

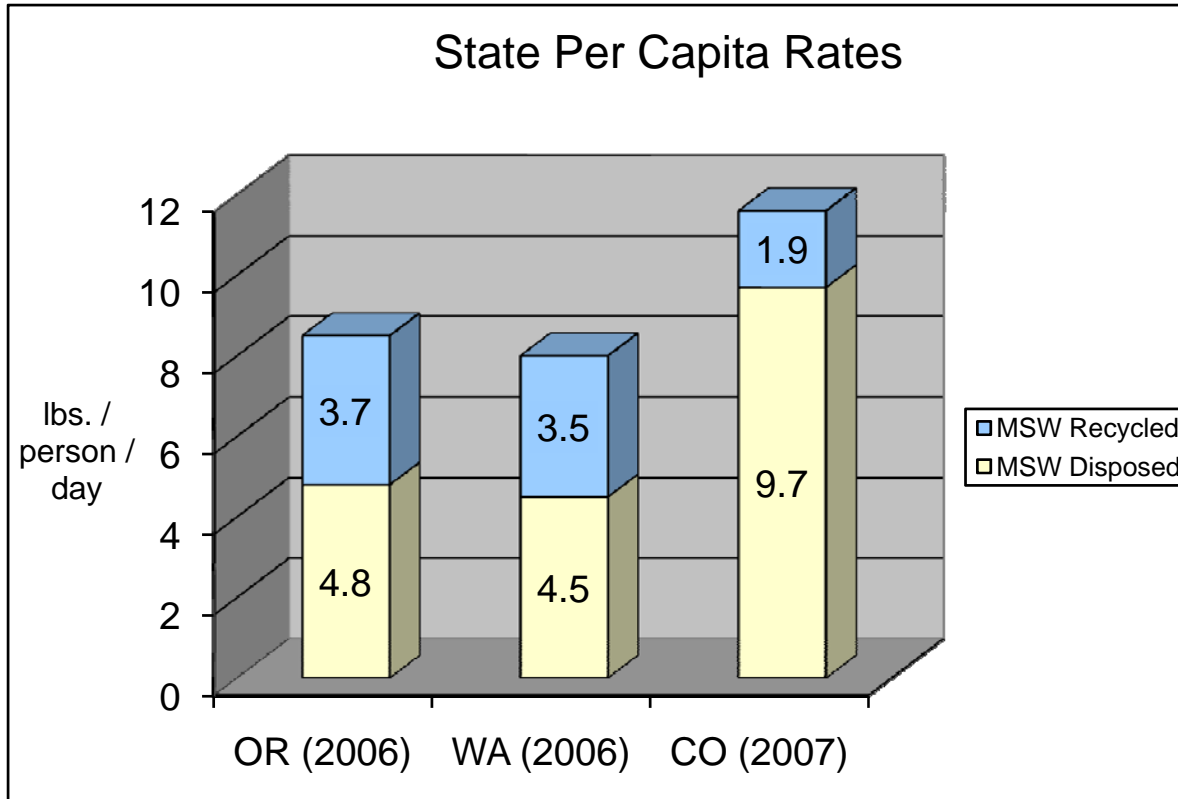


Recycling and Greenhouse Gas Impacts in Colorado

Wolf Kray

Solid Waste and Material Management Unit
Hazardous Materials and Waste Management Division

