

Myths and Opportunities in the world of solid waste

Why recycling isn't enough – and that's kind of a good thing

May 17, 2018



Agenda

- Knock down some myths with data
- Show how each busted myth reveals an opportunity
- List some practical things to measure and do



Point of agreement: the *ultimate* goal is a sustainable world



State of Oregon
Department of
Environmental
Quality

2050 Vision

for Materials Management
in Oregon

*Oregonians in 2050 produce and use materials responsibly
conserving resources • protecting the environment • living well*

☝

Recognizing that Earth's resources are finite, Oregonians live within the limits of our sustainable share of the world's natural resources. We make and use materials and products in a manner that maintains and restores a

We use renewable resources at levels that can be sustained in perpetuity while maintaining the resiliency of natural systems. Wherever they are made, the materials and products we purchase in Oregon

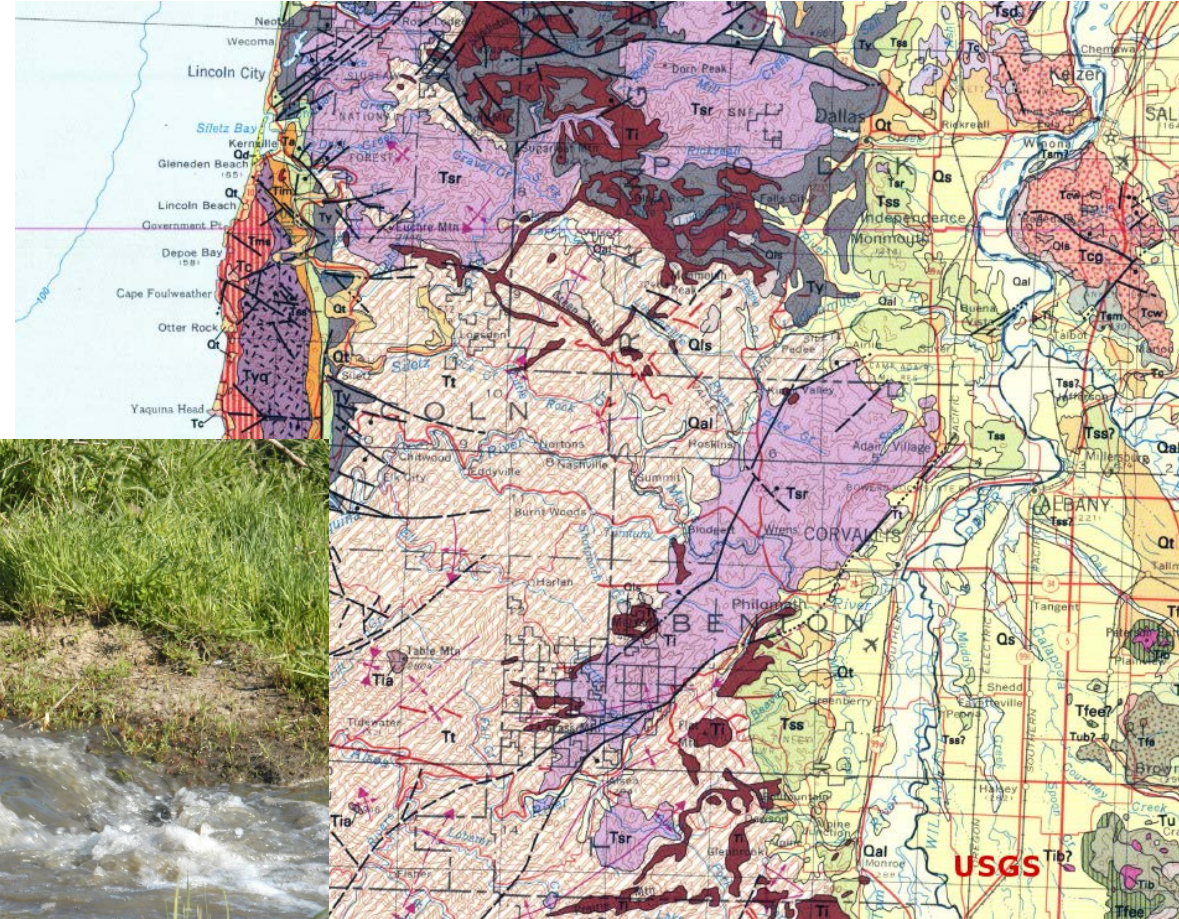
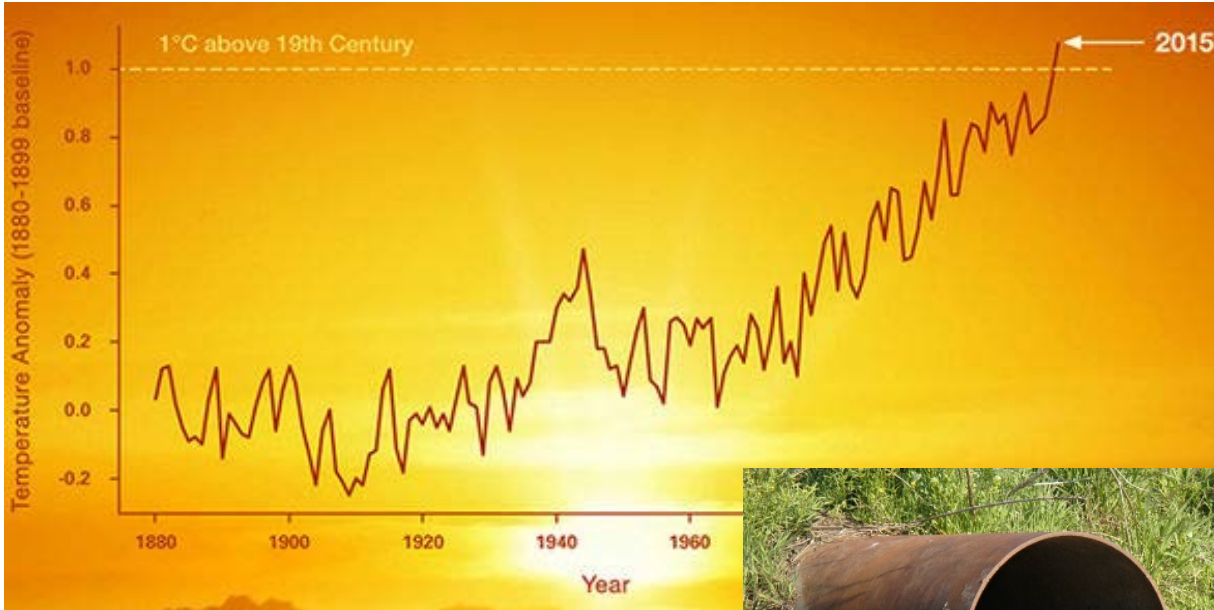


