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The Association for Packaging and Processing Technologies

Growth, Trends and New Opportunities in Packaging Equipment

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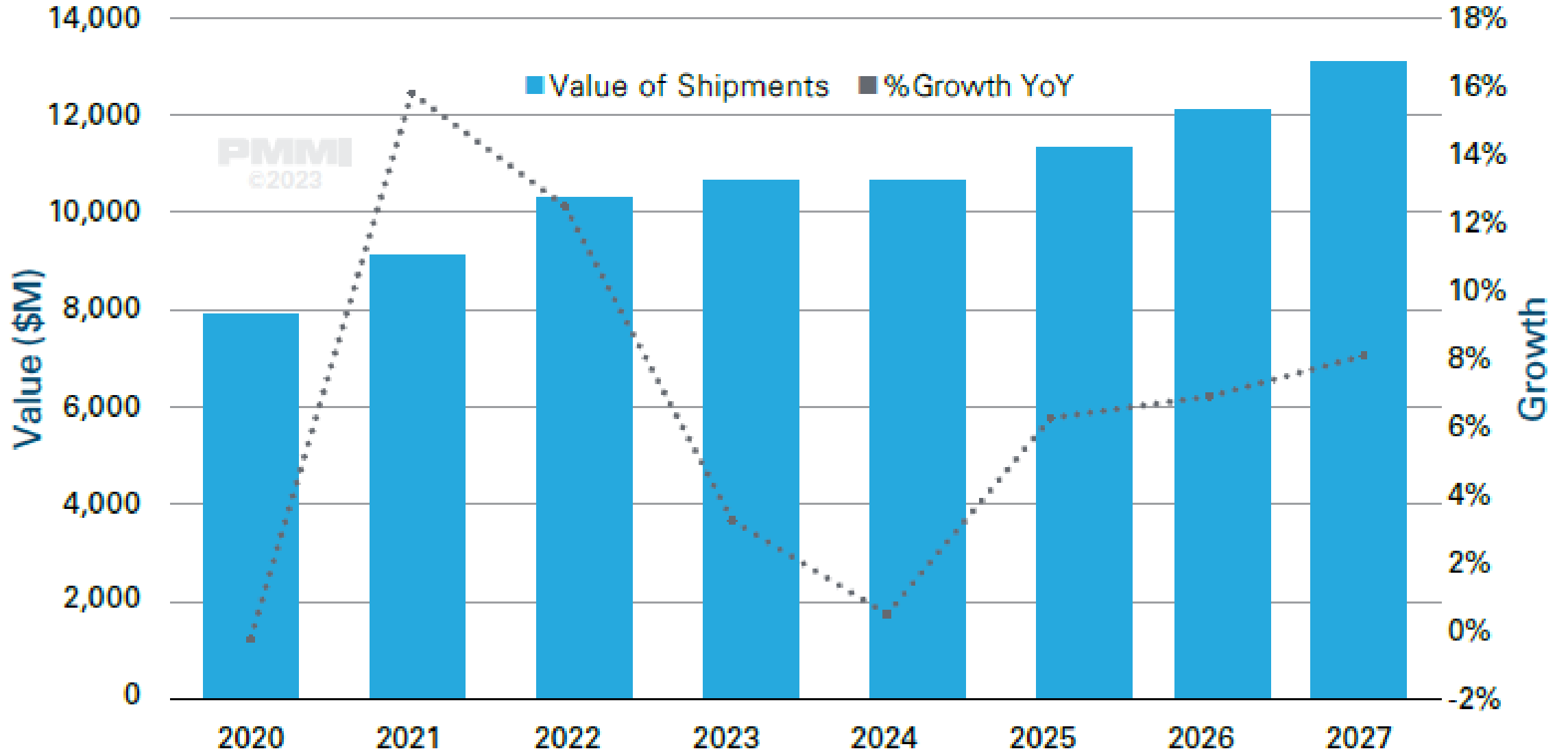
Growth, Trends and New Opportunities in Packaging Equipment

