The Sustainable Materials Management Webinar Series

PET Recycling Markets Trends and Challenges

Tuesday January 31, 2017/ 1:30 – 2:45PM ED

Presenter:

Kate Eagles, Program Director
National Association for PET Container Resources (NAPCOR)

Pennsylvania Recycling Markets Center

NRC NATIONAL RECYCLING COALITION

WE ARE RECYCLING

PET Recycling
Markets, Trends & Challenges

Kate Eagles — NAPCOR Program Director

National Recycling Coalition

January 31, 2017

NAPCOR

National Association for PET Container Resources

Overview

- Introduction to NAPCOR
- PET Recycling Context
- Market Challenges
- Initiatives to address quality and supply
  - Bale Quality
  - Non-Clear PET Bottle Recycling
  - PET Thermoform Recycling

Introduction to NAPCOR

- NAPCOR is the trade association for the PET packaging industry in the United States, Canada and Mexico
- 51 members encompass all facets of the PET value chain

NAPCOR Membership 2017

PET INDUSTRY SUPPLIERS (19)

American Starlinger-Sahm, Inc.
AMUT North America, Inc.
BP
ColorMatrix
Erema North America
Husky Injection Molding Systems
Muehlstein
National Recovery Technologies
NGR Recycling Machines
Nissei ASB Company
Penn Color
Plastic Technologies, Inc.
Polymetrix
REPI
Sidel Inc.
Sorema Plastic Recycling Sys.
Sukano Polymers Corporation
TABB Packaging Solutions, LLC
TOMRA Systems ASA

PET CONTAINER MANUFACTURERS (3)

Amcor Rigid Plastics
Plastipak Packaging, Inc.
Yoshino America Corporation

PET RESIN MANUFACTURERS (3)

DAK Americas LLC
Indorama Ventures USA Inc
Nan Ya Plastics Corporation

PET RECLAIMERS (18)

BMP Recycling
CarbonLite Industries, LLC
Clear Path Recycling, LLC
Custom Polymers PET
Evergreen Plastics
Marglen Industries
Mohawk Industries Inc.
Parallel Products
Peninsula Plastics Recycling
Perpetual Recycling Solutions
PetStar
Plastrec, Inc.
Polyquest, Inc (PQ Recycling)
Reterra
Signode
UltrePET LLC
Verdeco Recycling, Inc.
Wellman Plastics Recycling

PET SHEET / THERMOFORMERS (8)

Dart Container Corporation
Direct Pack, Inc.
Genpak LLC
Nu-B, Inc.
Octal Extrusion Corporation
Polar-Pak, Ltd.
Peninsula Packaging Company
Plastic Ingenuity, Inc.

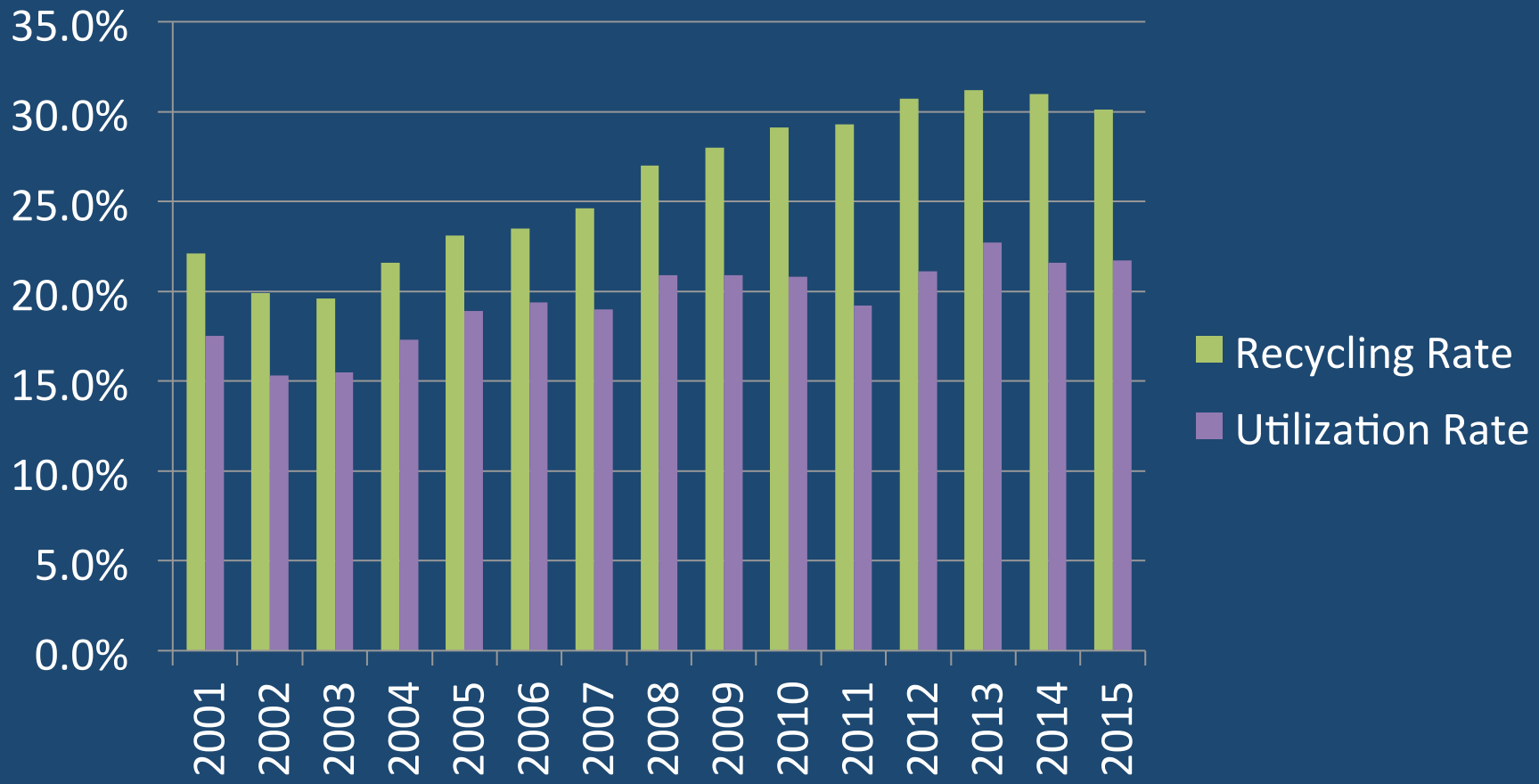
National Association for PET Container Resources (NAPCOR)

