

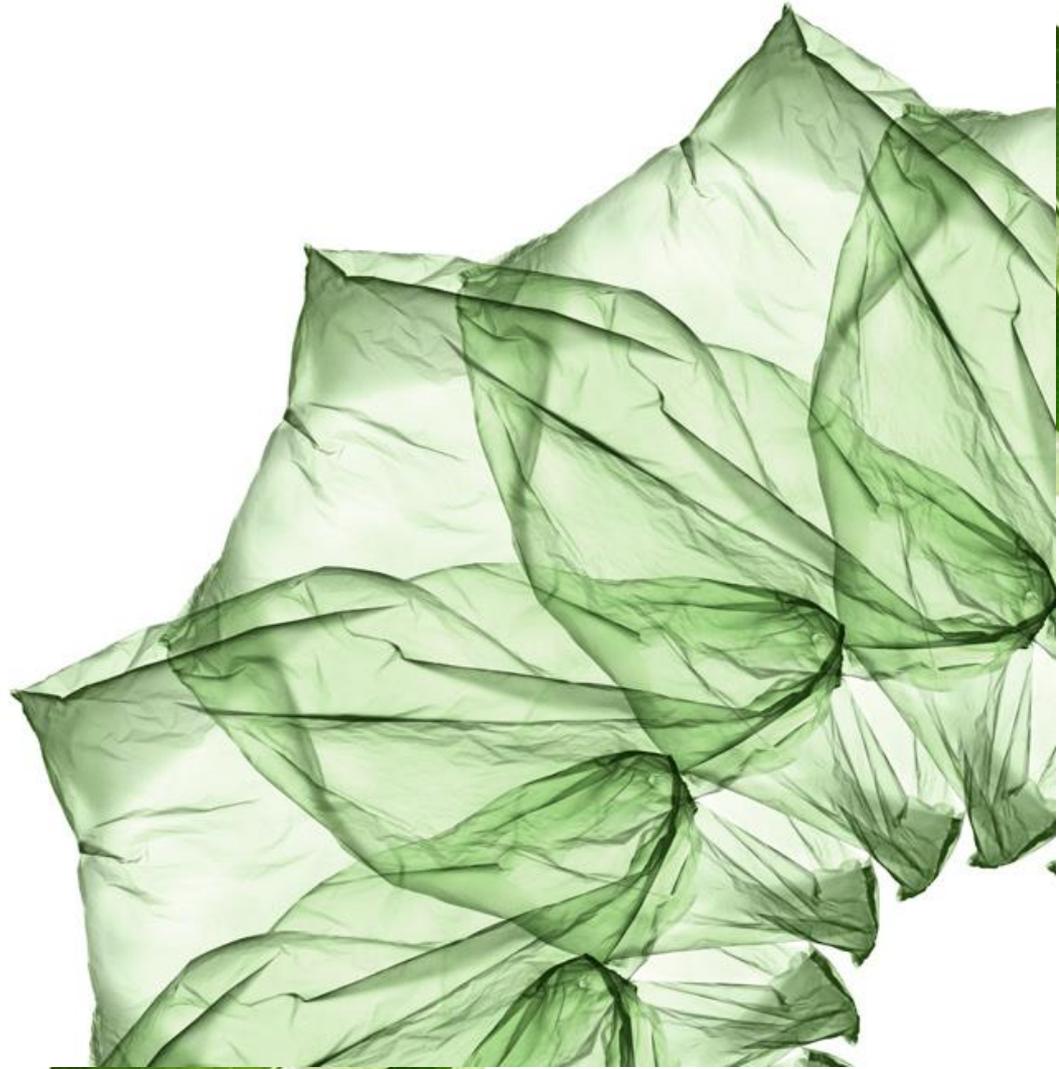
Recycling: Have we set the right goals?