- Industry Growth
- Industry Today
- CPG Priorities
- Trends and Opportunities

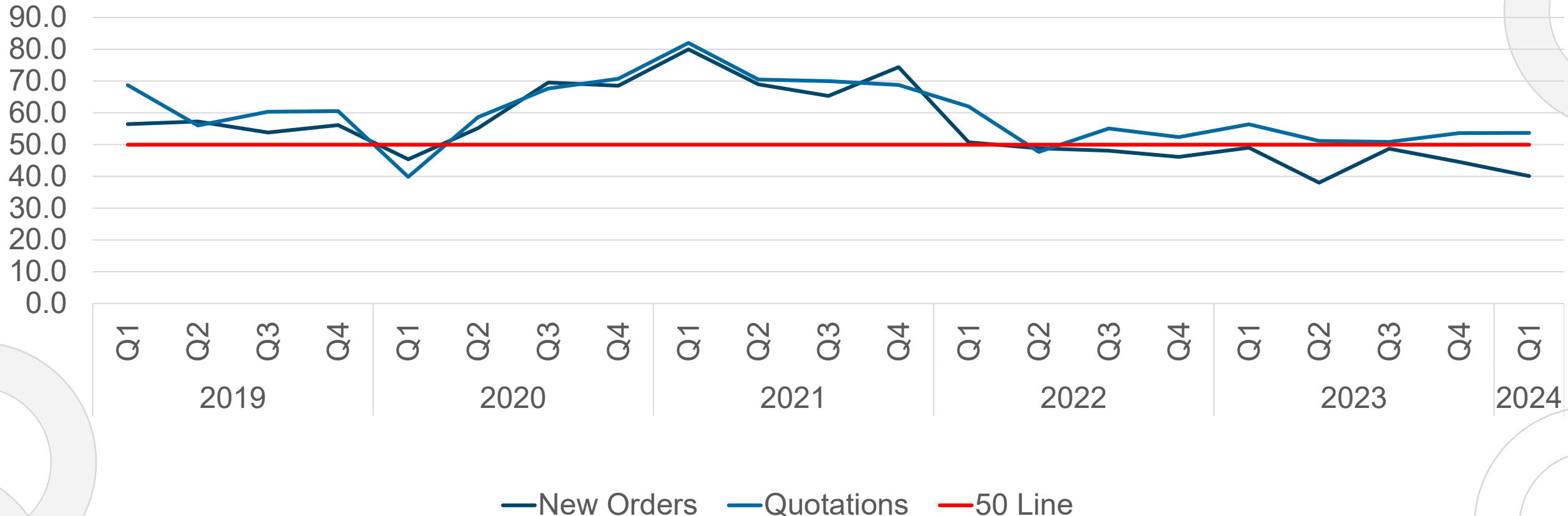
Industry Growth

US Packaging Machinery Forecast

Value of Shipments & % Growth YoY

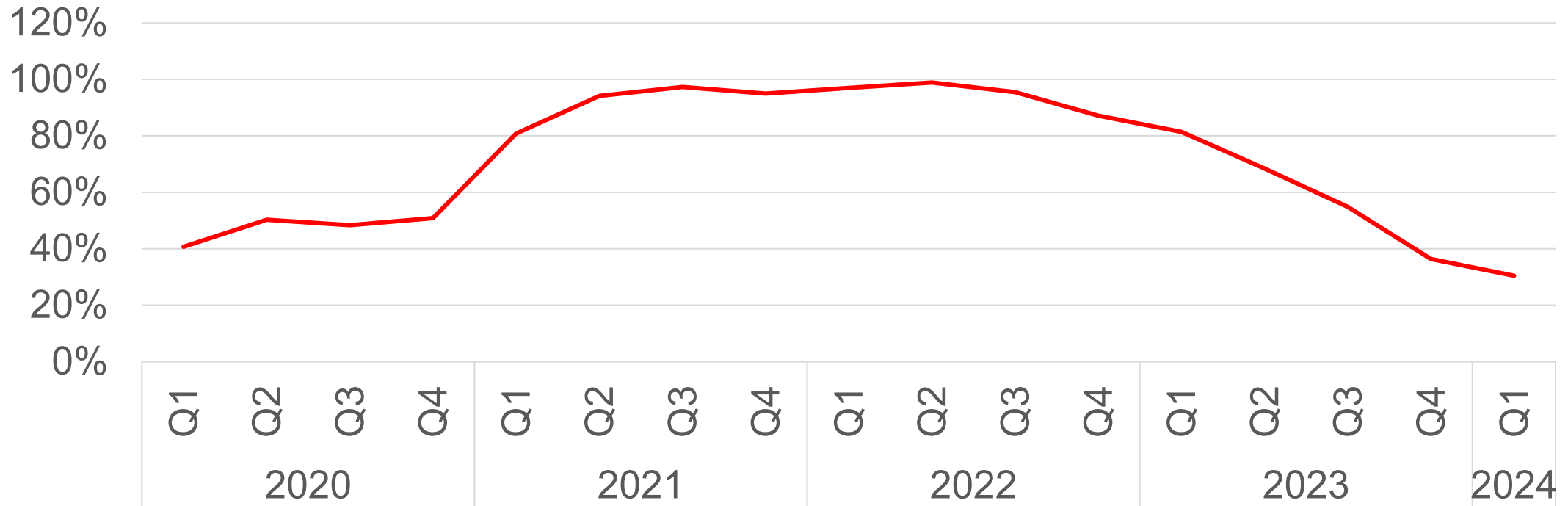