Founded in 1987

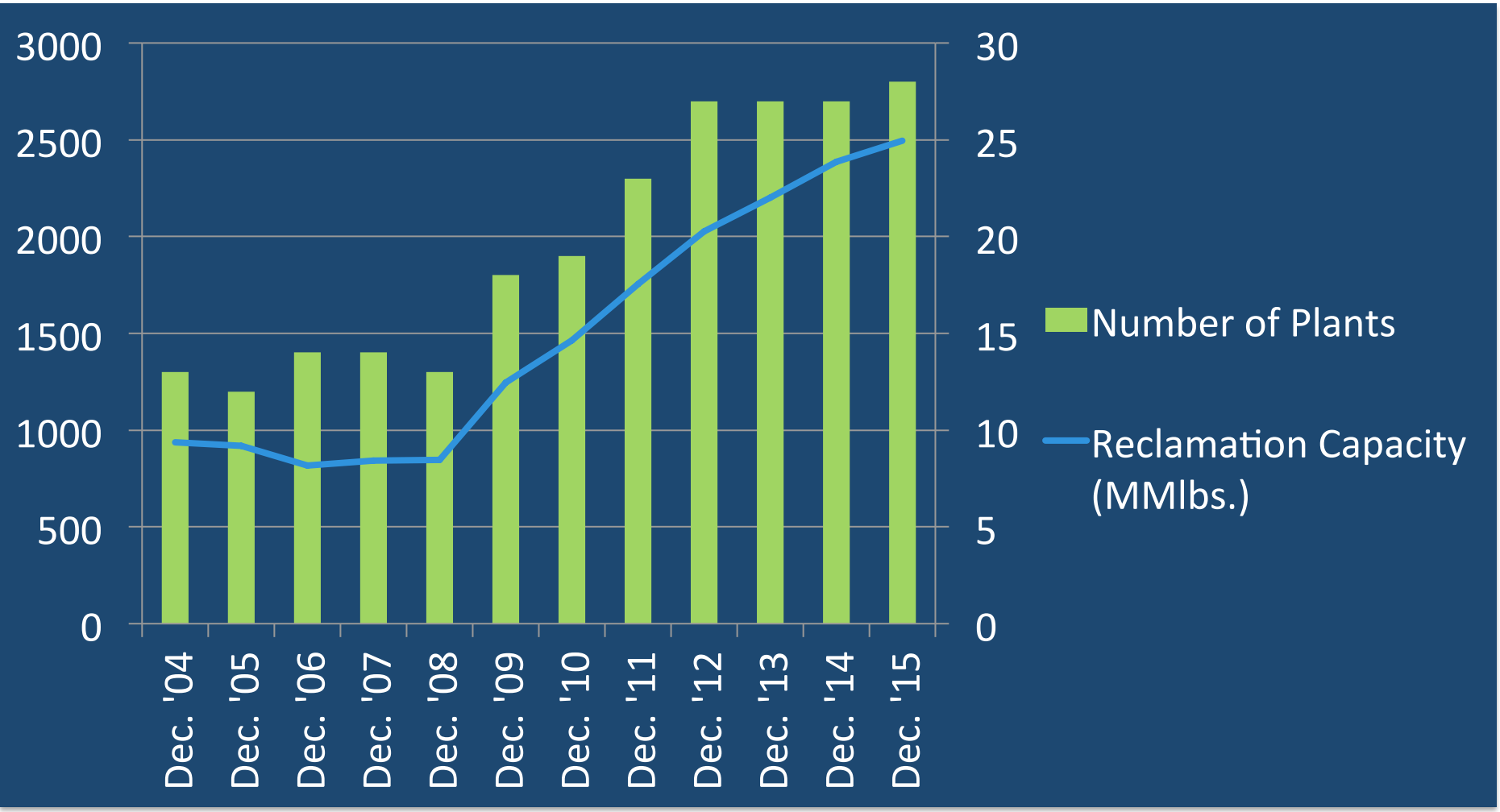
- Mission:
  - Promote the introduction and use of PET packaging
  - Protect the PET package and overcome hurdles to its successful introduction, use and recycling
  - Articulate and communicate the attributes of PET containers and PET thermoformed packaging as environmentally sustainable