A practical approach to materials management

National Federation of
Women Legislators

THINK GREEN®

November 19, 2016



WM Recycling Services



88%

Increase in amount
of recyclables managed
since 2007



14 M

Tons of recyclables
extracted from the waste
stream



104

Materials recovery facilities
owned/operated by
Waste Management

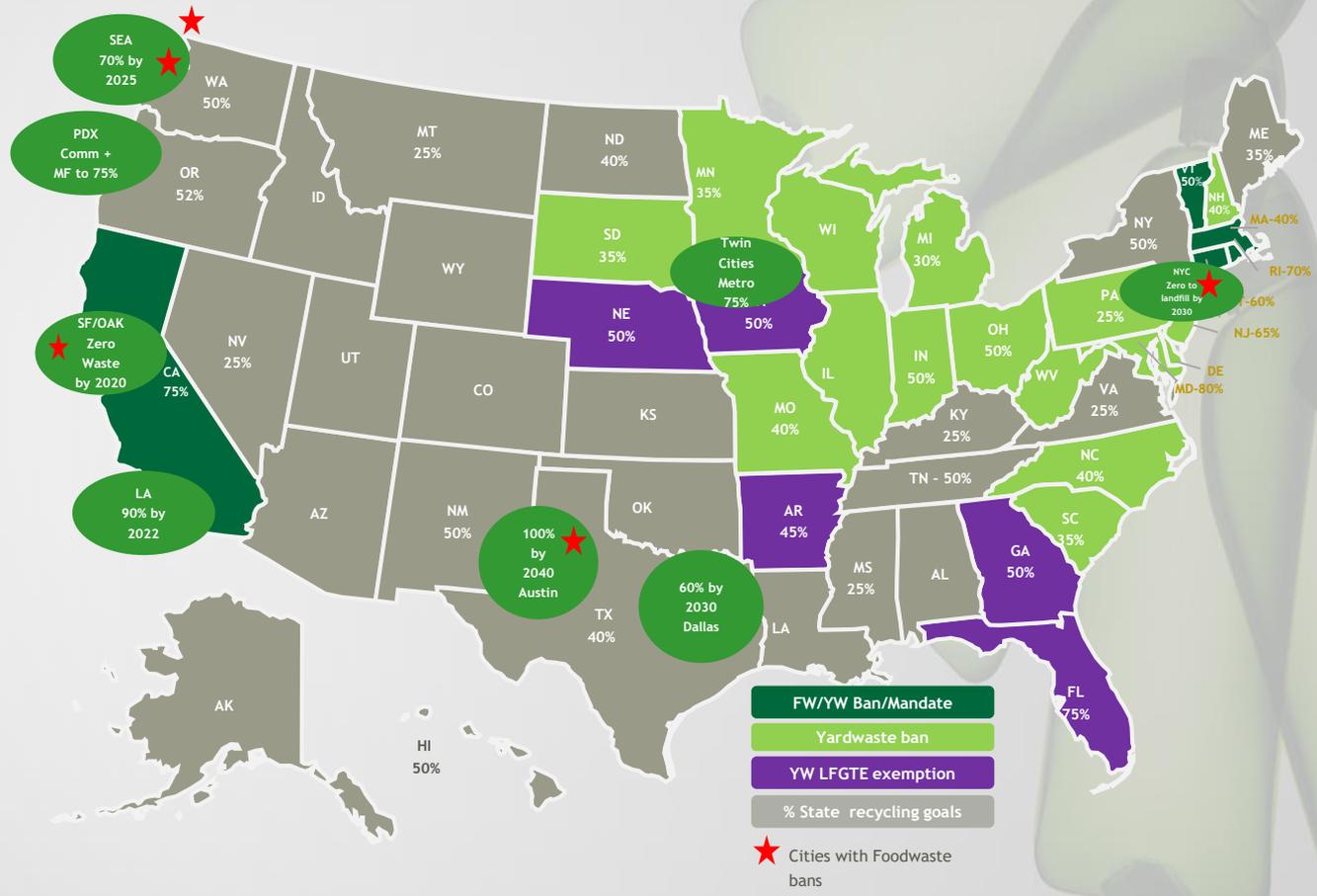
WM has invested over \$1 billion in recycling
infrastructure

The Role of Goals

- Weight-based recycling has been our measure of material management performance
- States, cities and corporations have developed 50%, 75% and even Zero-Waste goals
- Cities added more materials and convenient programs to help achieve their goals.

Goals drive programs.
Do we have the right goals?

Goals Drive Programs



The Focus for Today - and Aspiration for Tomorrow

Easily Diverted - Recyclable Materials - 30-40%

- Low cost, hi diversion potential
- Common materials - OCC, paper, metals, basic plastics, glass
- Local infrastructure available
- Success through best practices

Harder to Divert - Organics - 20-30%

- Food waste, green waste
- Infrastructure limited
- Higher level of segregation and best practices req'd

Challenging to Divert - 10%

- Small rigids, flexible packaging, etc.
- Not compatible w/ existing infrastructure
- Contamination potential
- Investment needed to prove solutions

Manageable? - 20%

- Not separable
- Sanitary wastes, dirty streams, Trash
- High cost to separate/clean
- If not landfill, need alt infrastructure