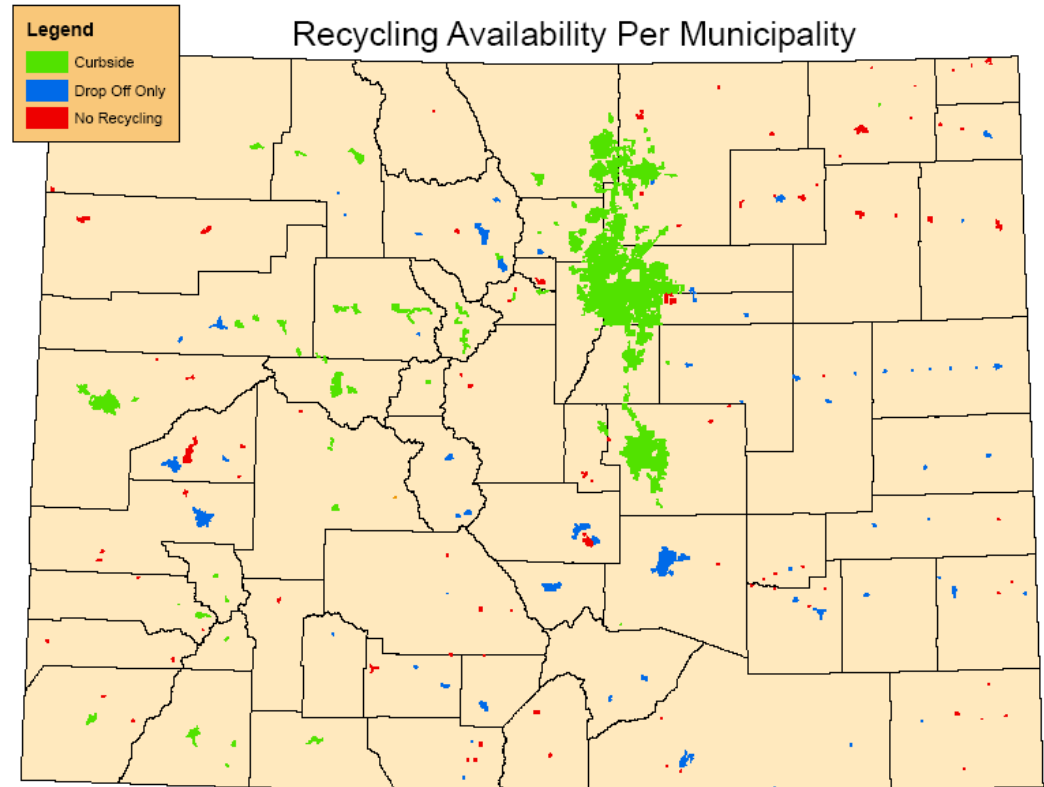
Where Does Colorado Stand?



- High waste generation and disposal rates
- Low recycling rates

Can I Recycle?

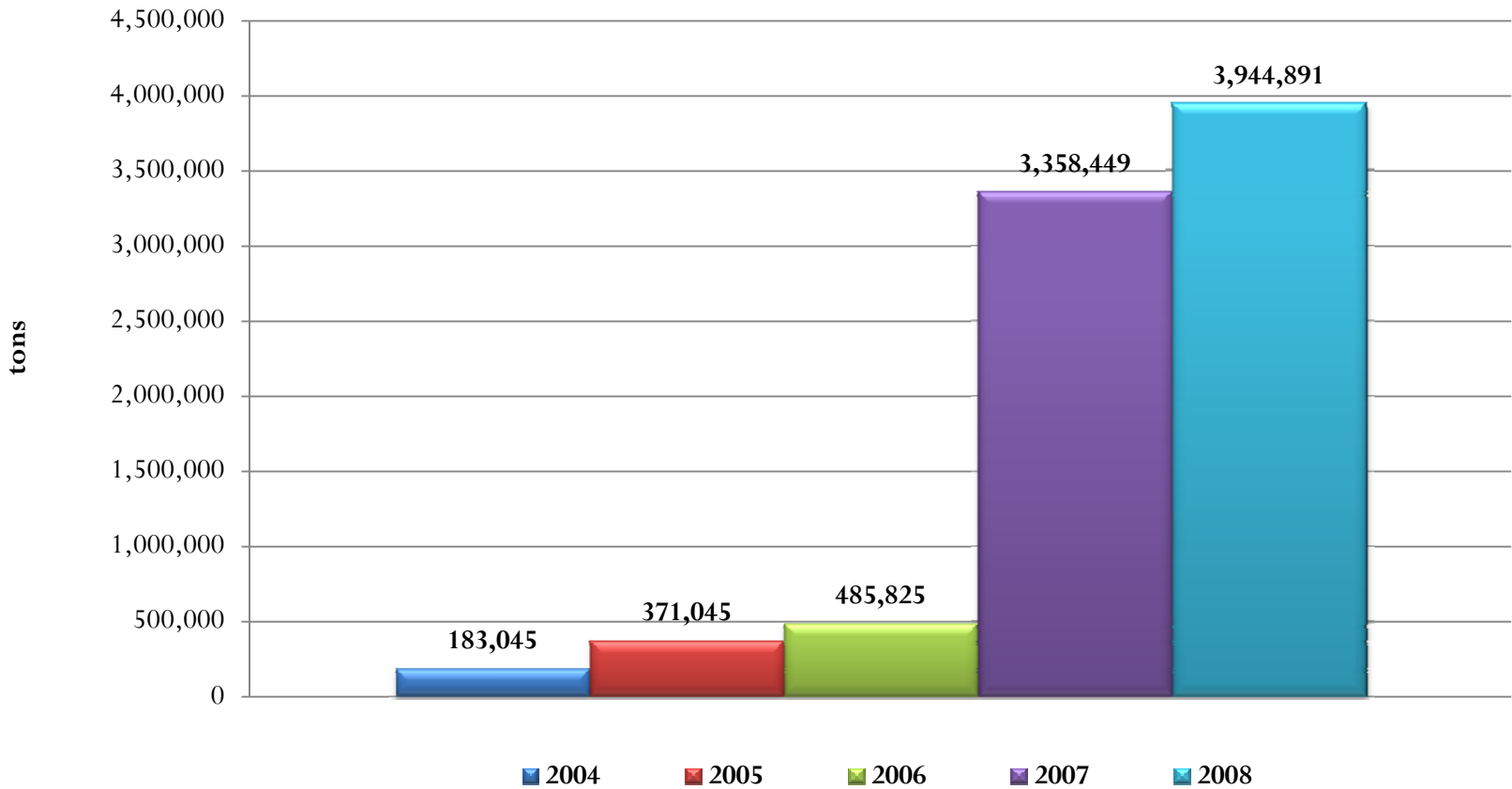
- Population w/ access to curbside recycling: 3.04 million! (107 cities)
- Access to only drop-off recycling: 263,000 (64 cities)
- No access to recycling: 84,000 (93 cities)
- 39 cities with a pop. under 5,000 have curbside recycling
- 31 cities with a pop. under 1,000 have drop-off recycling