PET Recycling Rates, Collection & End Markets

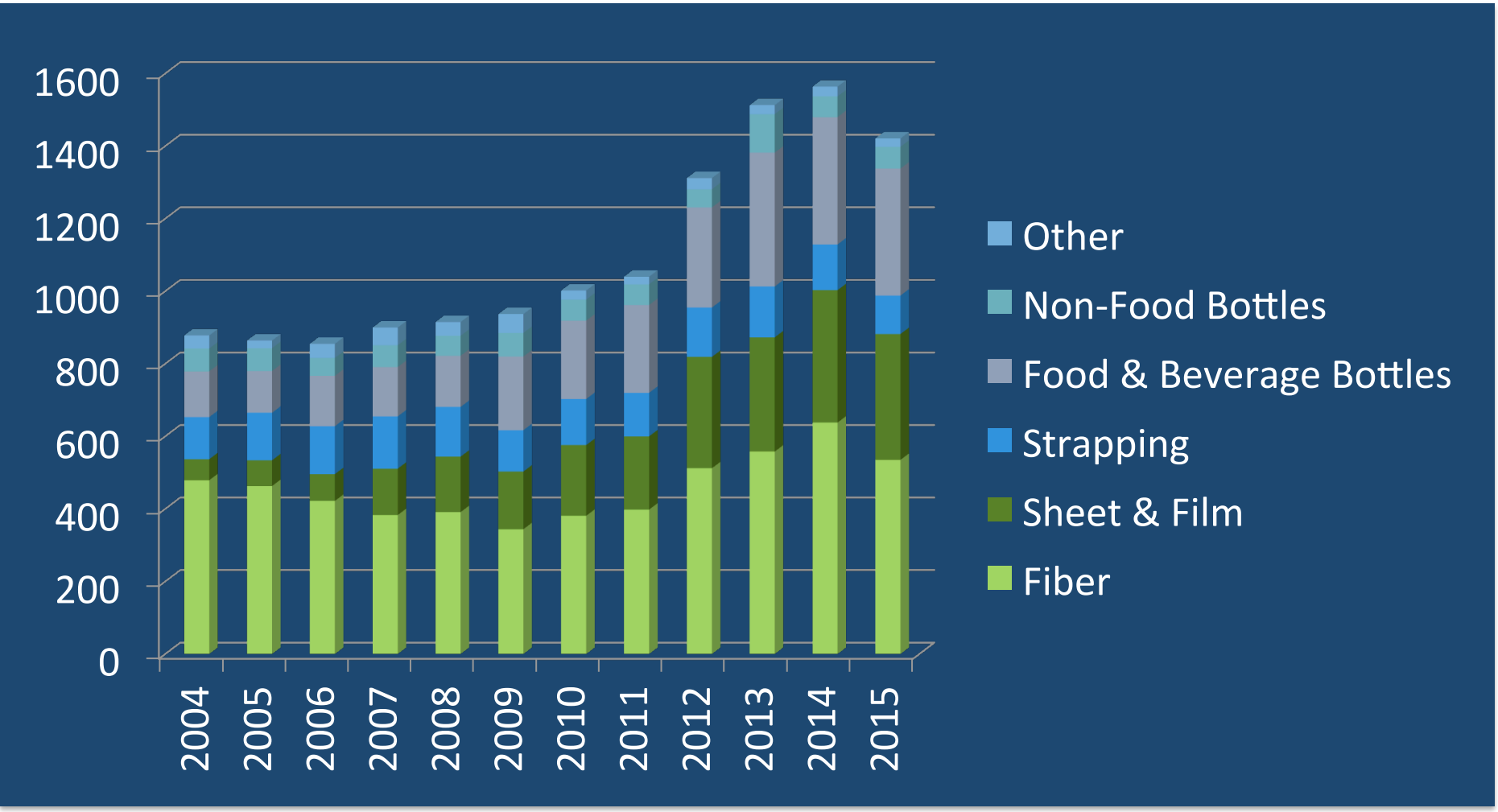
PET Recycling / Material Utilization Rates



