



AHAM – Plastics & Packaging Vermont Working Group on Single Use Packaging

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Leadership > Knowledge > Innovation

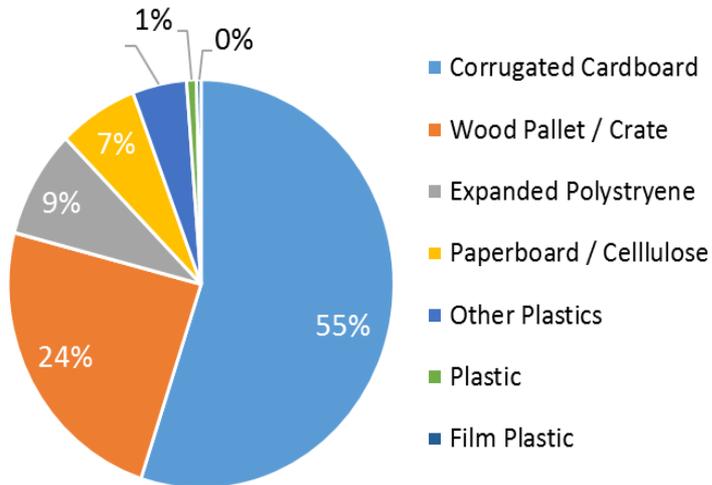




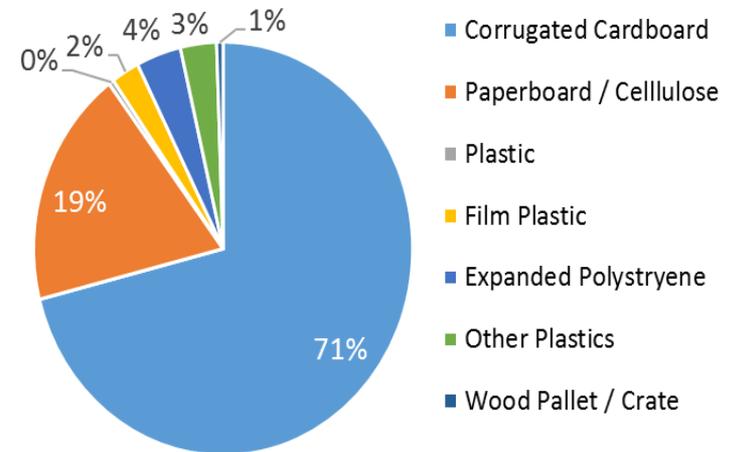


Materials Composition – Majors, Portables & Floor Care

Composition of Packaging of Major Appliances (% of Weight)



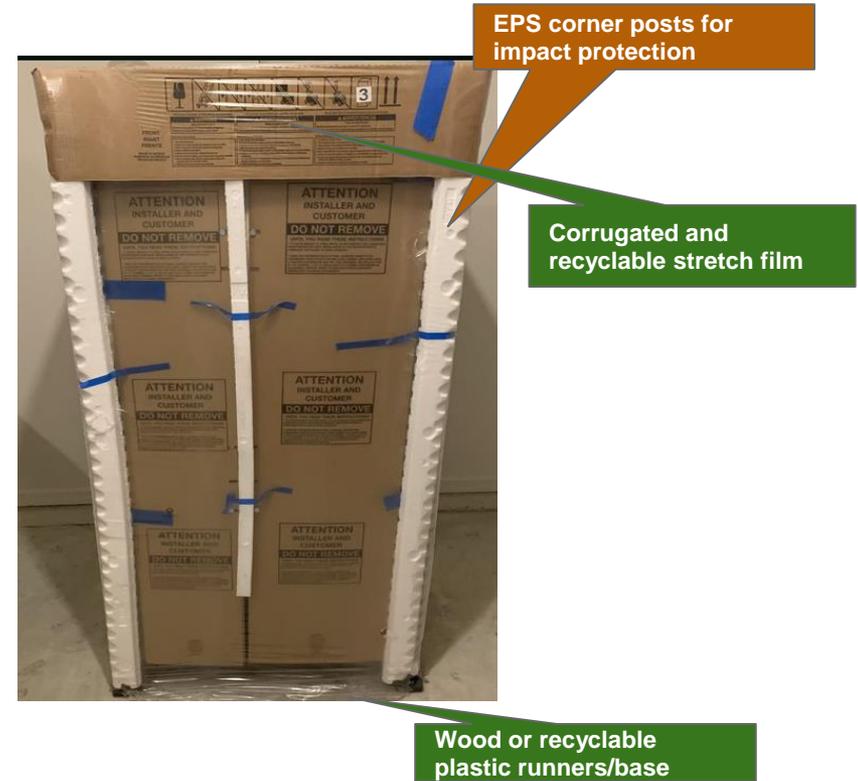
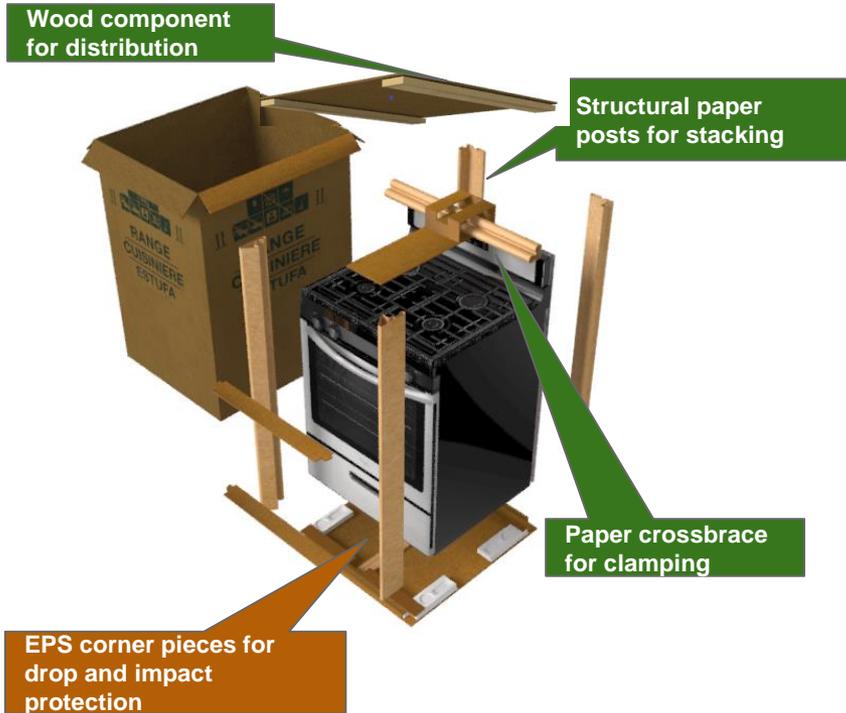
Composition of Packaging of Portable and Floor Care Appliances (% of Weight)