Barriers to Recycling

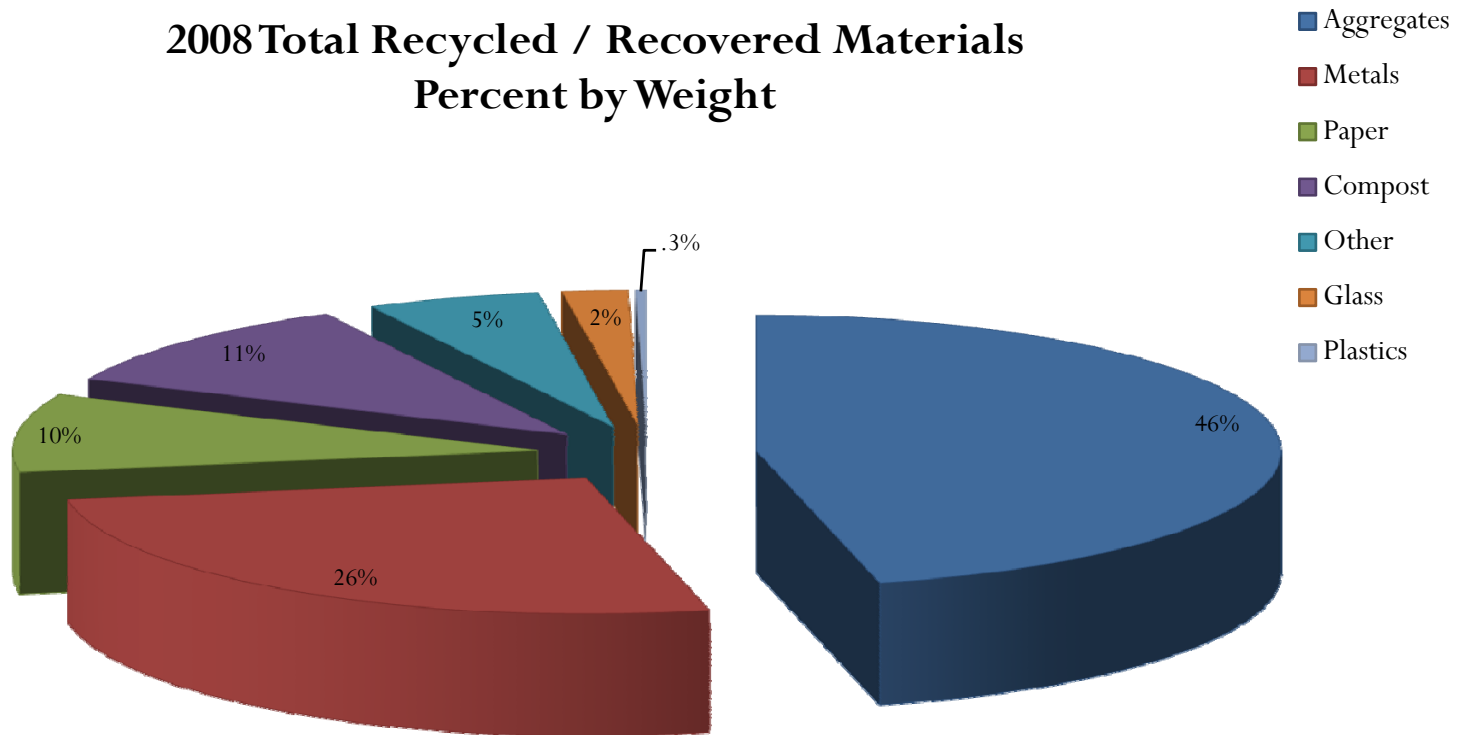
- Lack of Incentives
 - Flat fee for disposal in most of Colorado
 - Municipal level mandates
- Regional Economics
 - Low tipping fees at landfills (lack of cost incentive to recycle)
 - Distant end-markets for recyclable materials
 - Market variability
- Basic Operations
 - Public awareness and mindset
 - Complications with variations of sorting recyclables