**Diversion
Focused Mgmt**

**Sustainable
Materials Mgmt**

Materials Management

- Two different approaches
- Informed by science
- Focused solely on environment

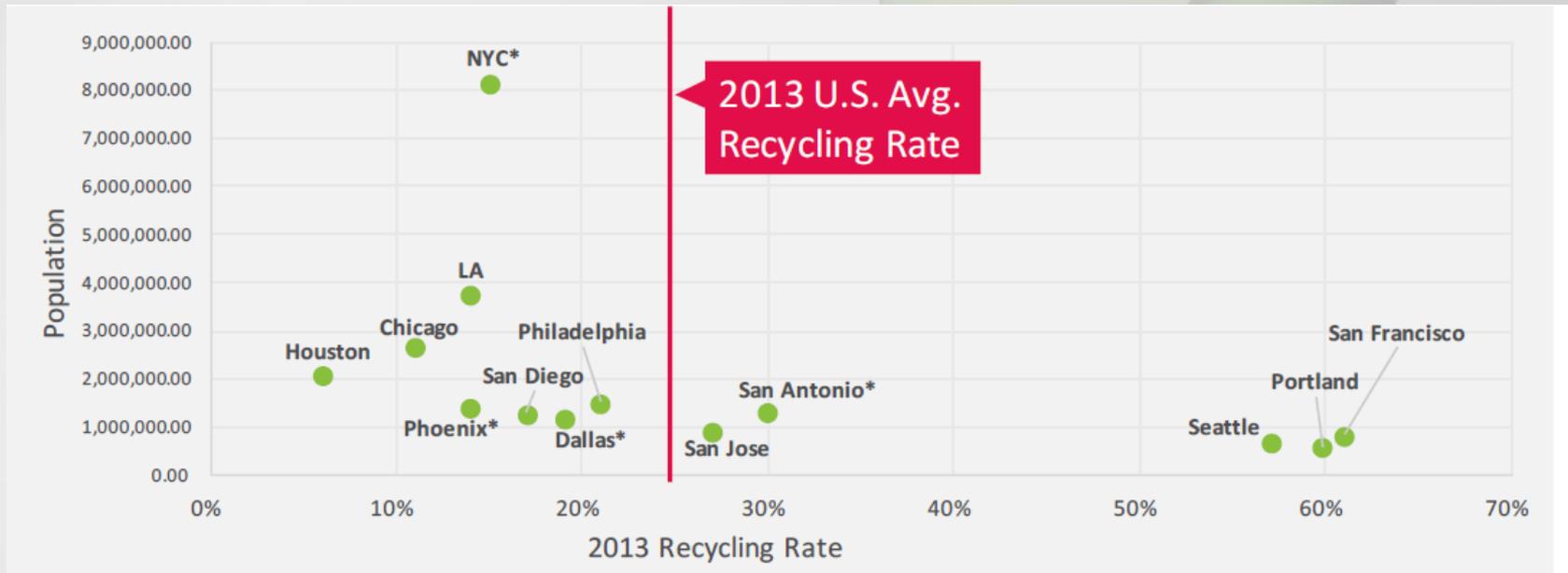
↑ Today

↑ Emerging

↑ Tomorrow

↑ Unknown

Actual recycling rates in large-cities in the U.S.



Curbside data from Resource Recycling, May 2015. Other data from city website and reports. *Dallas, San Antonio include organics diversion, Phoenix includes organics and commercial diversion. LA is 2015 data. Portland and Seattle are 2014 data.

Changing reality of recycling

Commodity Markets

- Reduced global market demand
- More stringent quality requirements

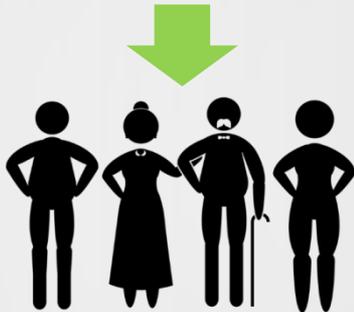
Evolving Inputs & Systems

- Packaging material much more complex
- Increase in number of cart-based single stream recycling systems

