Plastic Recycling & MRFs

WA Commingled Project

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Overview

Materials

- PE Film
- Non-bottle Rigid Plastic
- Last time
  - PET
  - HDPE

Topics

- Prohibitives? Methods to track?
- Outhrows? Methods to track?
- Yield loss?
- Problems with equipment?
- Value (environmental and economic) in using vs. other virgin feedstock?
- Final product?

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PE Film: Prohibitives

- Non-PE Film [must be clean and dry!]
  - Paper
  - Glass grit
  - Metal, rigid plastic
  - Other plastic film (laminates)
  - Degradable Plastic
  - Rocks, mud, dirt (unless Dirty Ag Film then up to 50%)
  - Oil, grease
  - Moisture
- Very few MRFs can create bales that find a domestic market

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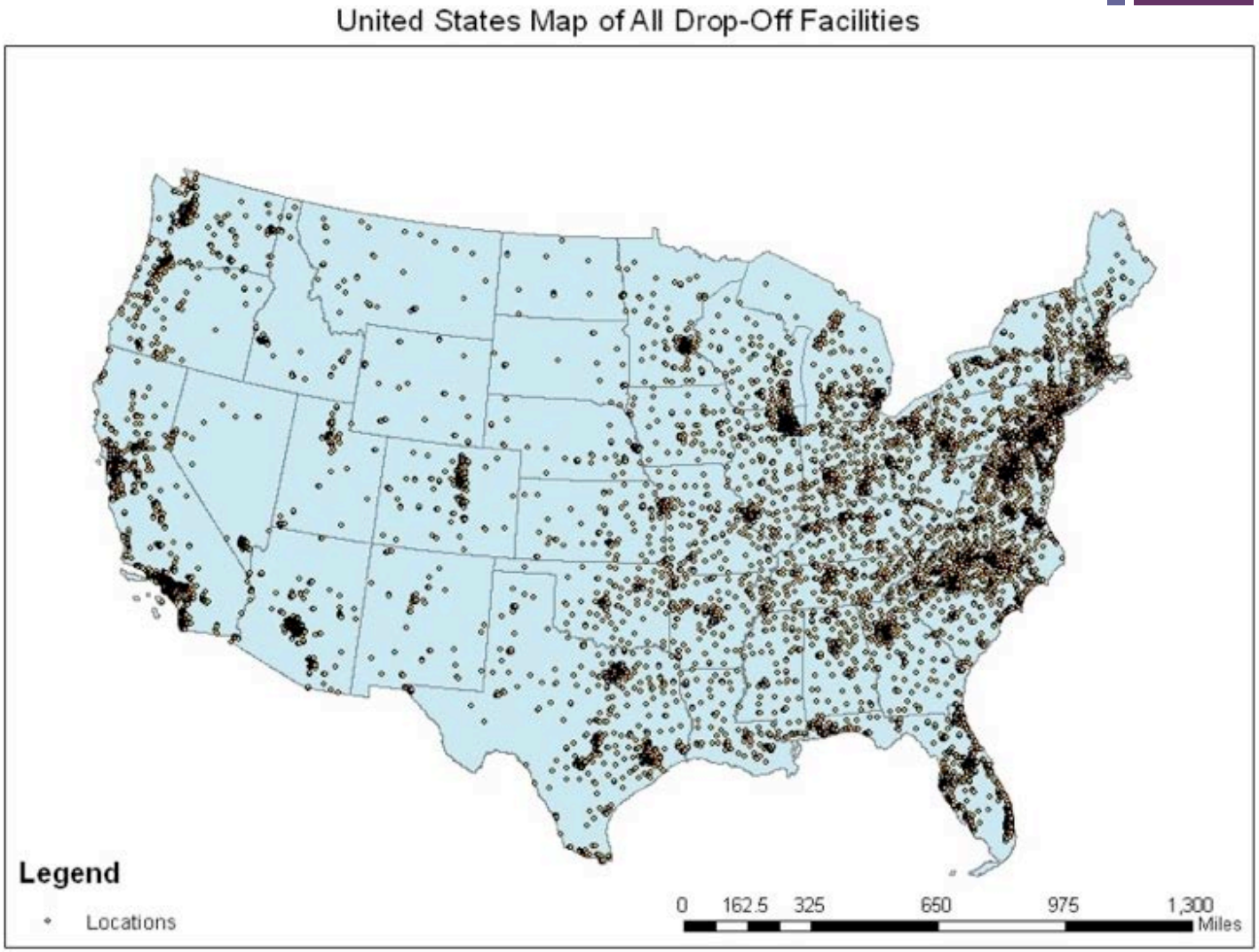
Film & Bags