Reclamation Capacity 2015 – Major Assets USA



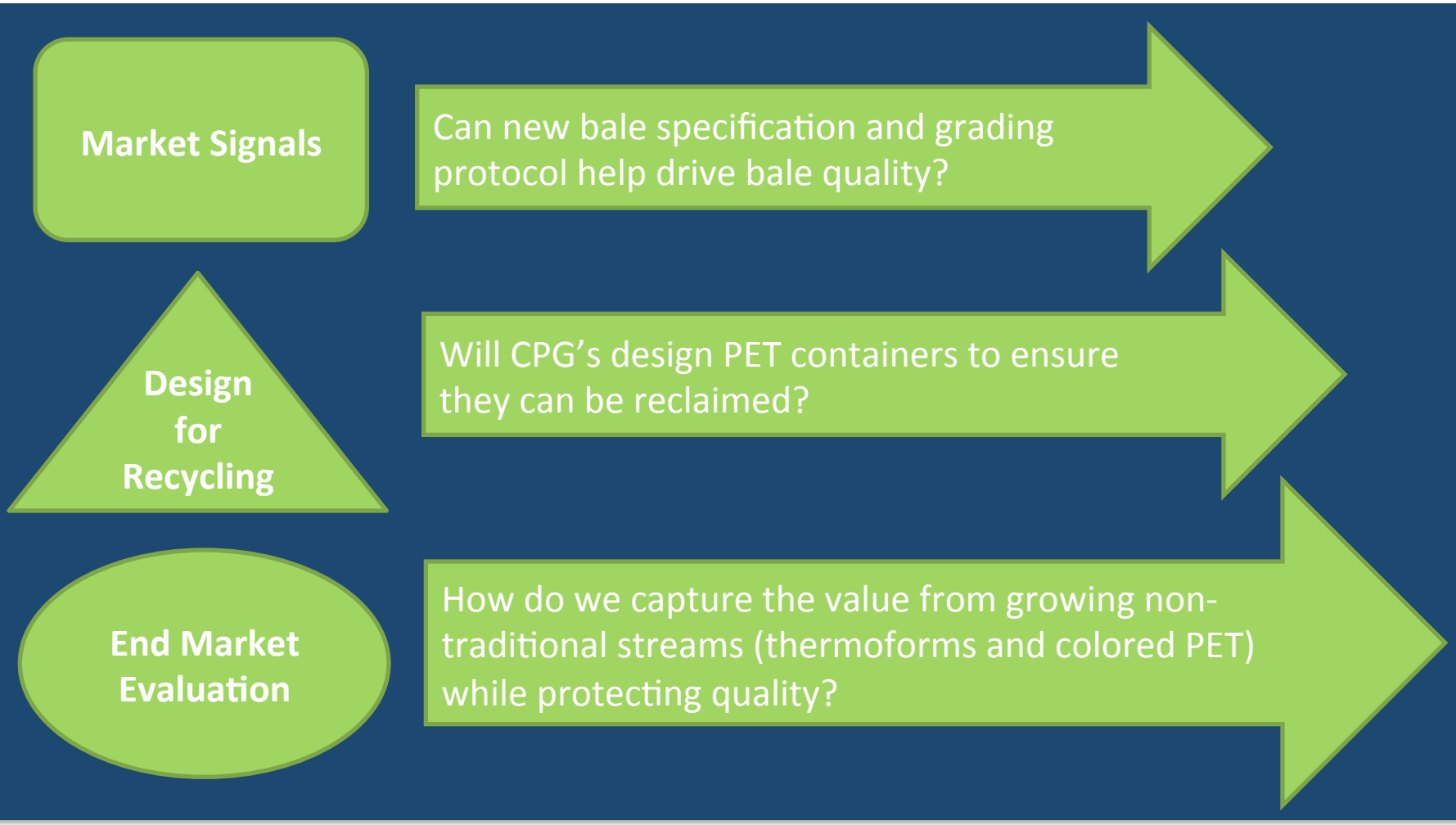
RPET Product Categories



NAPCOR's Goal?

Increasing supply while reducing contamination

Our Approach



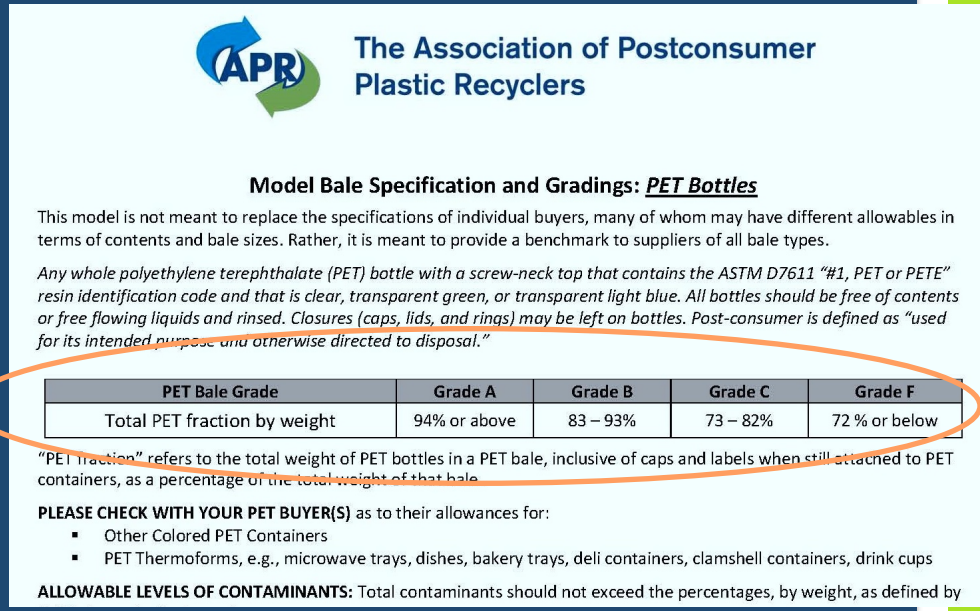
NAPCOR Initiatives to Address Supply: Bale Quality

What's Affecting Bale Quality?

- Increased single stream curbside collection
- Proliferation of packaging of all types
- Not all PET packages reflect design for recyclability guidelines, e.g., full shrink labels, barrier layers
- Ongoing lightweighting means more PET sorting and processing is required per pound of clean flake generated

Driving Bale Quality through Gradings

- **Objective:** to develop a bale grading system and material audit tool to provide:
  - Consistent terminology, clear pathway for improvement
  - Industry-vetted, voluntary standards
  - Approved by both NAPCOR & APR in 2015



The Association of Postconsumer Plastic Recyclers

Model Bale Specification and Gradings: *PET Bottles*

This model is not meant to replace the specifications of individual buyers, many of whom may have different allowables in terms of contents and bale sizes. Rather, it is meant to provide a benchmark to suppliers of all bale types.

Any whole polyethylene terephthalate (PET) bottle with a screw-neck top that contains the ASTM D7611 "#1, PET or PETE" resin identification code and that is clear, transparent green, or transparent light blue. All bottles should be free of contents or free flowing liquids and rinsed. Closures (caps, lids, and rings) may be left on bottles. Post-consumer is defined as "used for its intended purpose and otherwise directed to disposal."

PET Bale Grade	Grade A	Grade B	Grade C	Grade F
Total PET fraction by weight	94% or above	83 – 93%	73 – 82%	72 % or below

"PET fraction" refers to the total weight of PET bottles in a PET bale, inclusive of caps and labels when still attached to PET containers, as a percentage of the total weight of that bale.

PLEASE CHECK WITH YOUR PET BUYER(S) as to their allowances for:

- Other Colored PET Containers
- PET Thermoforms, e.g., microwave trays, dishes, bakery trays, deli containers, clamshell containers, drink cups

ALLOWABLE LEVELS OF CONTAMINANTS: Total contaminants should not exceed the percentages, by weight, as defined by

Bale Gradings (in Model PET Bale Spec)

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Test Audit for Incoming PET Material

- A reasonably representative sample is pulled from sample load (preferred sample > 225 pounds)
- Key measurement is PET fraction of unprocessed bale material, taken as a percentage of total sample weight (not a yield)

	- SAMPLE AUDIT SORT CATEGORIES -						
	PET Bottles & Jars (clear, light blue)	**Green PET Bottles & Jars**	**Other Color PET Bottles & Jars***	**PET Thermoform***	**Non-PET Plastics**	**Metals**	**Other Contaminants**
Fraction Weight	_____	_____					
TOTAL Sample Weight	_____						
Category Fraction / Total Weight X 100 = PET Fraction %	_____ %						