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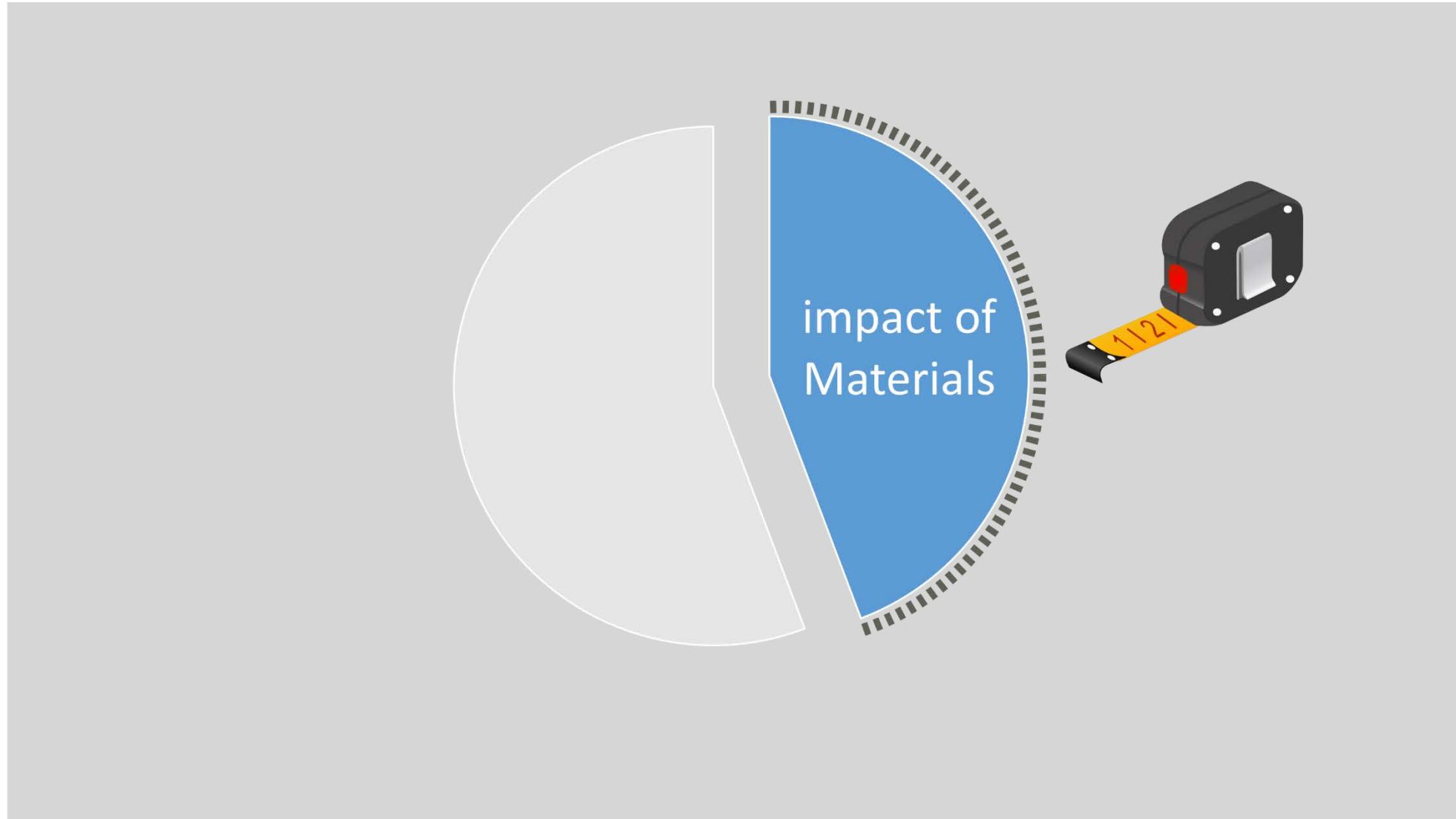
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Point of agreement: the *immediate* goal is reduced impacts