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Film: Commercial Collection Options

- Co-collection with Cardboard
- Drop off at a collection center
- Utilizing reverse logistics
  - Business to Business: small neighboring businesses utilize larger retainer's recovery program
  - Back-haul after delivery of product by wholesale distributor

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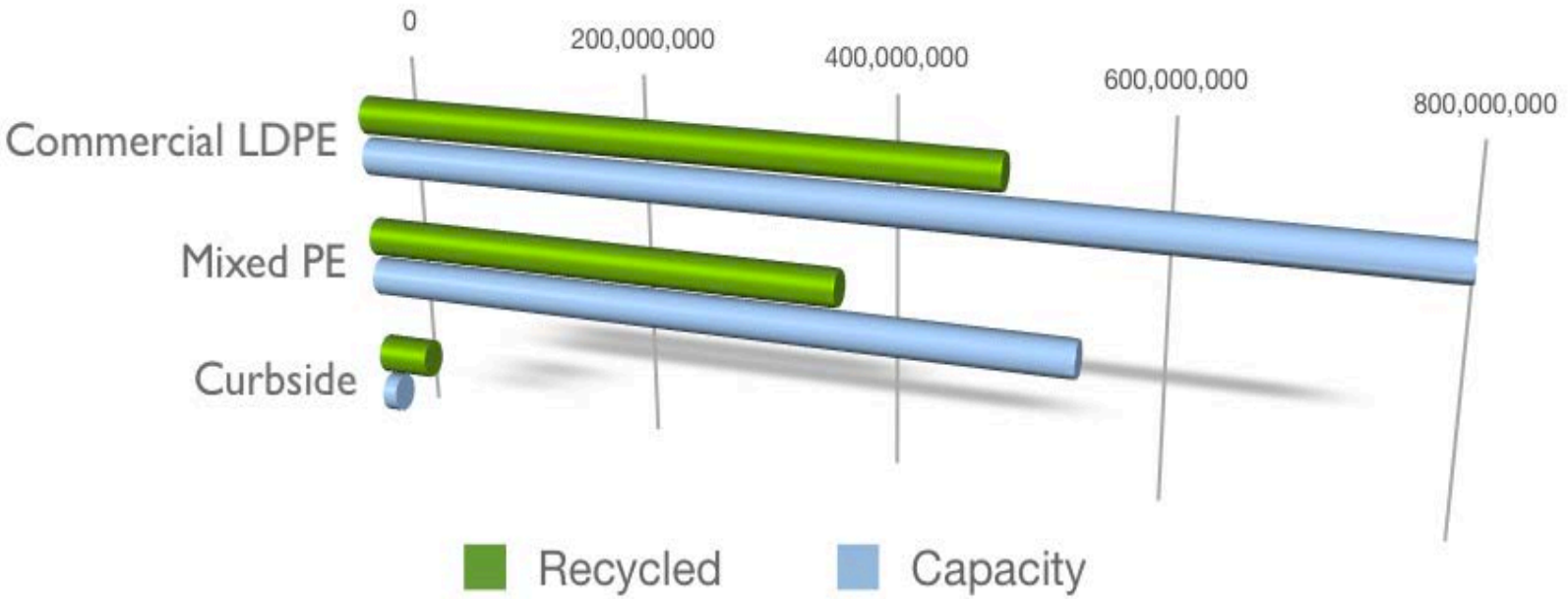
2011 North America Supply/Demand (pounds)



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Recycling Label

How2Recycle.org

GREENBLUE

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PE Film: Outthrows & Yield Loss

- Very grade dependent, could be:
  - Color
  - LDPE or HDPE
  - PP
  - Calcium carbonate loaded bags
  - Vinyl and nylon

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PE Film: Equipment Issues

- In MRFs
  - Screens
  - Lightweight nature
  - Tramp or on Purpose?
- At Reclaimers
  - Grit will tear up extruders
  - Moisture impacts blending and extrusion; adds cost to remove moisture