Moving forward

- Reached out to bale suppliers and MRFs: *"So, what's changed?"*
- Continue to evaluate / refine bale comp data
- Understand key impact points:

MRF: Material Flow, Sort, Best Practice

Market Changes: Thermoforms, Light-weighting, Non-Clear

Design for Recyclability

NAPCOR Initiatives to Address Supply: Non-Clear Material

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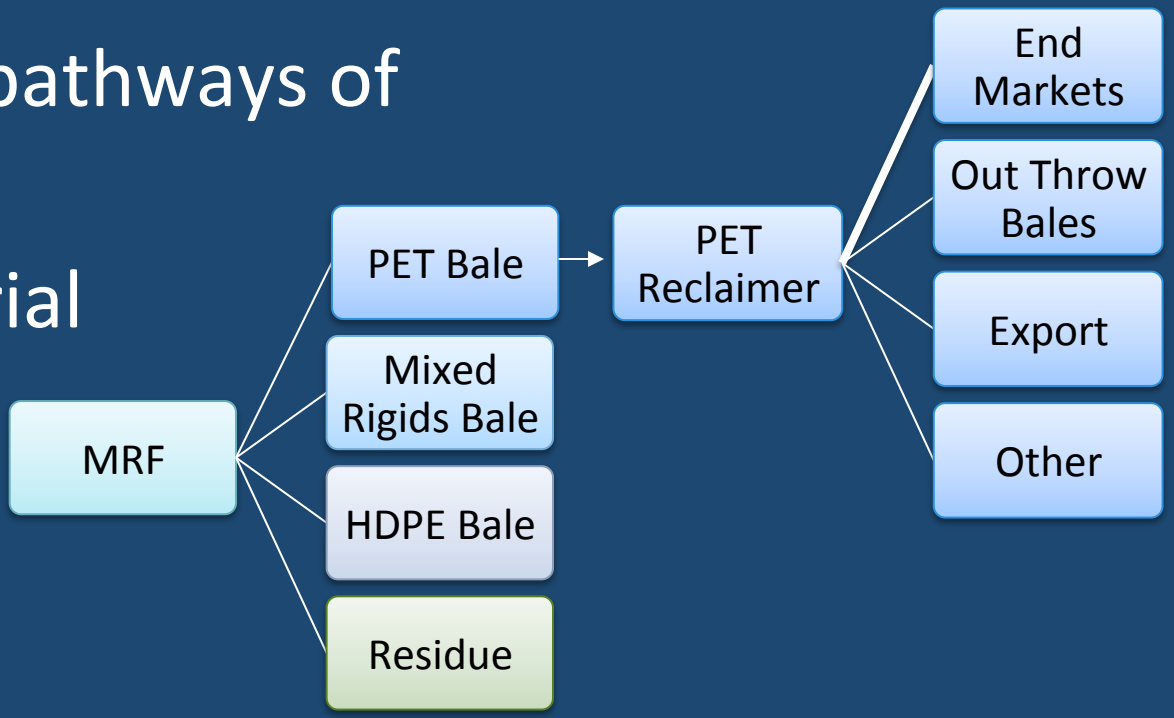
Promoting and Protecting the PET Package

Non-Clear PET Packaging Recycling Initiative

- Goal: Increase recycling and develop additional sustainable markets for non-clear PET containers
- Strategies:
  - Identify existing and potential end-markets for "non-clear" PET
  - Identify obstacles to sustainable markets and methods to overcome them

Non-Clear Initiative: Activities to Date

- Collected data
- Developed projections
- Determined pathways of material flow
- Tested material
- Evaluated end markets



Non-Clear Initiative: Obstacles Identified

- Critical Mass
- Disparate Material Flow
  - through MRF, PRF, PET Reclaimer and/or HDPE reclaimer
- Variability in the Stream
  - Colors, labels, and other contaminants are unpredictable
- Low-Value Markets

Non-Clear Initiative: Next Steps

- Facilitate partnerships and market arrangements
- Research end-markets

NAPCOR Initiatives to Address Supply PET Thermoform Recycling

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Promoting and Protecting the PET Package

PET Thermoform Recycling

- Goal: To make recycling PET thermoforms as easy as recycling PET bottles, without disrupting bottle recycling infrastructure
- Strategies
  - Achieve broad acceptance of PET thermoforms by PET reclaimers
  - Communicate consistent recycling message to communities and MRF operators

PET Thermoform Recycling Progress

2007
NAPCOR expands its membership to include PET thermoform and sheet manufacturers

2009
The Canadian Retail Initiative

2011
PET thermoform recycling is at 45 million pounds

2013
PET thermoform recycling is at 60 million pounds

2014
Technical trials to evaluate the impact on rPET quality and the PET bottle reclaiming infrastructure

Initial lab trials aimed at identifying potential issues with thermoform recycling

