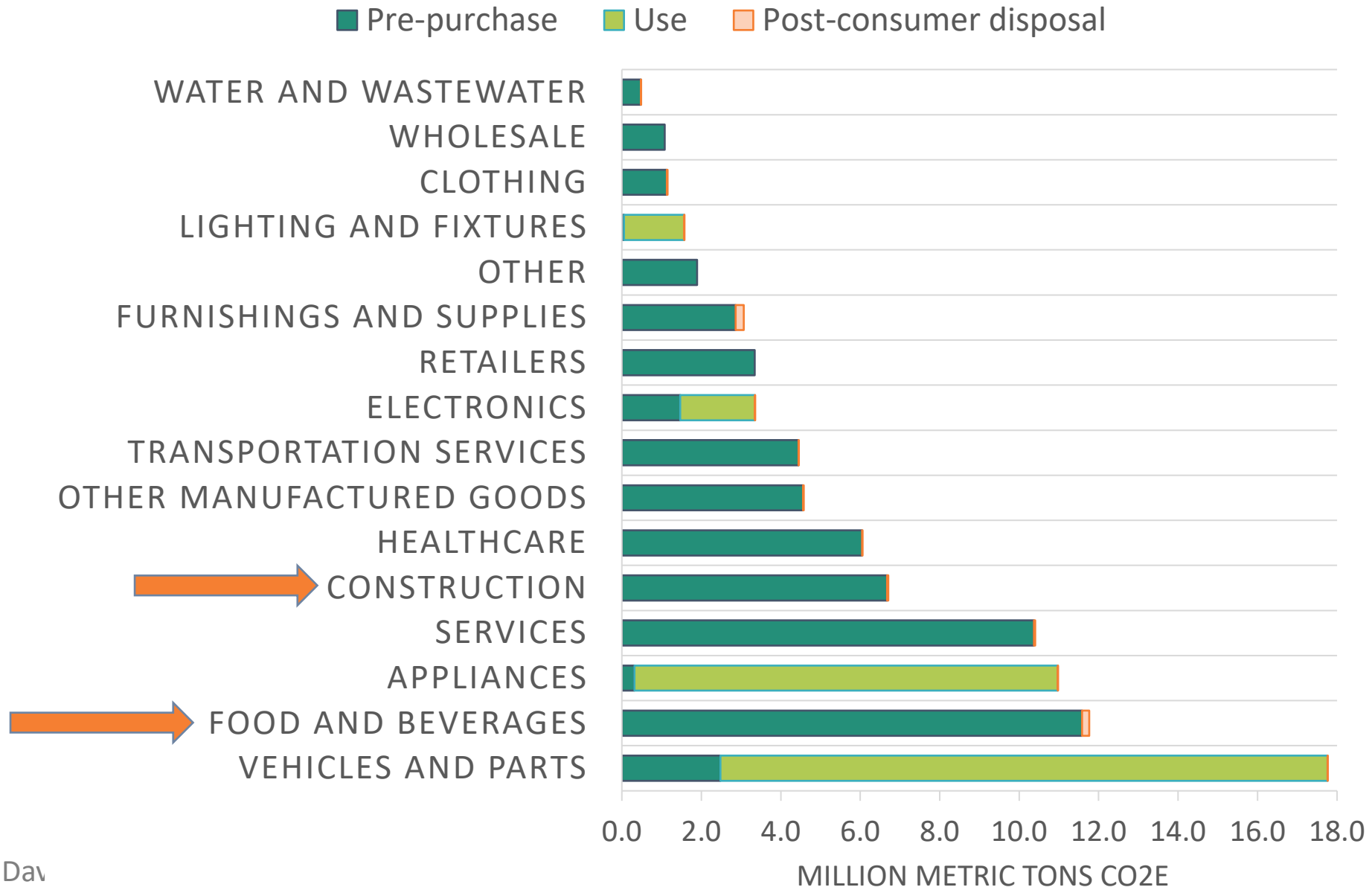


China doesn’t want the world’s trash

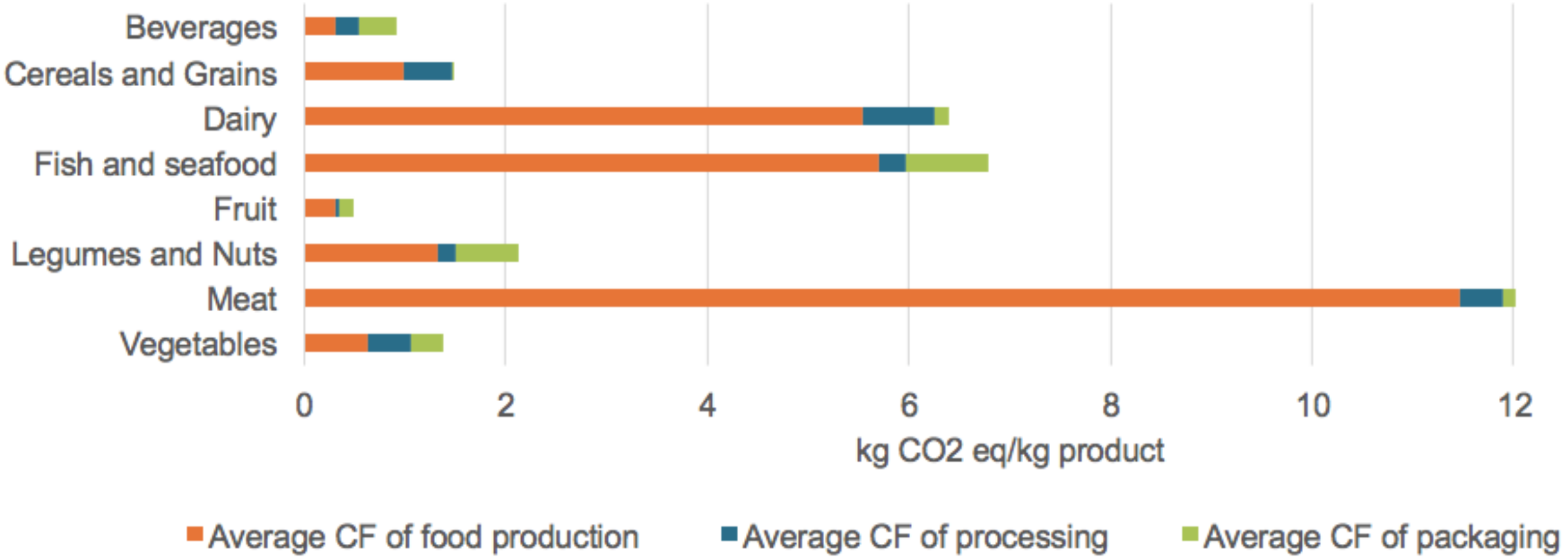
Focus instead on “big impact” materials

- Materials you use regularly and in large quantity
- Materials with oversized environmental impacts