Social & behavioral trends

Demographics changes & on-the go lifestyles

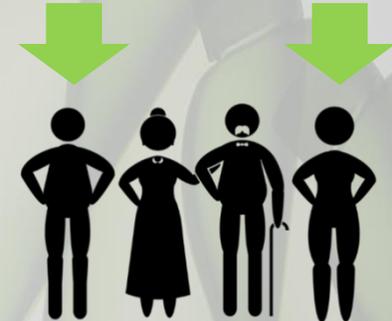
Baby Boomers / Aging population



Smaller household size = Smaller portions & more pre-prepared food



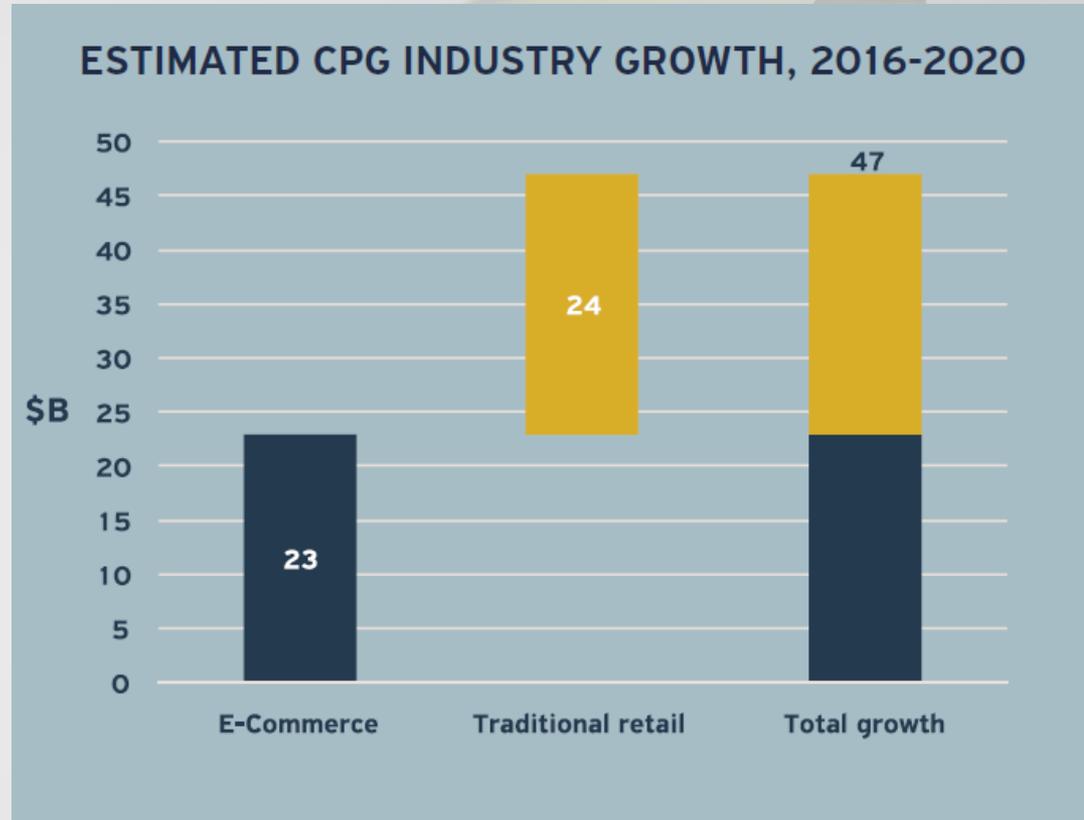
Millennials



79 million this year
(larger than baby boomers)
Not bound to traditional packaging
(cans, jars and bottles)

E-Commerce: Explosive Growth

- Online sales account for just 3% of the \$795B CPG market
- While revenue from traditional retail drew 1.5% in 2015, on line sales revenue grew by 14.5%
- A projected four-year compounded average growth rate of 18% means that nearly half of the growth the industry will experience through 2020 will come through digital channels.



Bemis Corporation - 2016

Millennials are digital savvy consumers and are approaching their peak spending years. Much of their spending will be online.

Relevance to Packaging & Recycling

| | FAIL | | PASS |
|-----------|---|--|---|
| BABY FOOD |  Glass Jar |  Semi-Rigid Container With Lid |  Fitment Standup Pouch |
| SOUP |  Can |  Tetra Box |  Standup Pouch (tear open) |
| PET FOOD | |  Paper Bag |  Plastic Flat-Bottom Bag |
| DETERGENT |  Rigid Bottle | |  Fitment Standup Pouch |

Bemis Corporation - 2016

As companies pivot toward e-commerce, they are moving away from rigid or glass packaging that may be prone to damage when shipped to a consumer's home. Flexible pouches are easier to ship, offer a lower total package cost, and optimize the product-to-package ratio.

The evolving ton



Less Paper.....