2009
<2% thermoform content in curbside PET bales

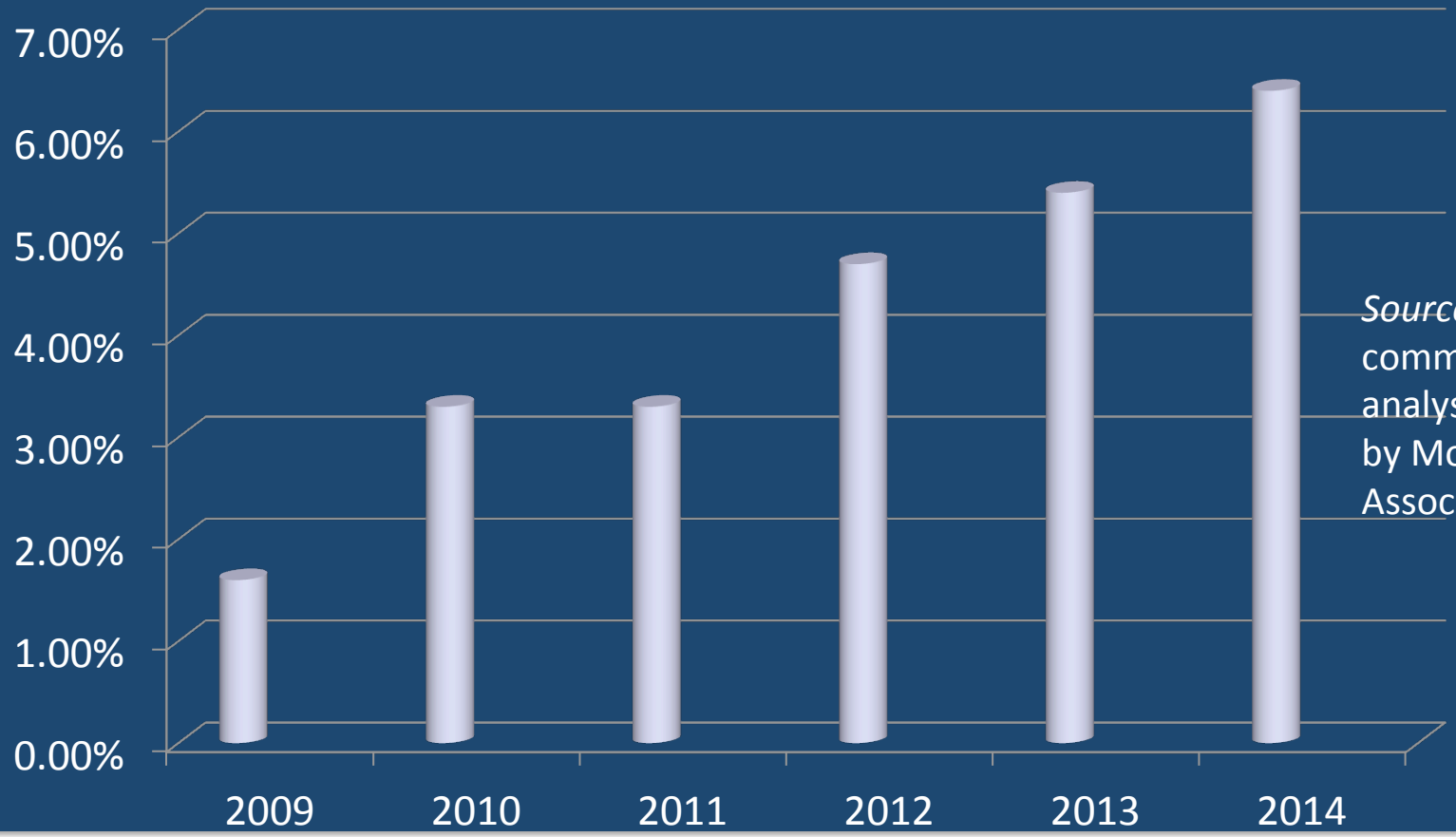
2012
Three grant programs to test collection, sorting, and marketing strategies

2013
~6% thermoform content in curbside PET bales

2015 & Beyond
Continued work on design, technical, and mechanical challenges; ensuring consistent and accurate messaging; and promoting collection volume increases and tracking

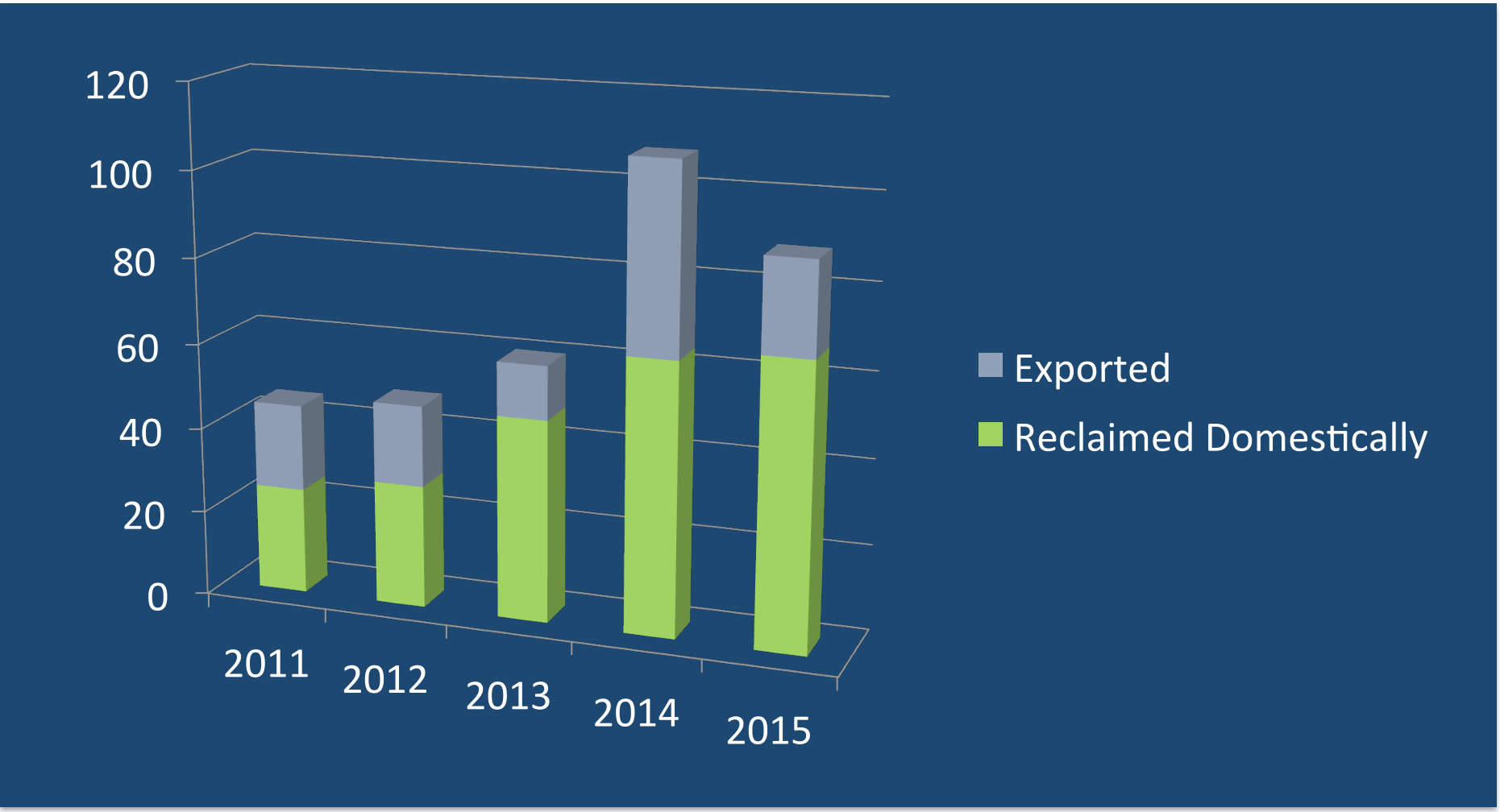
PET Thermoforms in Bottle Bales are Increasing