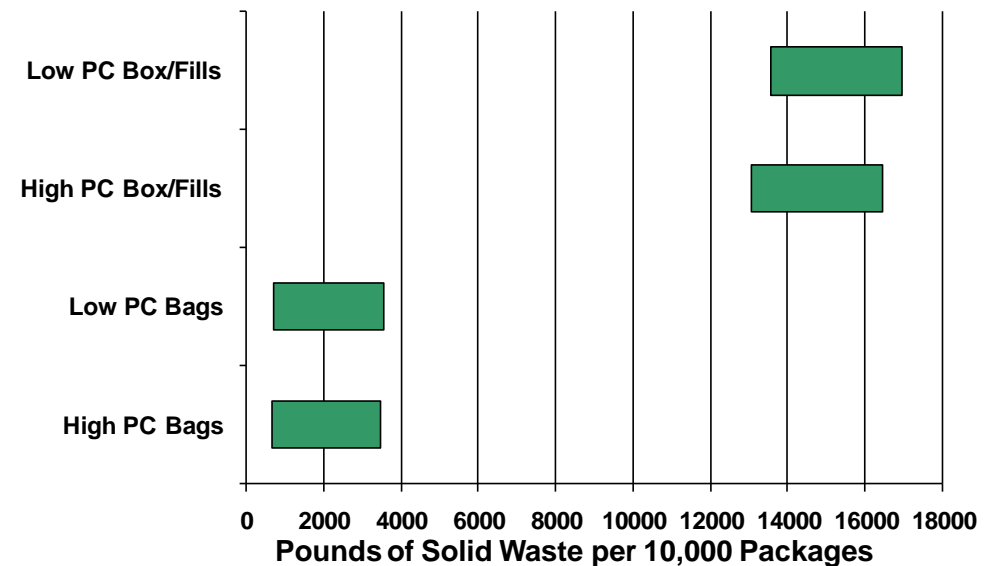
Point of agreement: materials are a logical place to work



Myth: recycling is always the best choice

Good reasons to recycle:

- Conserves resources
- Provides materials to industry
- Limits environmental impacts