More non-recyclables pouches

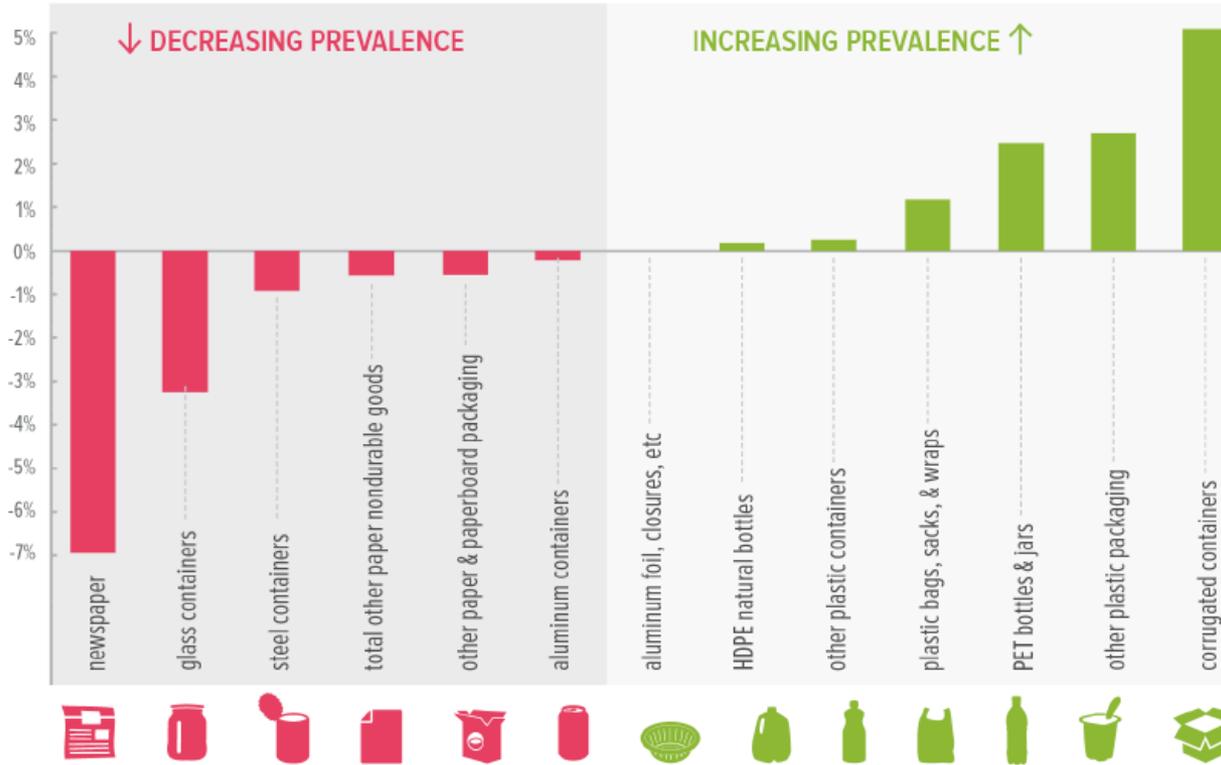


Lightweight packaging

More plastic....