% Thermoforms by Weight, Curbside/Drop-off Bales



Source: NAPCOR commissioned bale analyses, conducted by Moore Recycling Associates

Thermoform Recovery in US & Canada (*MMlbs*)



Are PET thermoforms recyclable?

- Recent ”Availability of Recycling” study found that over 60% of US consumers have recycling programs available to them that accept PET thermoforms, meeting FTC ”green guides” threshold

Table 10: Availability of Recycling for Individual Materials

MATERIAL	PERCENT OF US POPULATION WITH RECYCLING PROGRAMS AVAILABLE FOR MATERIAL		
	Less than 20%	20%-60%	60% or Greater
PET bottles/jugs & jars			X
HDPE bottles/jugs & jars			X
PP bottles/jugs & jars			X
LDPE and LLDPE bottles/jugs & jars			X
PVC bottles/jugs & jars			X
Other bottles/jugs			X
Bottle Caps			X
PET cups			X
PET containers/trays			X
PET clamshells			X

http://www.sustainablepackaging.org/content/?type=5&id=centralized-study-on-availability-of-recycling

Are PET thermoforms recyclable?

- NAPCOR surveyed MRFs and PET reclaimers to ask "What do you do with PET thermoforms?"

MRFs

For most part, PET thermoforms collected at curbside are being sent to PET markets in bottle bales

Reclaimers

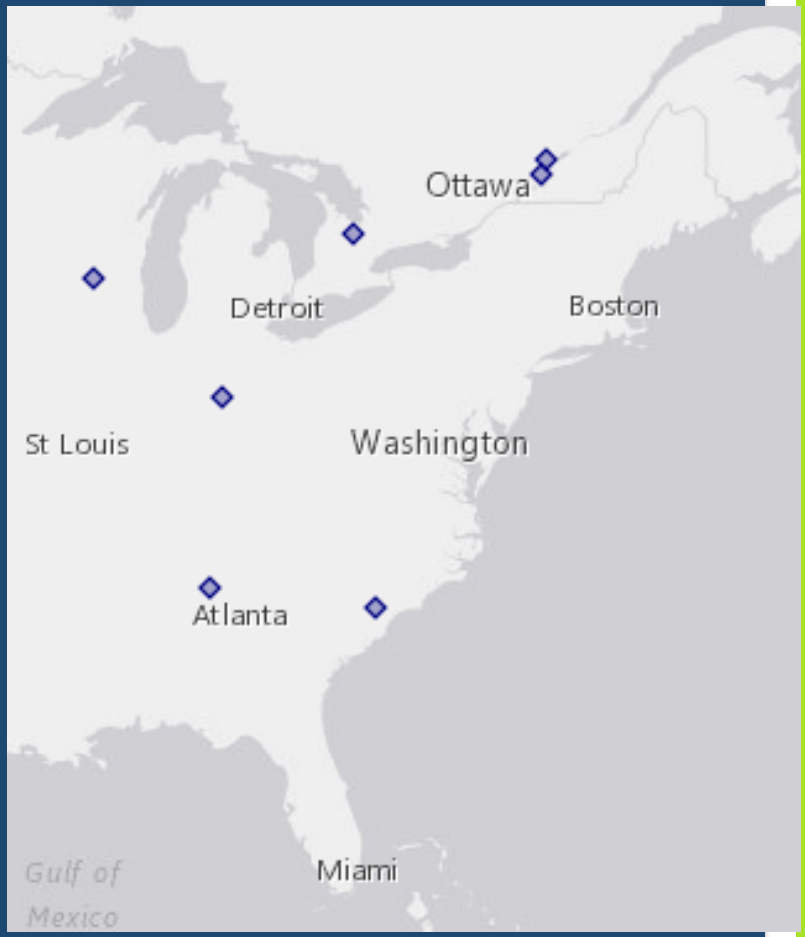
Those who handle curbside materials generally recycle PET thermoforms along with PET bottles

SPC Guidance on Recyclability Claims

- PET thermoforms will get "widely recycled" label, with these exceptions
  - Black Trays
  - PET thermoforms with paper labels that are not compatible with the APR protocol

Markets for PET Bottle & Thermoform Bales

PET thermoforms are technically recyclable with PET bottles, but not all thermoforms are PET. Many PET reclaimers accept thermoforms in bottle bales, as long as autosort systems and best practices are in place. Talk to your buyer about their specifications.