Opportunity: don't need to figure out how to recycle it ALL



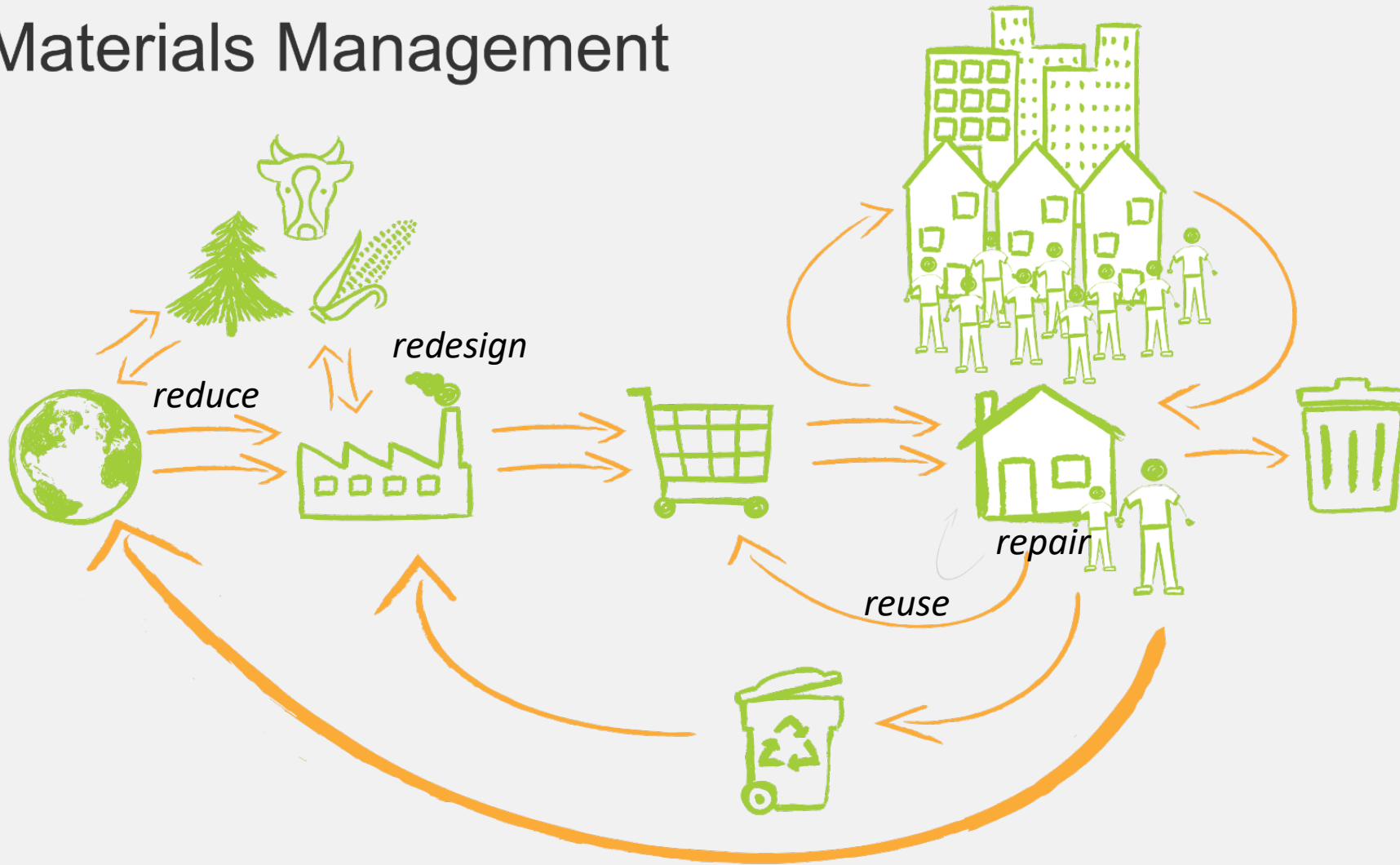
Myth: all the impacts of materials come from “end of life”

Solid Waste



Opportunity: you can act in more places

Materials Management



Myth: 100% recycling will zero material impacts

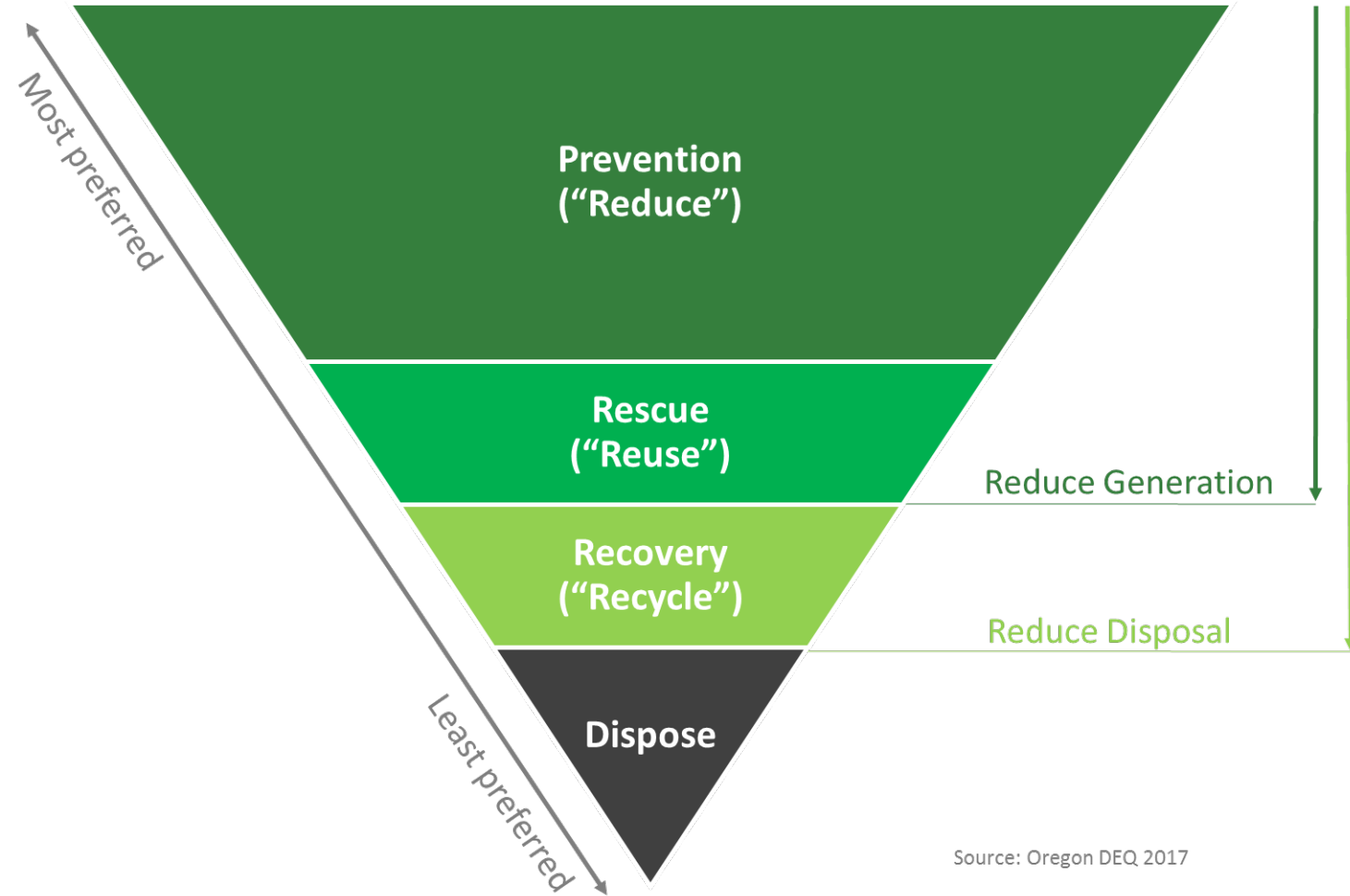
- a) Physical laws
- b) Practical restraints
- c) Demand and accumulation (see Cullen, JIE)