Recycling in Colorado 2004 - 2008

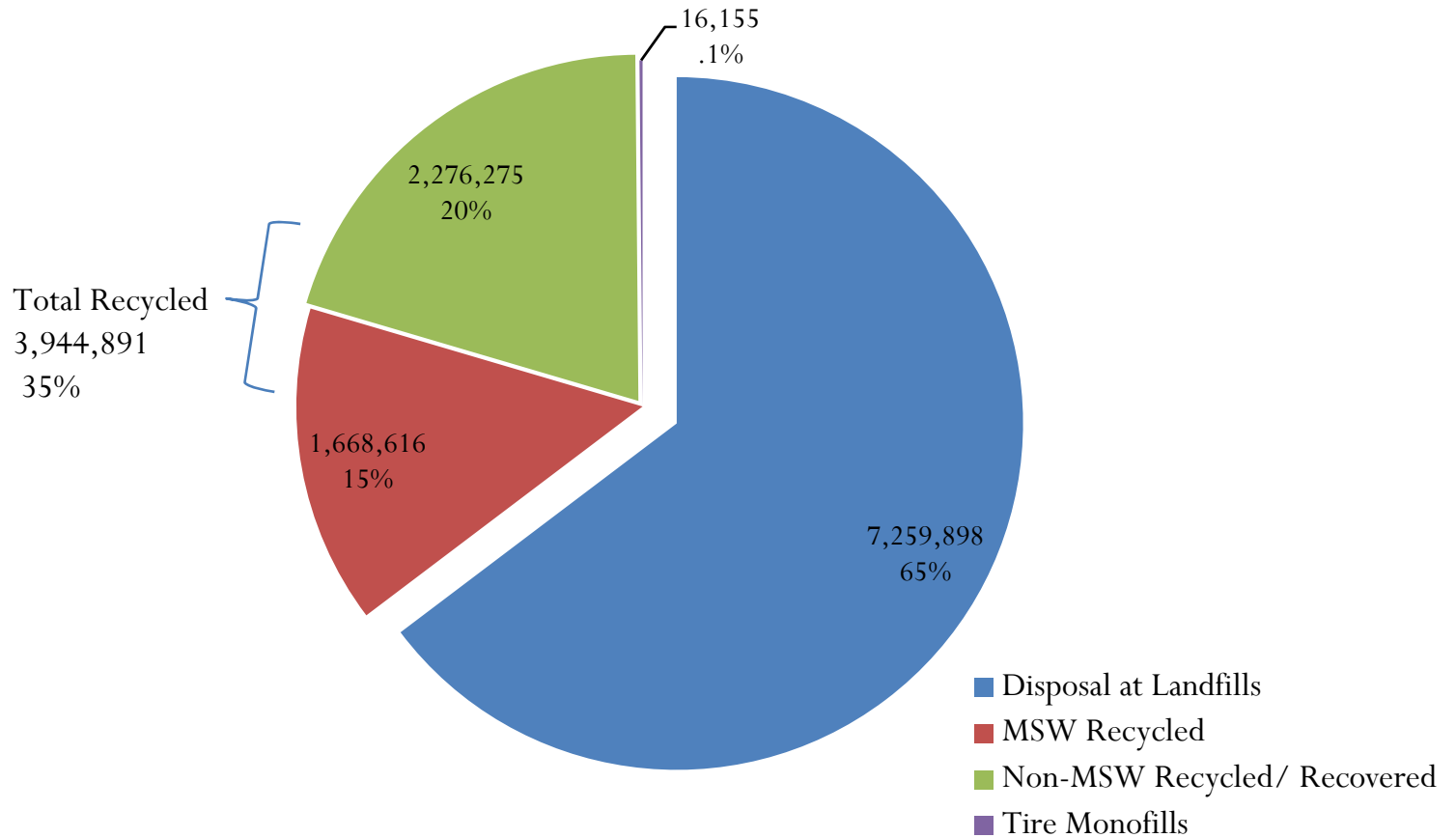


*Registered recyclers increased from: 30 to 67 for 2006 to 2007
67 to 81 for 2007 to 2008