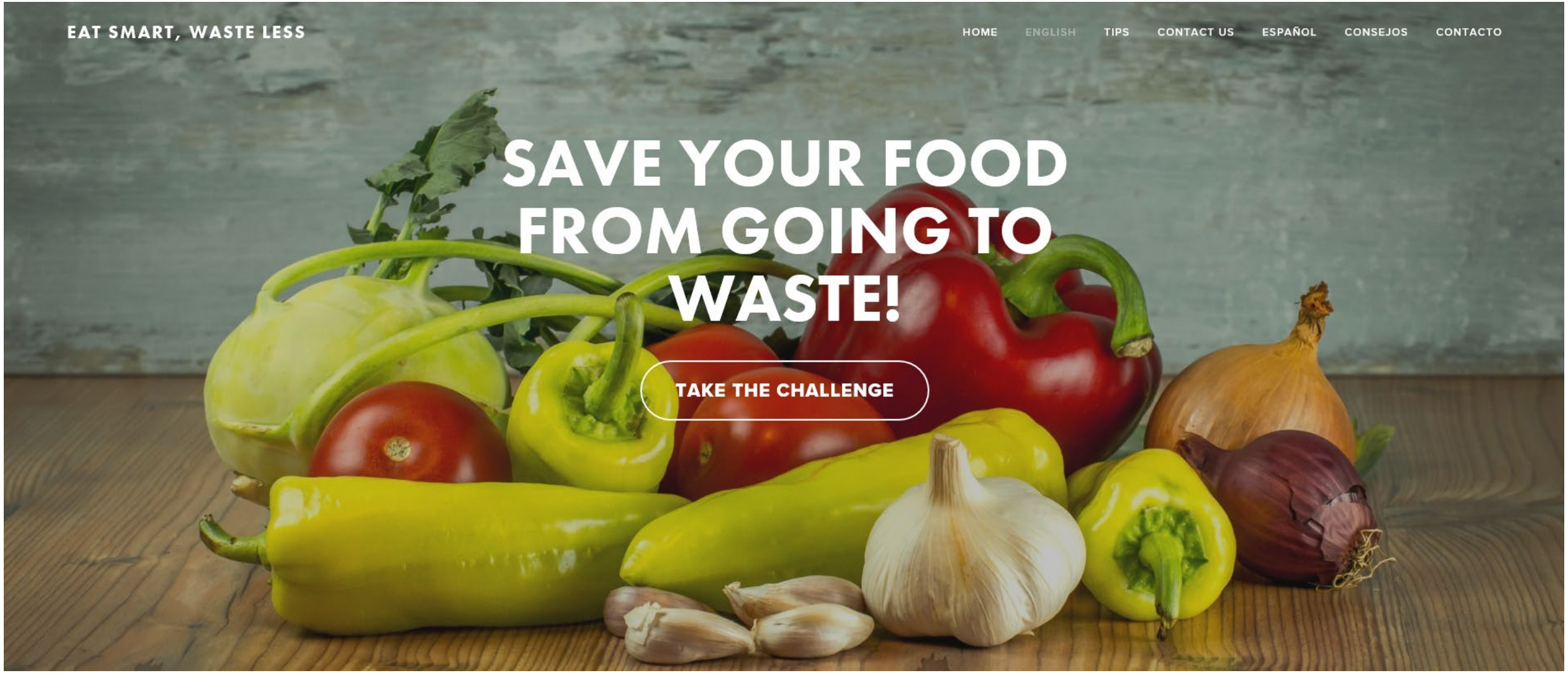
Oregon 2015 consumption-based GHG emissions, by category of consumption and life cycle stage