Common Packaging Materials



Need for Structurally Sound Packaging



Packaging Materials: Shrink v. Stretch

SHRINK Film

1. Some cooking product and some microwaves
2. Works well with paper packaging to tightly wrap/keep PKG together
3. Uses heat to “shrink” film



STRETCH Film

1. Used primarily on refrigeration & on some laundry
2. Designed to work with EPS
3. Lachenmeier Machine Applies/Stretches “hood” of film over product
4. Doesn't work well with paper PKG (posts) on heavier product



Packaging Materials

CARTON / POST

1. Load is stacked through the **package**
 - a. Structural Cornerposts
 - b. Due to console or unit structure
1. Damage is usually hidden
2. Slightly more robust for package integrity



CLEARVIEW - Load Through Package

1. Load is stacked through the **package**
 - a. Structural Cornerposts
2. Damage may be hidden



CLEARVIEW - Load Through Product

1. Load is stacked through the **product**
 - a. Product can support stack
 - b. Product can support clamp
2. Damage may be visible



Warehouse Stacking



Warehouse Clamp Trucks



Technical Challenges in Packaging Design

- Storage and Distribution of Appliances After Manufacture
 - Extreme heat and humidity
 - Stacking (safety)
 - Movement and transportation

- Abrasion Damage

- Shipping and Transportation of Small Appliances
 - Consumer facing v. e-commerce
 - Drops and touches
 - Consumer assembly
 - Wide variety of evaluation standards (ISTA3, Amazon, Sam's, Walmart, Fed Ex)

Most Common Problems Based on Delivery Channel

Product	Examples	Delivery Method	Biggest Issues
Large Product	Refrigerators, Large AC product	Agent installation	The last 50 feet
Core Product	Laundry, Range, Refrigeration. Dishwasher, Over the Range Microwave	Agent Installation with few customer pick-up and install	Mechanically Assisted Damage
Small Appliances	Counter-top Microwave, Window AC, Hood, Disposer	Customer pick-up, eCommerce, with few Agent installs	Mechanically assisted Damage & Drop
Parts	Repair Parts and Accessories	Parcel / Fed Ex	Drop

Alternatives Assessment

Material	Details	Initial Challenges
BASF Ecovio Foam	PLA + PET, the PLA is biobased (corn feedstock) Ecovio is 75% biobased material industrial compostable	cost mfg technical criteria EoL options availability is very limited
Synbra Biofoam	98% PLA industrial compostable	cost mfg EoL options availability is very limited Performance yet to be proven
Thin walled molded pulp	curbside recycled 100% RC	cost (tooling) abrasion on aesthetic surfaces limited to small appliances (<20lbs) cosmetic labeling challenges some shape restrictions increased weight
Thick walled molded pulp	curbside recycled 100% RC	cost (tooling) cushioning over time some shape restrictions increased weight
Cardboard filler	curbside recycled variable RC	cost+++ mfg increased weight
Paper corner posts	curbside recycled variable RC	cost mfg increased weight