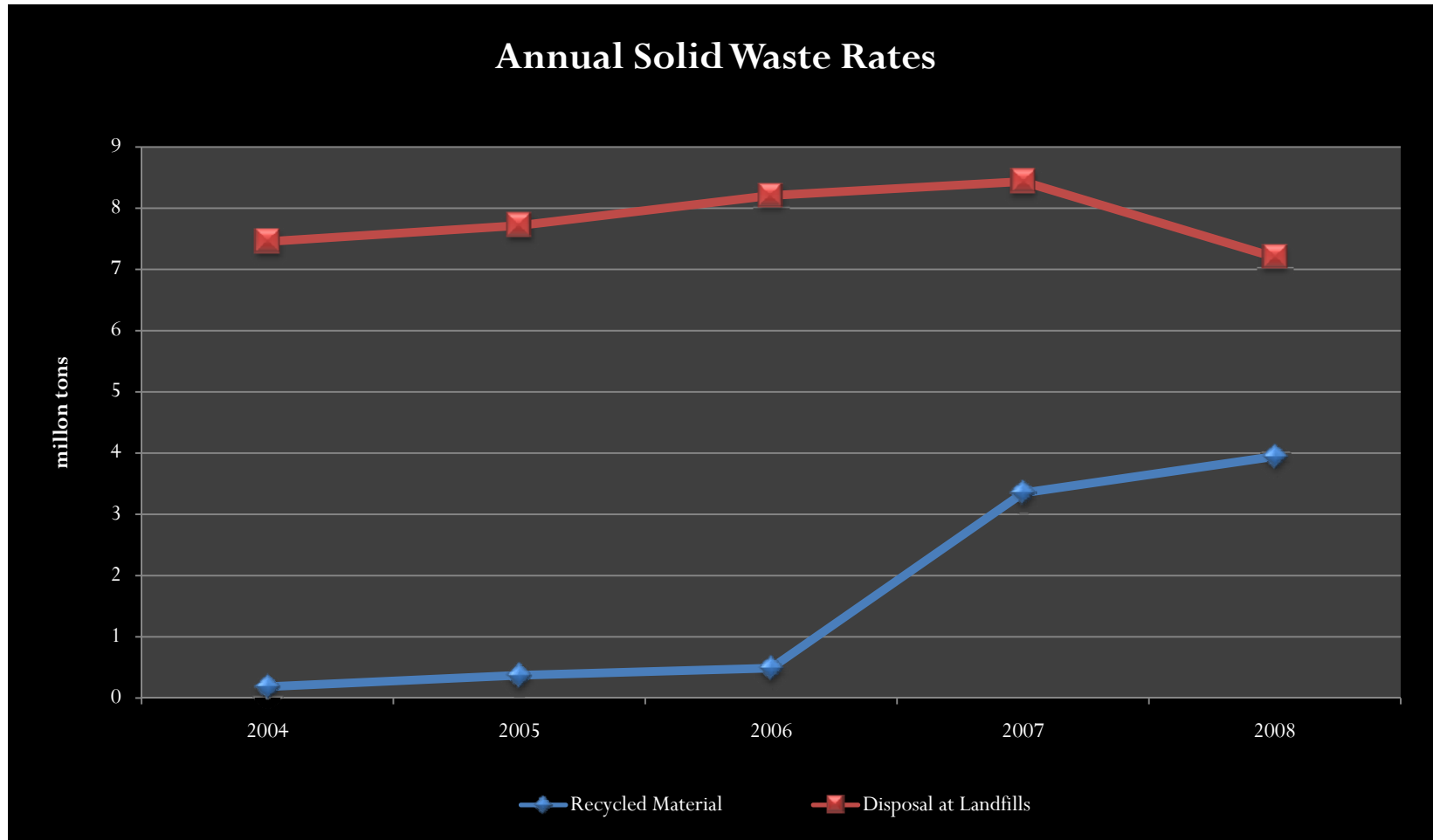
2008 Total Recycled / Recovered Materials Percent by Weight