Table 1 Estimates of α and β for four energy-intensive materials

	<i>Steel</i>	<i>Concrete</i>	<i>Plastic</i>	<i>Paper</i>	<i>Aluminum</i>
Recovered EOL material (Mt)	298	660	28	156	11
Total material demand (Mt)	1,500	32,800	299	408	54
α	0.2	0.02	0.09	0.38	0.21
Energy required to recover material (MJ/kg)	6.7	3.4	9.6	23.4	7.6
Energy required for primary production (MJ/kg)	21.7	3.4	38.4	26.2	174
β	0.69	0	0.75	0.11	0.96
Circularity Index, CI	0.14	0	0.07	0.04	0.20

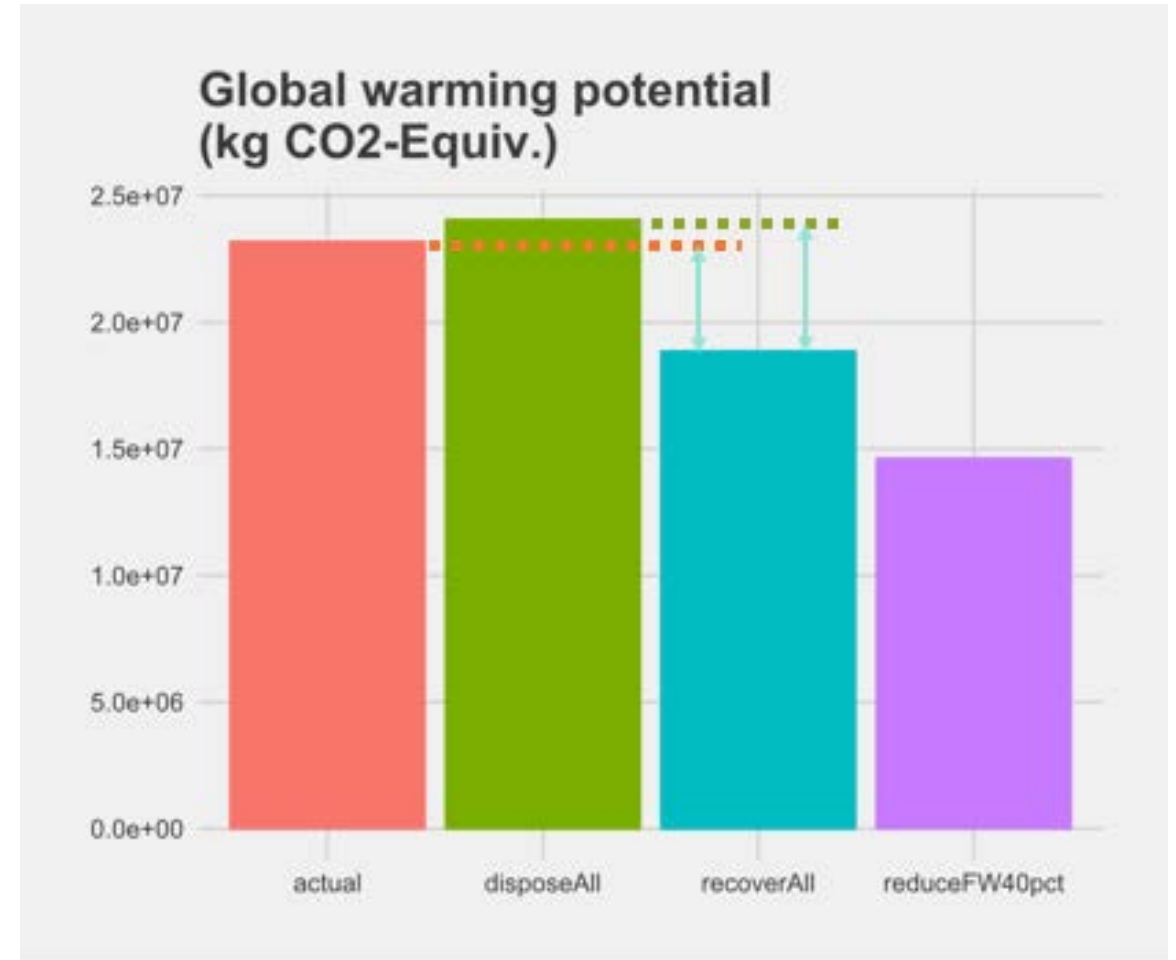
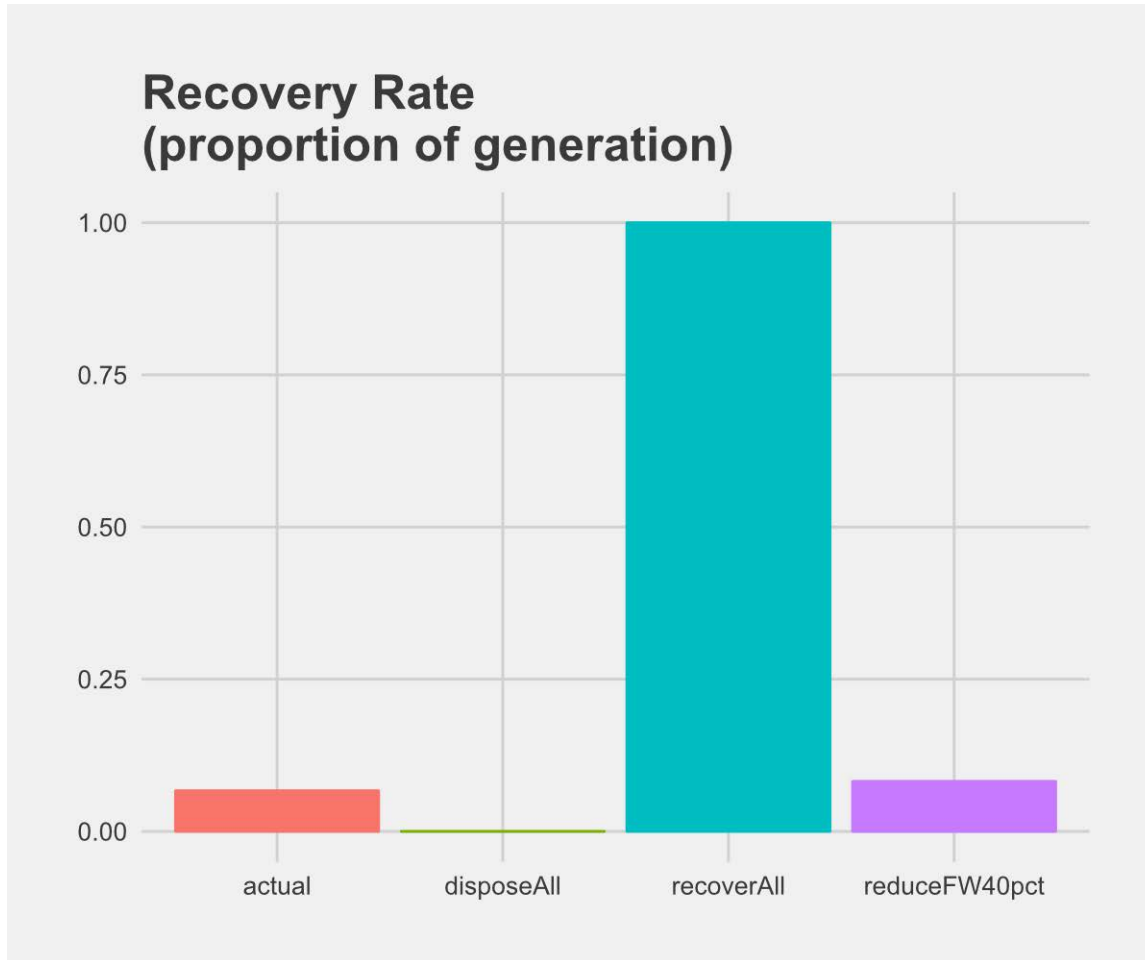
Notes: α = recovered end-of-life (EOL) material / total material demand; β = 1 – energy required to recover material / energy required for primary production; Circularity Index (CI) = $\alpha\beta$, maximum value = 1; text in bold indicates the main equations; Mt = megatonnes; MJ/kg = megajoules per kilogram. Data sources: Material estimates from various sources (~2014); energy intensities, best practice, mostly from Worrell and colleagues. (2008); steel (worldsteel) EOL material excludes home/prompt scrap; concrete (CSI) EOL includes recycled concrete aggregate (RCA), and requires equal amounts of cement/energy to bind crushed aggregate in recycled concrete; plastic (various) mass for PET, PS, PVC, HDPE, LDPE, PP, other, energy values for PET (indicative); paper (CEPI) energy for graphic papers/newsprint, packing/board, sanitary/tissue, weighted by mass; aluminum (World Aluminium), EOL material excludes home/prompt scrap.