CHANGE FROM 1990-2013

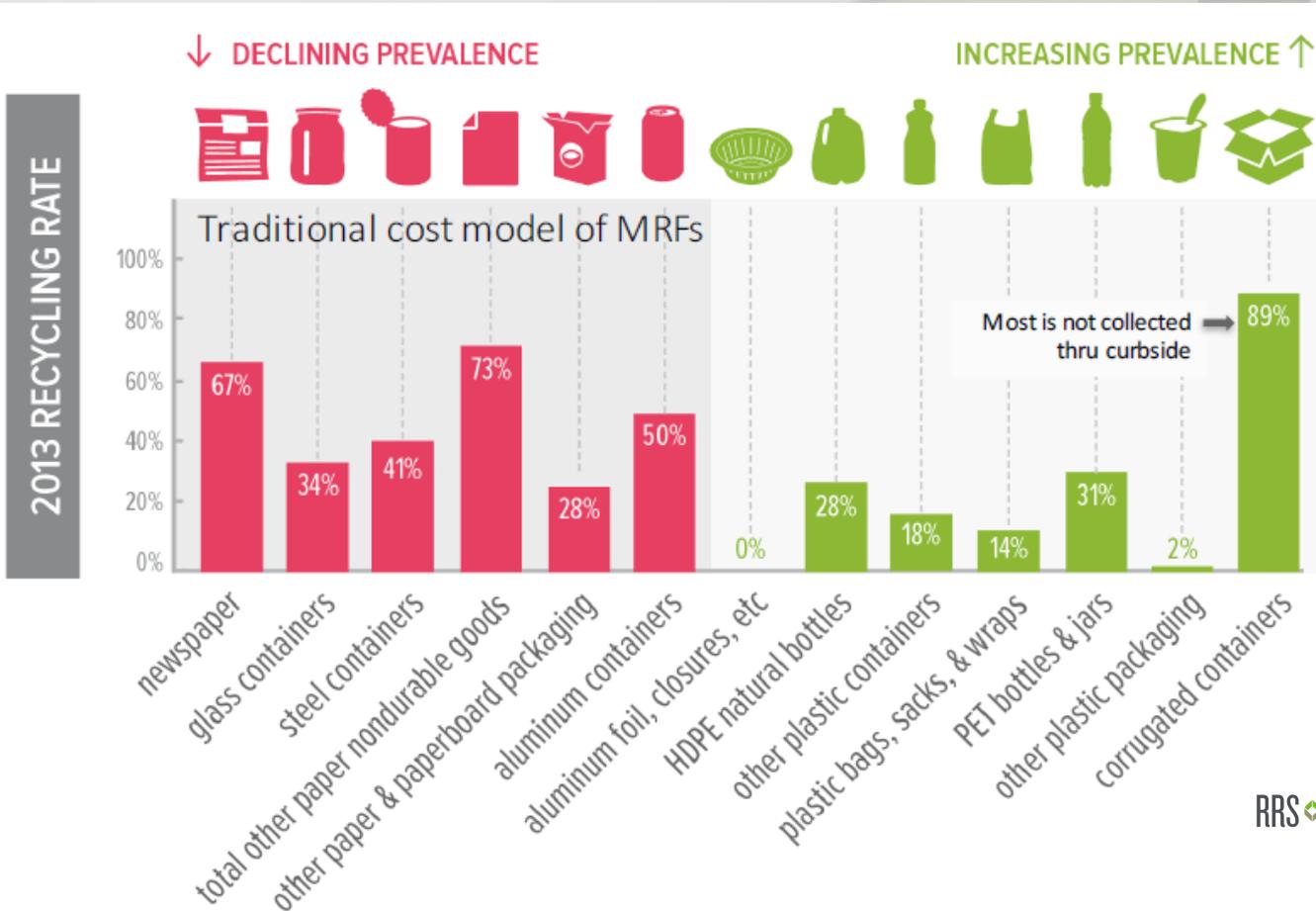


HOW PACKAGING IS EVOLVING: 2013 to 1990 Baseline

Source: USEPA



What we recycle



Technology and the global marketplace have evolved

Do we need a paradigm shift?

Which is Better From a Life Cycle Perspective?

(Note: Use Phase not included)

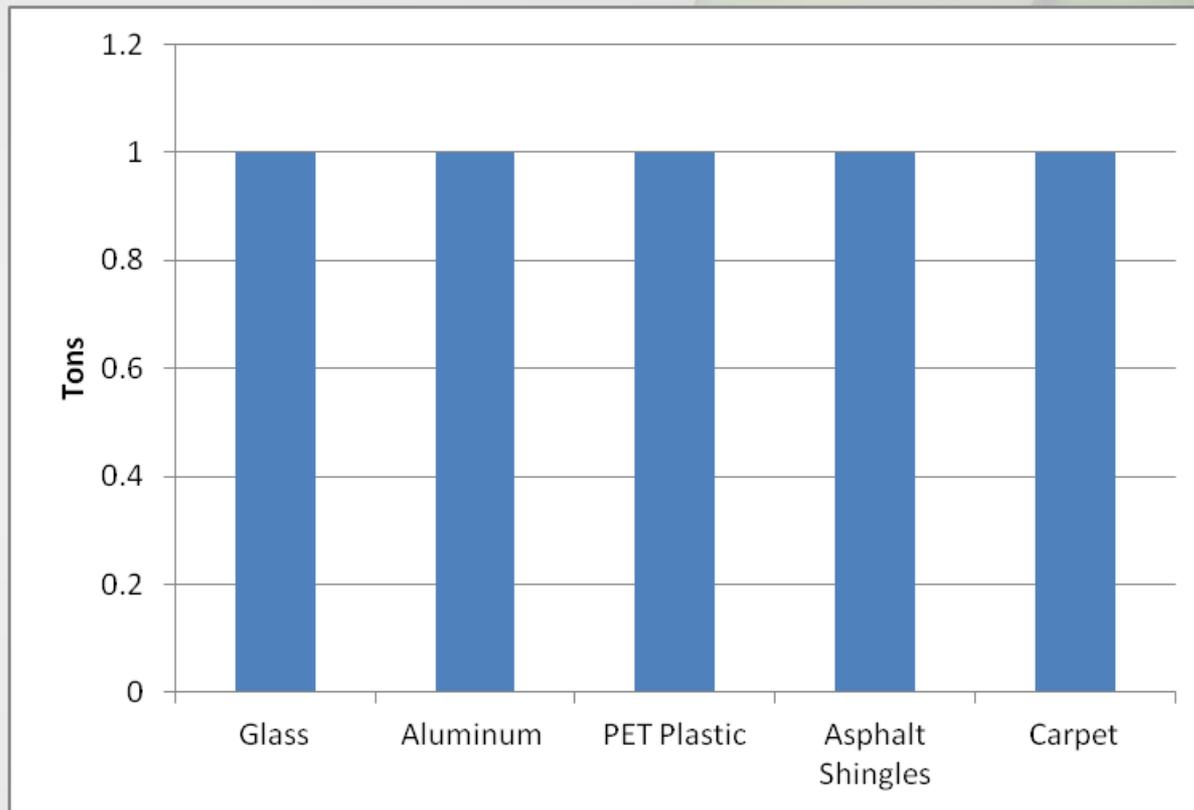
| Coffee Packaging (11.5 oz product) | *Package Wt. | *Product-to-Packaging Ratio | *Energy Consumption (MJ/11.5 oz.) | *CO2 eq Emissions/ 11.5 oz | **Efficient Use of Space (relevant for storage and transportation) | **Recyclable postconsumer | ***MSW Waste Generated (lbs./ 100,000 oz. of product) |
|--|--------------|-----------------------------|-----------------------------------|----------------------------|--|---------------------------|---|
|  | ~ 4 oz. | 3:1 | 4.21 | 0.33 | no | yes | 1,305 |
|  | ~3 oz. | 5:1 | 5.18 | 0.17 | no | yes | 847 |
|  | ~0.4 oz. | 29:1 | 1.14 | 0.04 | yes | no | 176 |