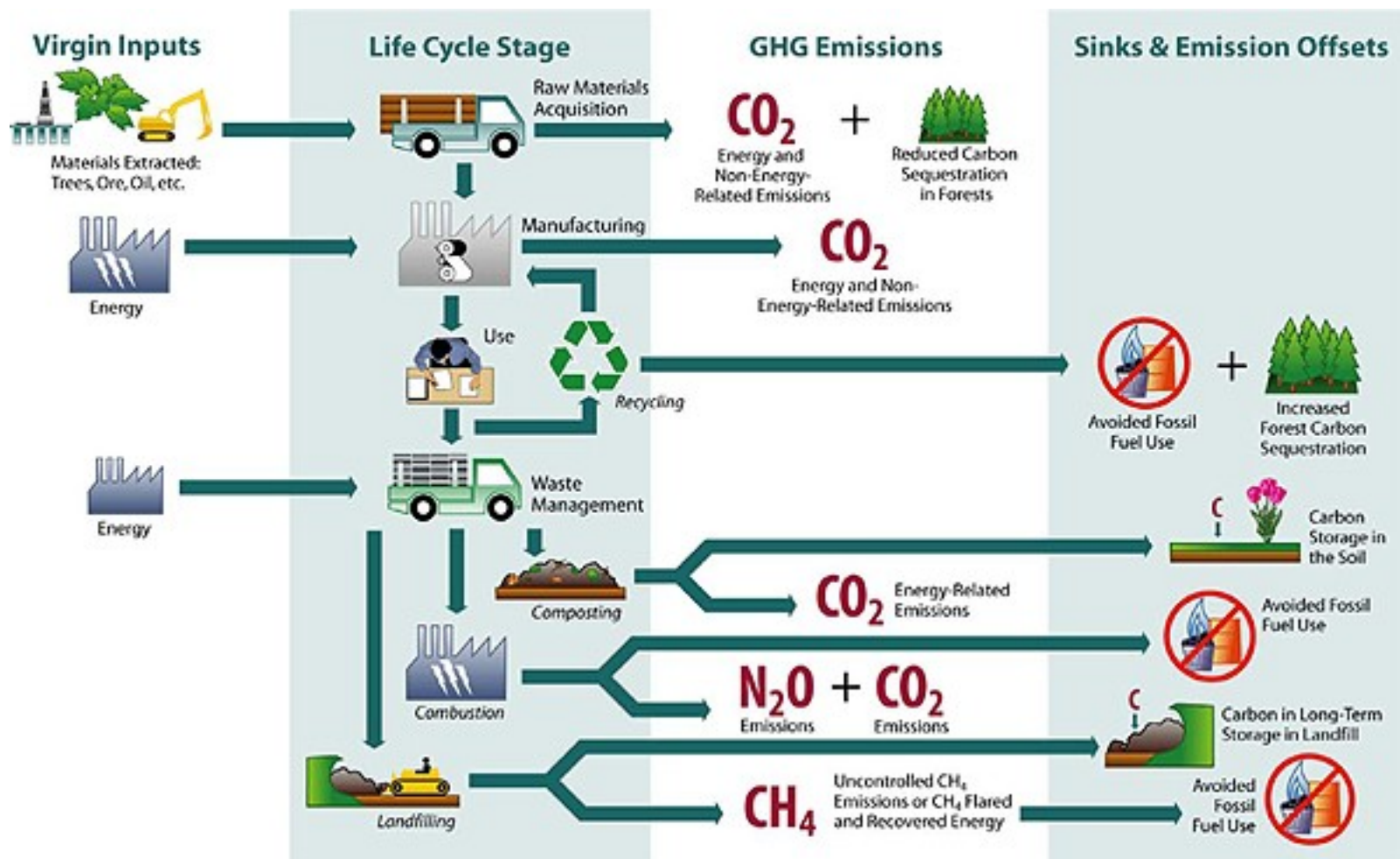
2008 Solid Waste Management



Closing in on the Gap



Product Lifecycle Impacts





Recycling & GHG Impacts



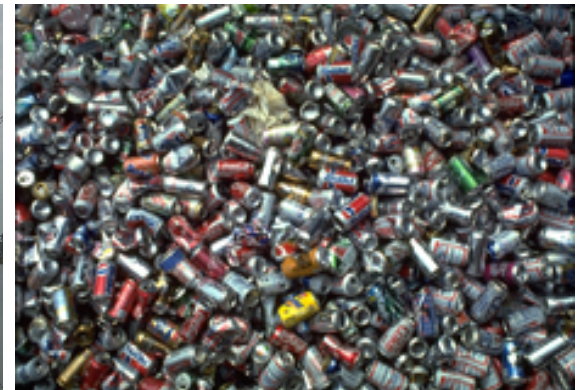
2.6 million MTCO₂ emissions were avoided by recycling and composting in CO for 2007, a saving equivalent to:

- Removing 511,000 cars from the road per year
- 13,000 rail cars worth of coal emissions from an average power plant
- 285 million gallons of gasoline

Recycling is one of the easiest ways for communities to reduce greenhouse gas emissions

Energy Savings from Recycling

- What does 3.36 million tons recycled equate to for 2007?
- **Energy Savings**
- recycling in Colorado saved enough energy to run over 341,000 average homes for a year
- Savings equivalent of conserving over 6 million barrels of oil