Plastic Recycling Update Article

Reprinted from
PLASTICS RECYCLING UPDATE

GOING BEYOND COLLECTION

Are PET thermoforms that are placed in curbside bins actually making it to market? A trade group looks into that question and provides an update on the opportunities and challenges tied to this increasingly prevalent form of plastic packaging. BY RESA DIMINO

Earlier this year, the Sustainable Packaging Coalition's Centralized Study on the Availability of Recycling found that a substantial majority of Americans have recycling programs available to them that accept all PET packaging. Included in this designation were bottles and jugs but also non-bottle PET packages – the clamshells, cups, tubs, lids, boxes, trays, egg cartons and similar rigid, non-bottle packaging made of PET (No.1) plastic resin that are increasingly common on retailer shelves.

"We were very pleased to see that most Americans can put PET thermoforms in their recycling bins according to the guidelines provided to them by their communities, but we know that this doesn't tell the whole story of what happens to those containers," said Michael Westerfield, corporate director of recycling programs for Dart Container Corporation in Mason, Mich. and a National Association for PET Container Resources (NAPCOR) board member.

As use of PET thermoform packaging continues to grow, the industry is being forced to confront an important question: How do we look beyond collection to determine whether a material placed in a recycling bin actually makes it to market?

erators of materials recovery facilities (MRFs) and plastics recovery facilities (PRFs), as well as PET reclaimers, to determine how they handle the PET thermoforms that flow through their systems.

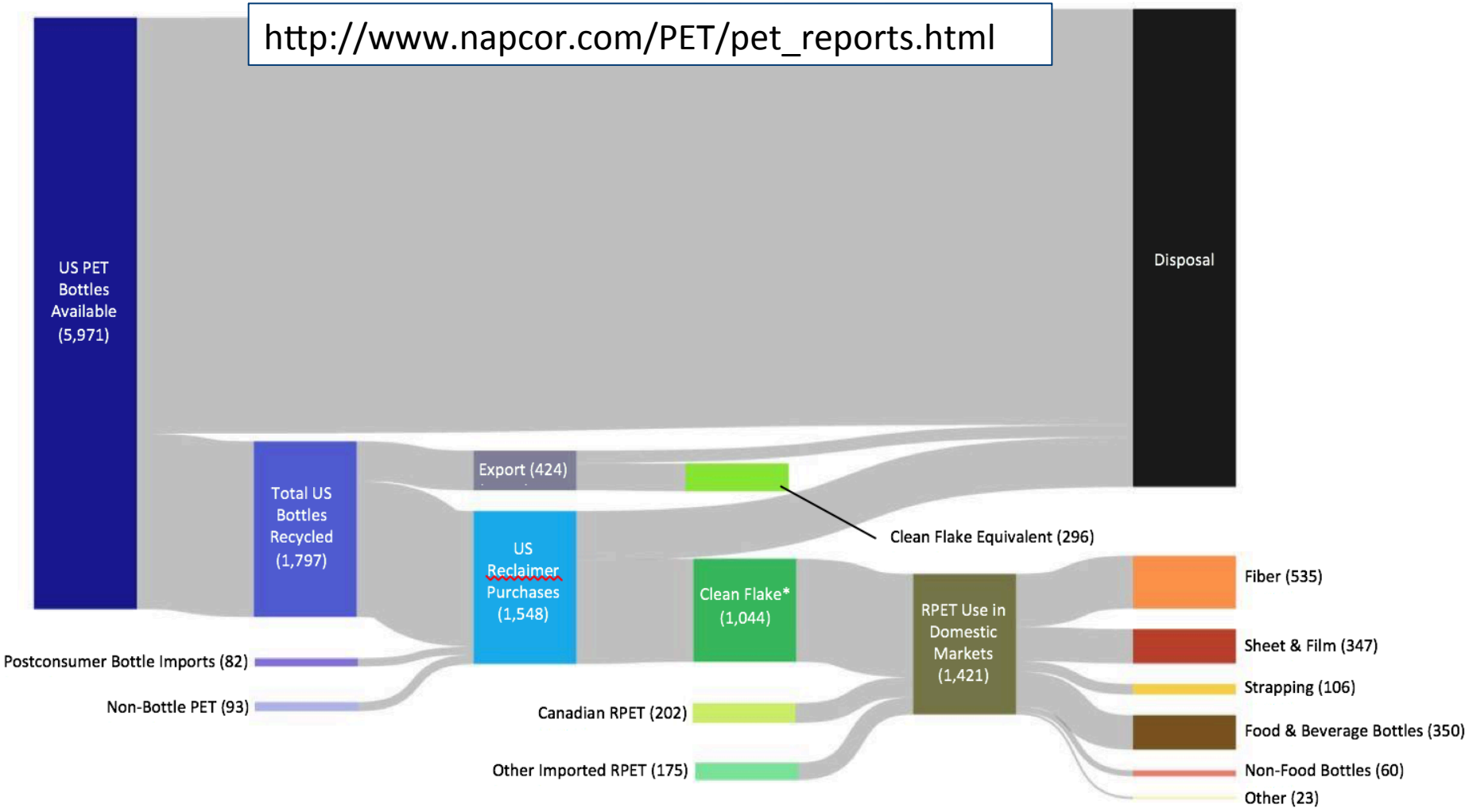
We found that, for the most part, PET thermoforms collected at curbside are being sent to PET markets in bottle bales, and most reclaimers who handle curbside materials generally recycle them along with PET bottles.

"We have worked closely with PET reclaimers to analyze the impacts of thermoforms on the recycling stream and wanted to do our due diligence with the other parts of the value chain to ensure real recyclability before we put messages into the marketplace," Westerfield noted. He and the NAPCOR leadership recommend that other resins and materials work to the same standard as they assess recyclability.

Do PET thermoforms meet the FTC's Green Guide's requirements for unqualified claims of recyclability? The answer is pretty clearly yes. Recycling programs that include this material are available to more than 60 percent of the U.S. population, and once collected, PET thermoforms can be separated and recovered through the existing PET recovery infrastructure.

PET Materials Flows in the US

http://www.napcor.com/PET/pet_reports.html



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Promoting and Protecting the PET Package

Thank You!

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QUESTIONS?

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