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PE Film: Value vs Virgin

Exhibit 12: Recycling Emission Factor for Plastics ($MTCO_2E$/Short Ton)

Product/Material	Raw Material Acquisition and Manufacturing (Current Mix of Inputs)	Materials Management Emissions	Recycled Input Credit[a] Process Energy	Recycled Input Credit[a] – Transportation Energy	Recycled Input Credit[a] – Process Non-Energy	Forest Carbon Sequestration	Net Emissions (Post-Consumer)
HDPE	–	–	-1.23	0.00	-0.15	–	-1.38
LDPE	–	–	-1.53	0.00	-0.15	–	-1.67
PET	–	–	-1.44	0.00	-0.08	–	-1.52

Note: Negative values denote net GHG emission reductions or carbon storage from a materials management practice.

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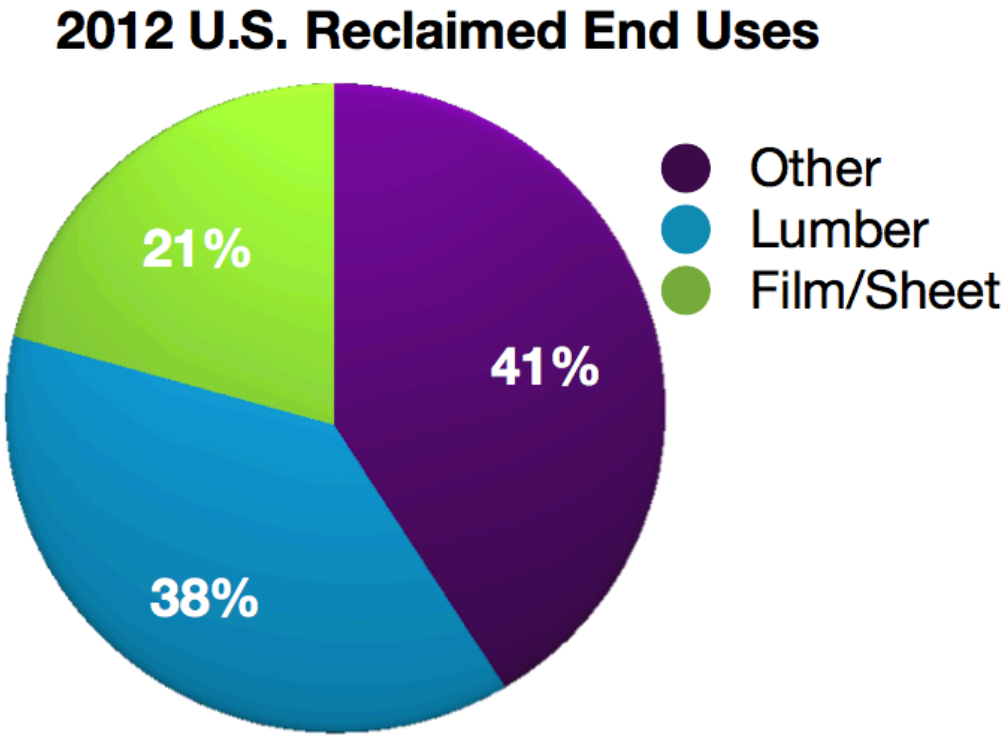
PE Film: Final Product