Long-haul is not a limiting GHG factor for many recyclables

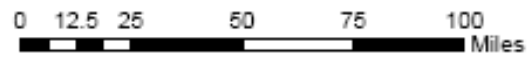
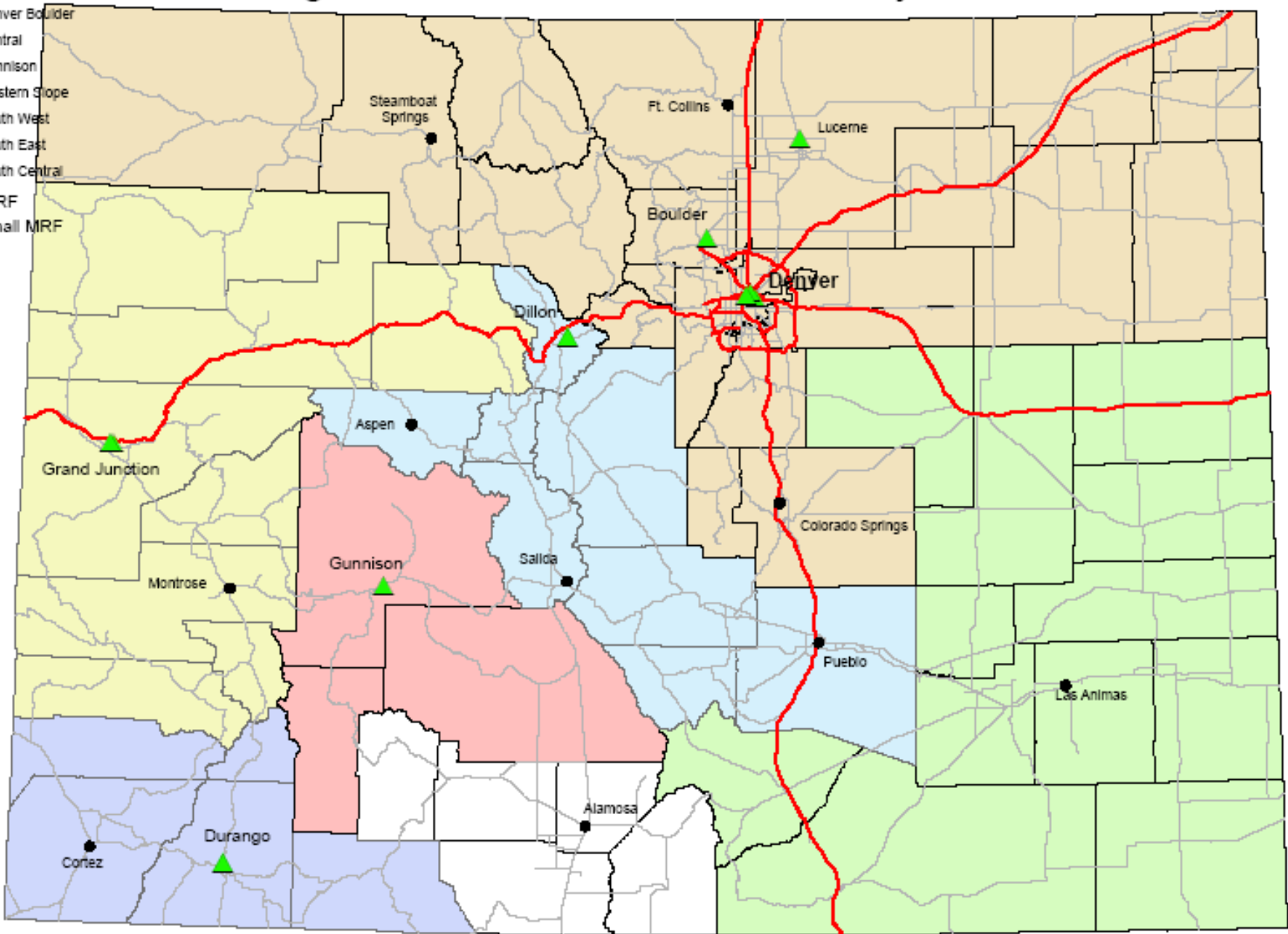
Material	Production & Forestry Savings (MTCE/ton collected)	<u>“Break-Even Point” (miles)</u>		
		Truck	Rail	Freighter
Aluminum	3.44	116,000	451,000	524,000
Corrugated	0.79	27,000	104,000	120,000
Newspaper	0.68	23,000	90,000	104,000
Steel	0.48	16,000	63,000	73,000
LDPE	0.36	12,000	47,000	55,000
PET	0.33	11,000	43,000	50,000
HDPE	0.30	10,000	39,000	45,000
Glass (to bottles)	0.07	2,000	9,000	11,000

“Break-Even Point” is where GHG emissions transporting the recyclables equals GHG emissions avoided when the recyclables displace virgin feedstocks.