EPA's Sustainable Materials Management (SMM): How is it different from Reduce, Reuse, Recycle?

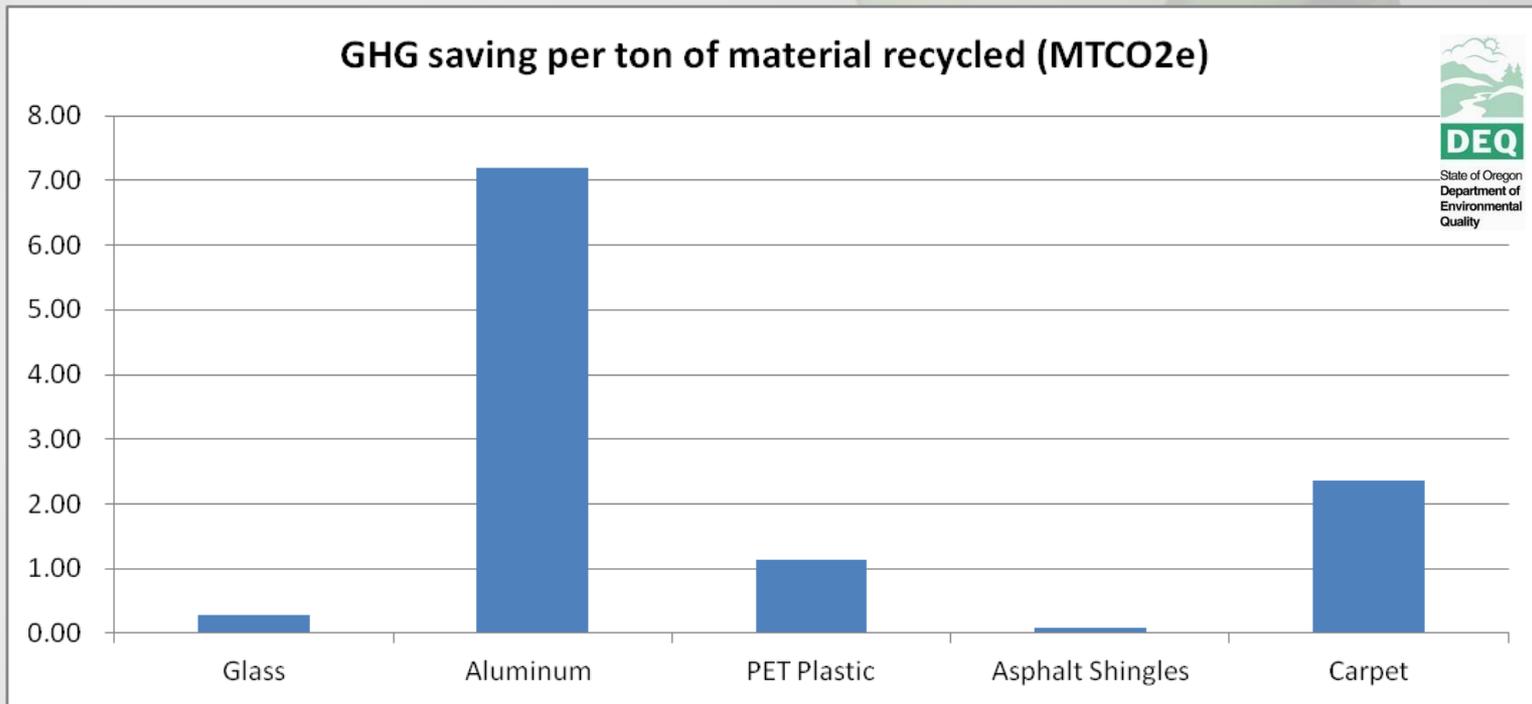
- The 3 R's waste hierarchy doesn't look at the environmental benefits of "Reduce, Reuse, and Recycle". The hierarchy is an implied measure of how we should manage material but uses no data.
- Conversely, SMM uses data to analyze materials management strategies to the highest environmental benefits. The solutions using LCAs are not always obvious.
- We care about all environmental impacts, so SMM gives us a more complete picture of how we should manage materials, goods and services.