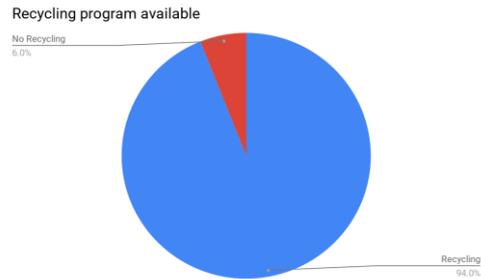
Alternatives Assessment

Material	Details	Initial Challenges
Honeycomb	curbside recycled variable RC	cost mfg increased weight technical criteria Performance concerns
Ecovativ Mushroom	MycoComposite 100% biobased: mycelium as a self-assembling, biological binder for hemp agricultural waste 100% biodegradable (home compostable) C2C gold certified hydrophobic	cost mfg unpleasant odor at consumer level EoL options can only be featured on one side
Returnables	reusable	logistics system needs to be in place LCA Significant initial investment
AirCarbon - Newlight Technologies (films)	air + methane-based GHGs + biocatalyst = PHA + monomer carbon negative	availability EOL?
EPE	provides better cushioning than EPS of same thickness (can reduce material usage) die cut vs molded; reducing inbound transportation	cost added labor to unfold limited on featuring for two sides (shape restrictions)

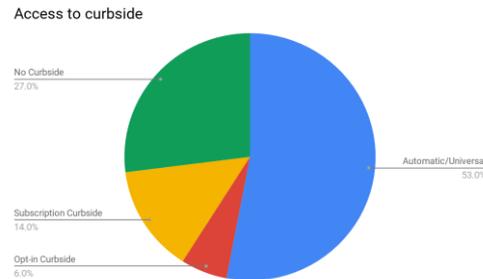
Problems With Current Recycling Plastic Policy

- Lack of Recycling Infrastructure
- Lack of Industry Control Over Recyclable Materials
- Lack of Market for Recycled Plastic
- Failure to Distinguish between IC&I and Residential Recycling

Current State – U.S. Access to Residential Recycling



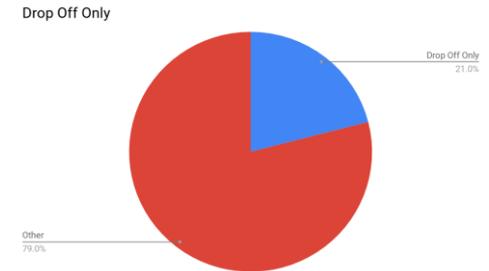
94%
Access to recycling programs



53%
Access to automatic/universal curbside recycling

Another 20% have access to opt-in or subscription curbside programs

89% of curbside programs single stream

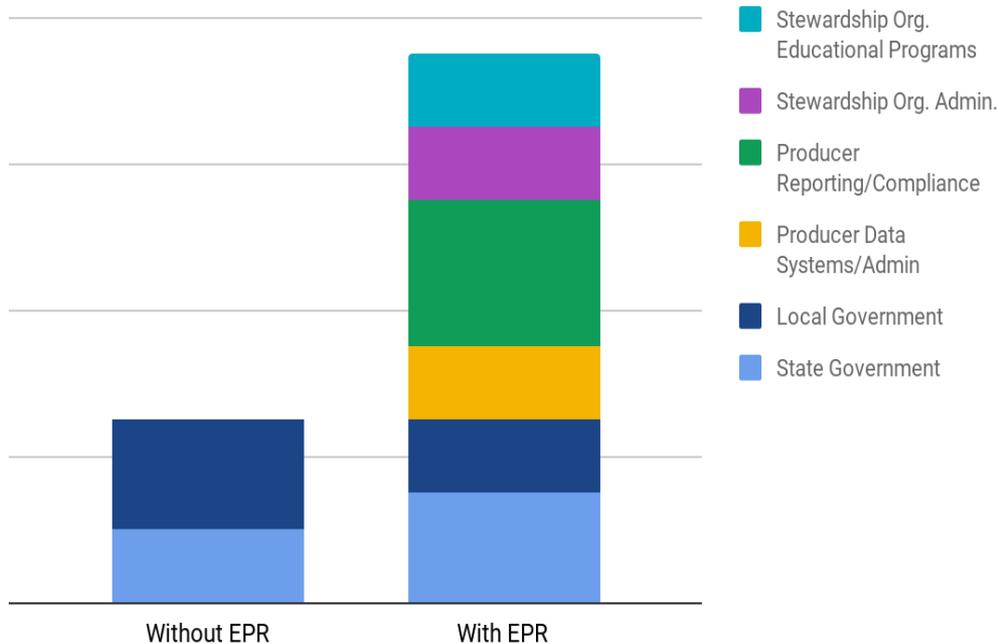


21%
Drop-off Only Programs

SOURCE: Sustainable Packaging Coalition 2015-16 Centralized Study on Availability of Recycling

Extended Producer Responsibility

EPR Administrative Costs



- EPR adds significant administrative costs throughout system, ultimately paid by consumers.
- Costs must be weighed against potential benefits.

Thank you.