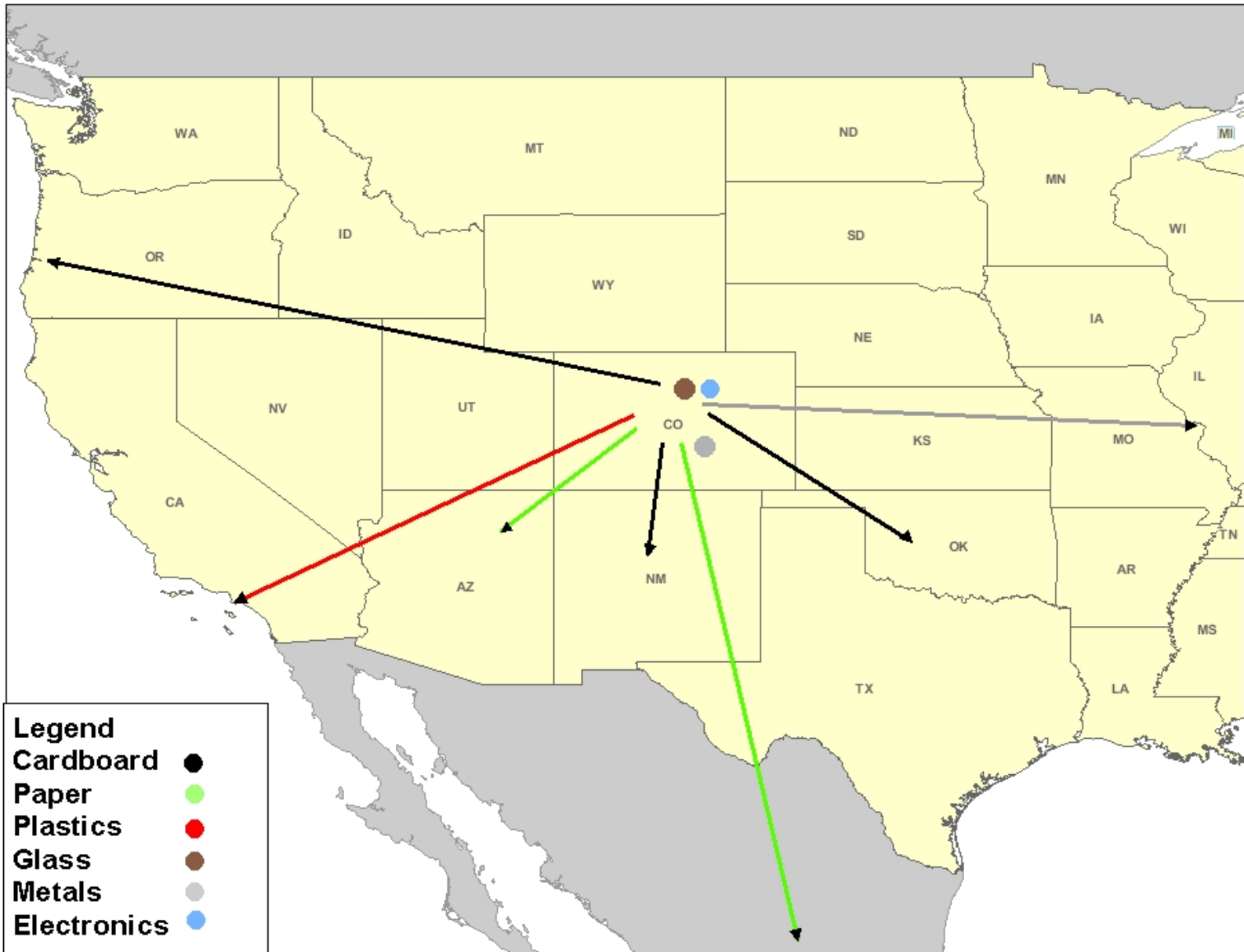
Avoided disposal-related emissions are not included.

Regional Material Flow of MSW Recyclables

- Legend**
- Interstate
 - Denver Boulder
 - Central
 - Gunnison
 - Western Slope
 - South West
 - South East
 - South Central
 - MRF
 - Small MRF



2008 Primary Recycling End Markets



Where do we go from here?

Next steps to increase recycling & waste diversion in Colorado

- **Improve and increase collection efforts (single stream, dual stream, PAYT)**
- **Participation/ education**
- **Market development (can we improve demand for reusable materials)**
- **Focus on specific materials (compost, glass, etc.)**

COLORADO



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