Opportunity: get reacquainted with the *THREE* r's



Source: Oregon DEQ 2017

Example: prevention bests composting



Myth: weight is a good indicator of impacts



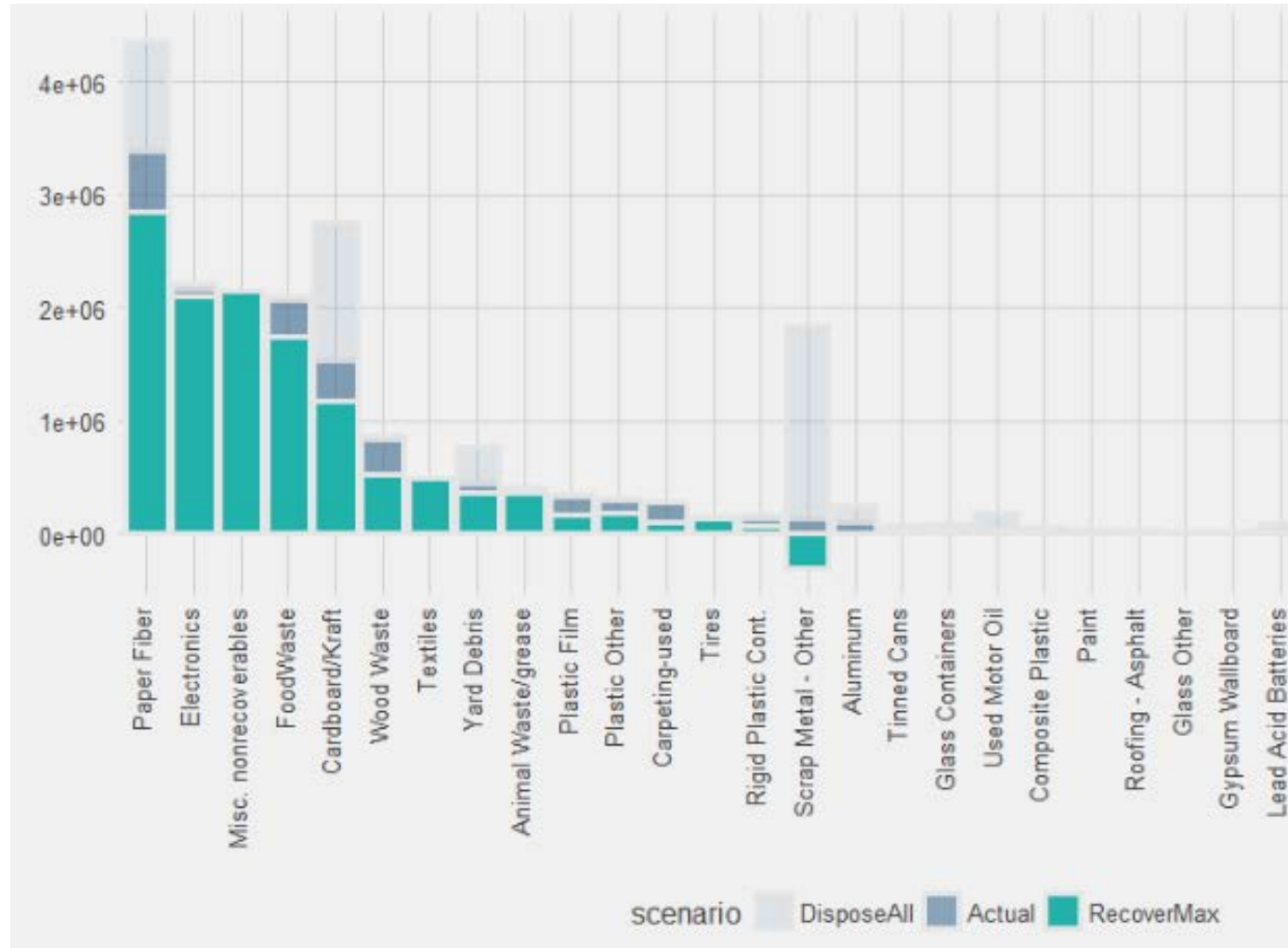
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Opportunity: you can target high impact materials