Food: choices matter



Preventing wasted food



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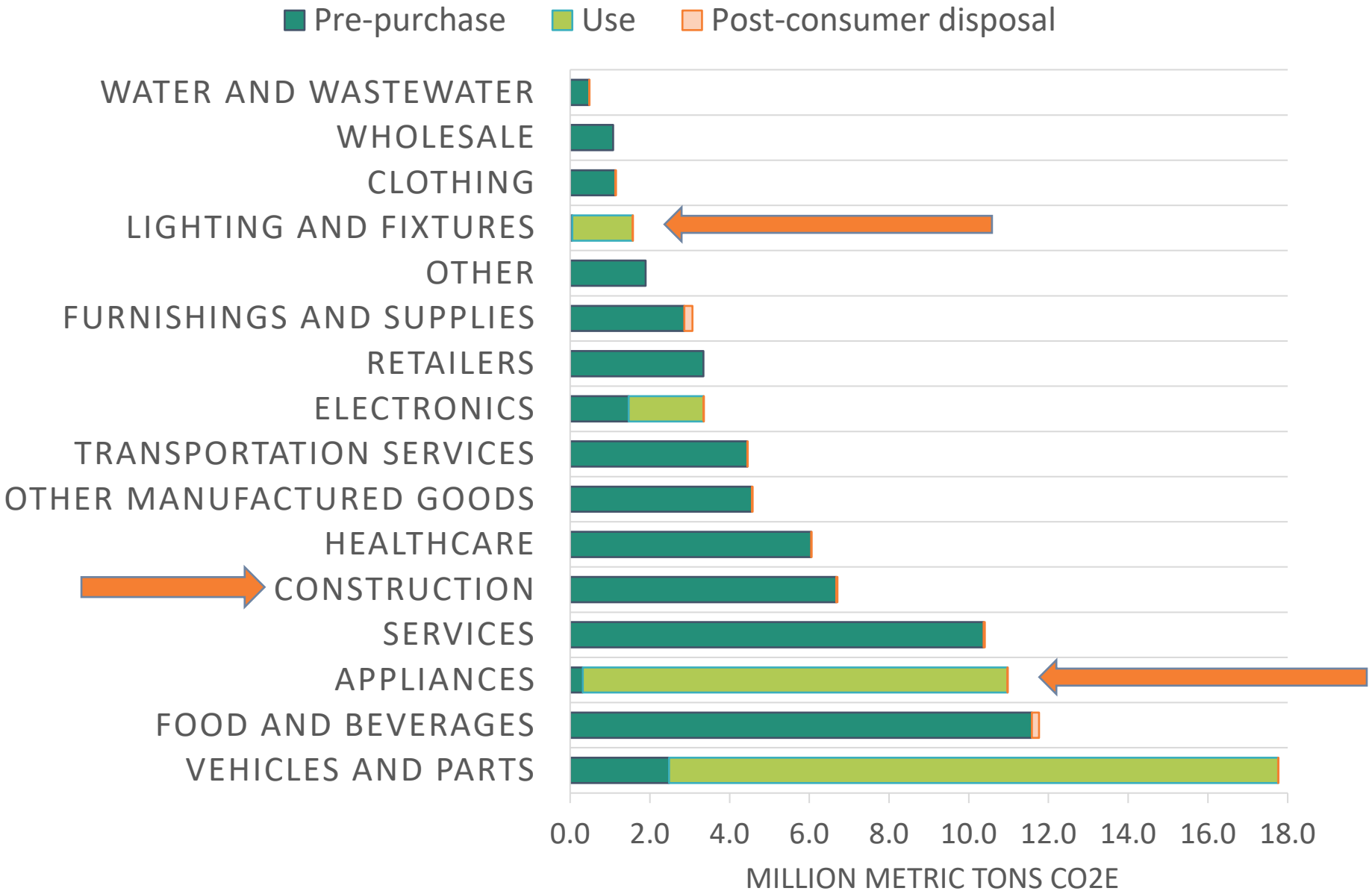

Single-family housing

- Very large environmental impacts
- Affordability and equity concerns (income, age)
- Single-most effective practice: build small
- Solutions: changes to codes, incentives, and outreach

2017 Build Small LIVE LARGE
National Housing Summit
www.buildsmall-livelarge.com

Friday-Sunday
November 3-5
2017
Portland State
University
Smith Center


Rainbow Valley Construction's Krause Cottage


2012 Build Small Live Large Summit


Dee Williams of PAD Tiny Houses

Accessory homes, tiny houses, and cottage communities.

Environmental product declarations: concrete

- Heavily consumed item
- Locally produced
- Engaged industry
- Cost-effective solutions to reduce impacts

EPD "Nutrition" Label

Your Building Product

Amount per Unit

LCA IMACT MEASURES	TOTAL
Primary Energy (MJ)	12.4
Global Warming Potential (kg CO^2 eq)	0.96
Ozone Depletion (kg CFC- 11 eq)	1.80E-08
Acidification Potential (mol H^+ eq)	0.93
Eutrophication Potential (kg N^- eq)	6.43E-04
Photo-Oxidant Creation Potential (kg 03 eq)	0.121

Your Product's Ingredients: Listed Here

Recycling Modernization Act (2021): upstream elements

- Addresses “covered products”: packaging, food serviceware, printing and writing paper
- “Eco-modulation” of producer fees to incent better design
- Impact disclosure:
  - Incented for all producers
  - Required for the 25 largest producers
- Waste prevention and reuse program

materials management

conserving resources · protecting the environment · living well

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