SMM is a paradigm shift in how we think about managing waste materials

Weight based recovery measurement



Oregon's outcome based recovery



Example of new material specific recovery goals

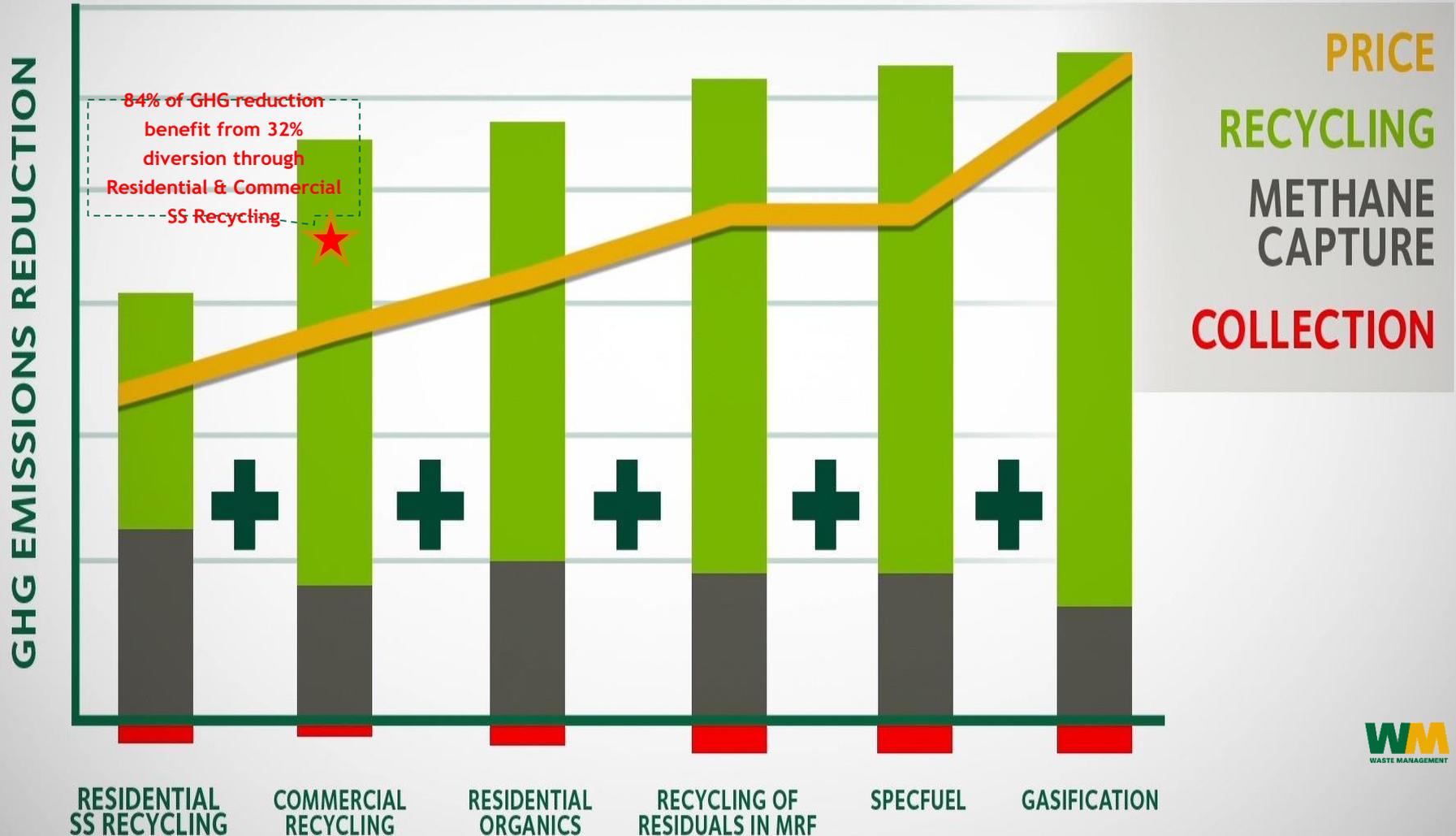
Carpet → 25% by 2025

Food → 25% by 2020

Plastics → 25% by 2020



RECYCLING DRIVES SIGNIFICANT REDUCTION OF GHG



Overall environmental benefits must be our first priority



Goals should rely on lifecycle analysis to target specific materials with the greatest environmental benefits.

Measurement should include per capita generation, recycling and disposal.