Myth: recycling is always benign



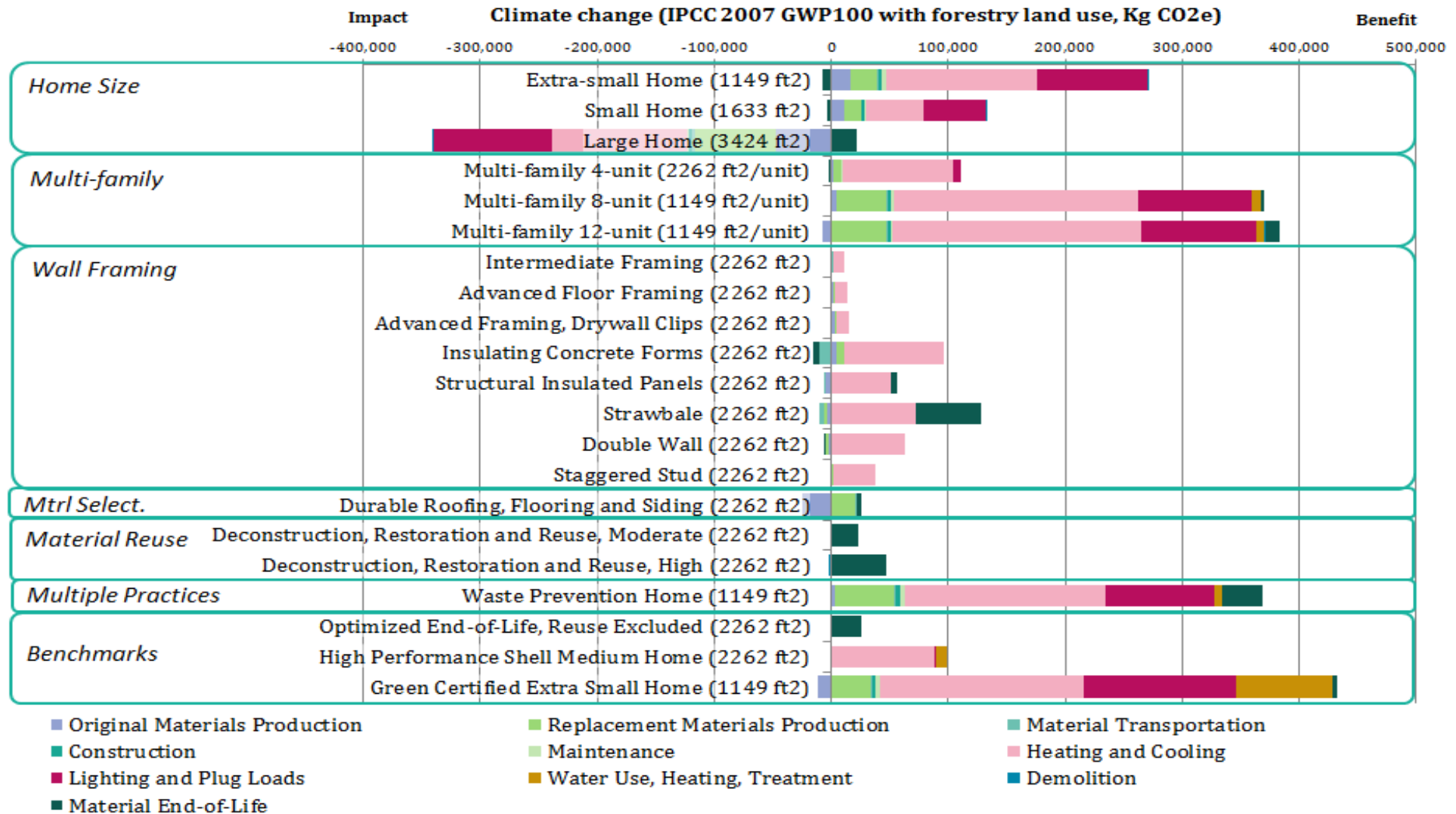
Opportunity: reuse and repair could be decent jobs



Myth: lower impact living makes life worse



Opportunity: make people's lives better



Specific recommended metrics

	Try NOT to use...	...when you could use this	.. With policy direction
Weight-based	Landfilling rate (tons)	Waste generation (tons)	Minimize generation
	Recycling rate (%)	Mass circularity rate (%)	Maximize circularity via reduction of demand as well as increased recycling
Impact-based	“Savings” in impact measurements	Total impacts from various management strategies: <ul style="list-style-type: none"> • In impact metrics most important to you 	a) Find the biggest components of total impacts; and then b) Work on those components



Specific recommended actions anyone can do

- In this order: **REDUCE.** *Reuse.* Recycle.
- Educate your children, elected officials, and corporate leaders about the materials lifecycle. Consider videos like “Dirty Jobs,” “How it’s Made,” and “The Story of Stuff.”
- Go for quality of life, not quantity of stuff.