- Film
- Composit Lumber
- Shapes and Profiles
- Other



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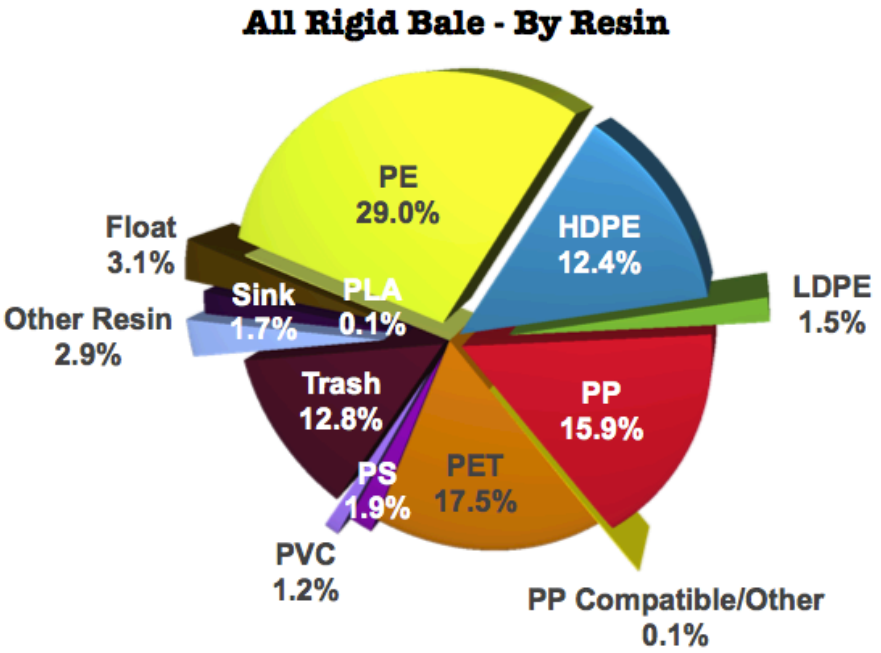
Non-Bottle Rigid Plastic: Prohibitives

- Non-Plastic
  - Glass
  - Aluminum
  - Paper
  - Metal
  - Degradable Plastic
  - Film Plastic
  - Rocks, mud, dirt, oil, grease
  - Industrial scrap bottles
  - Free flowing liquids
  - Wood, hazardous materials



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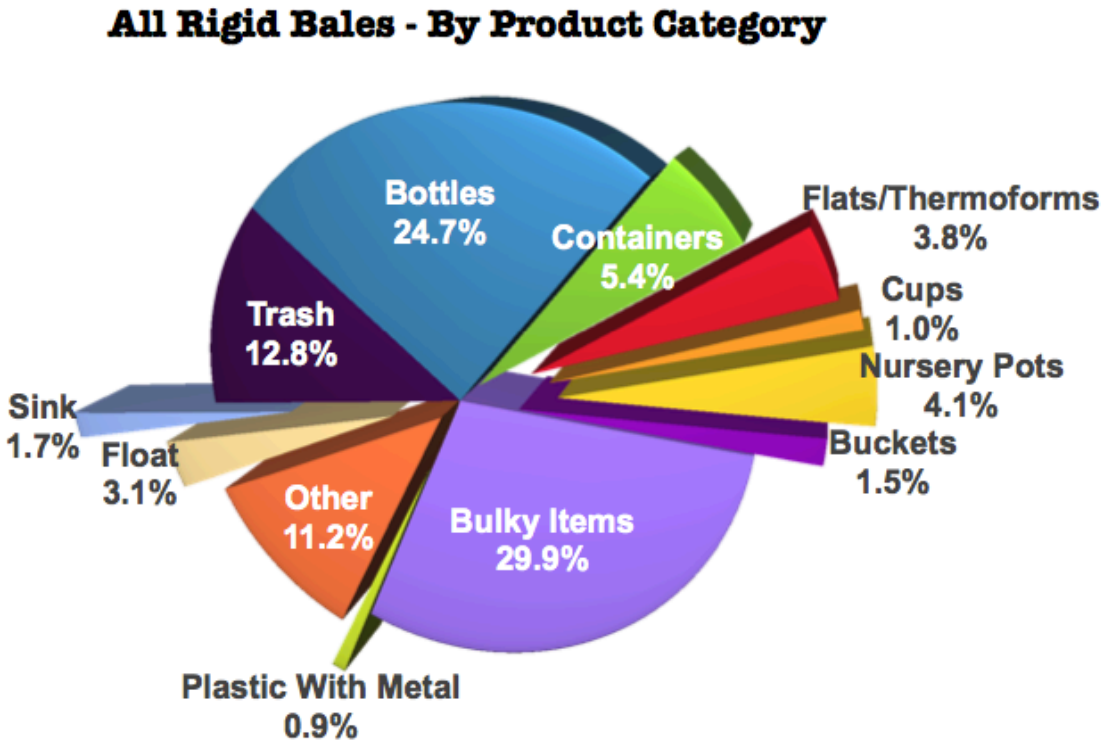
Non-Bottle Rigid Plastic: Outthrows & Yield Loss

- End market specific



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Non-Bottle Rigid Plastic: Equipment Issues

- Urgent need to expand domestic sortation and reclamation
- Need for converter modifications to accommodate postconsumer resins, which tend to have less consistent properties
- Need for R&D on potential postconsumer supply mixtures…
  - e.g., are there consistent properties and sufficient value in a typical mix of recycled household PP or PS resins?

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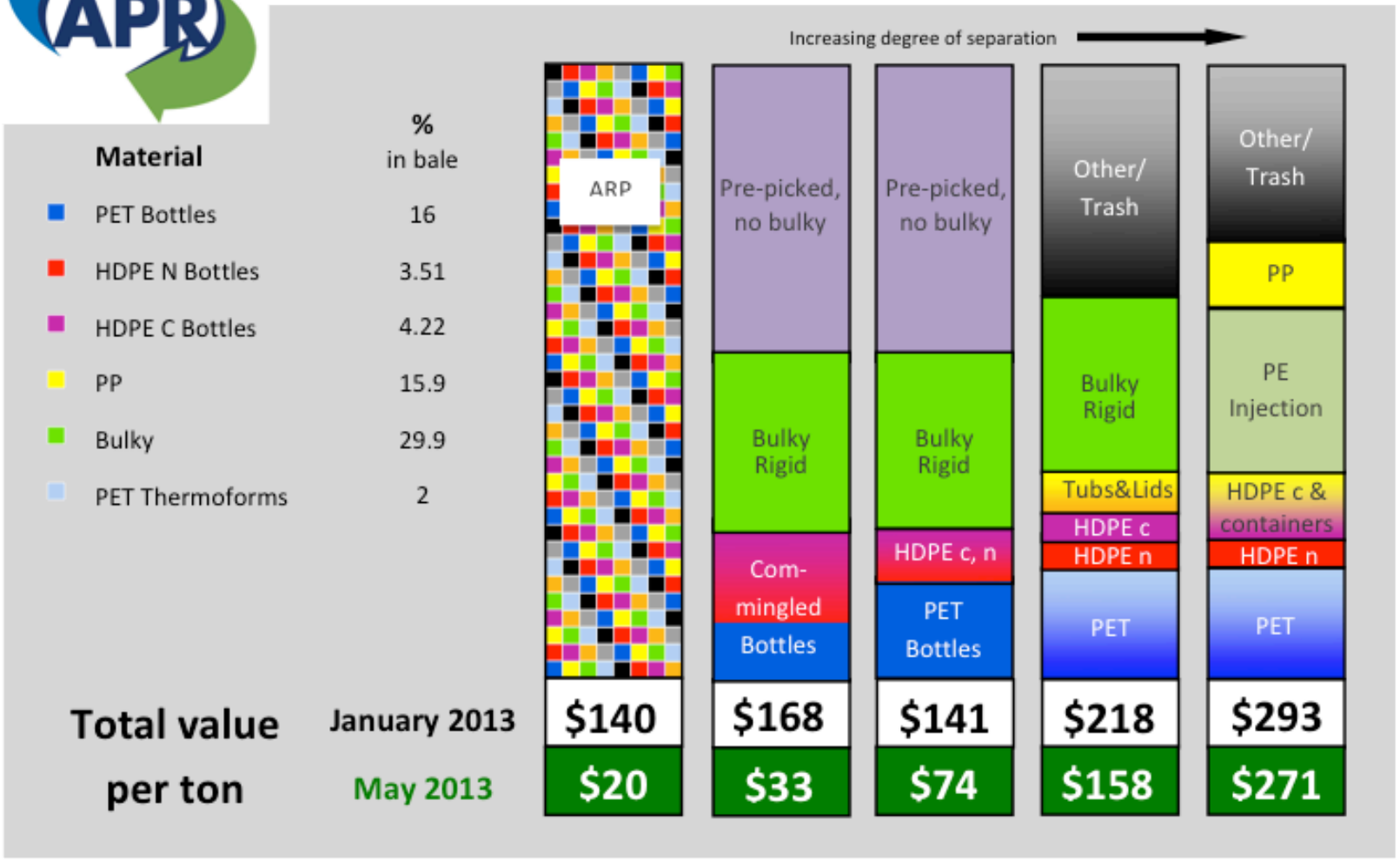
Sort for Value



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Non-Bottle Rigid Plastic: Final Product

- Buckets / Crates / Pails
- Pipe
- Lumber / RR Ties
- Automotive
- Lawn & Garden
- Other

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