Proposals and New Orders Index



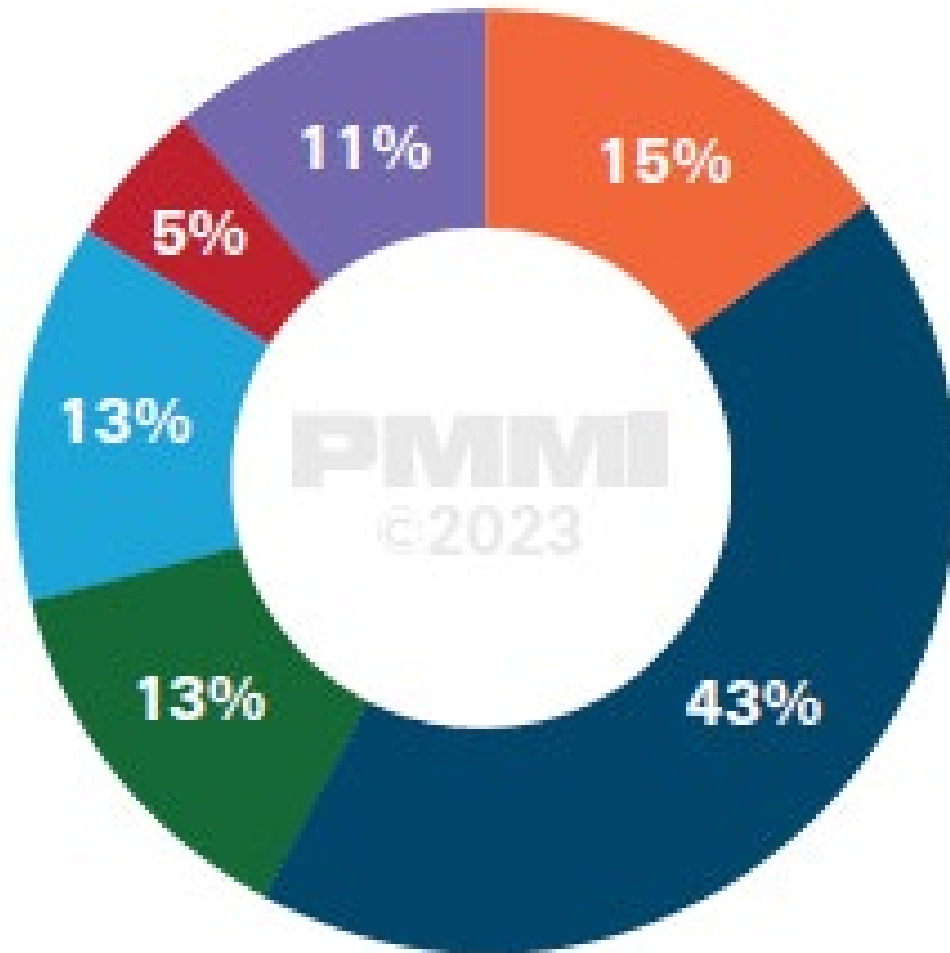
An index of 50 represents the midpoint, no change. A reading above 50 indicates that activity is generally expanding. Below 50 indicates that it is generally contracting.

Supply Chain Constraints



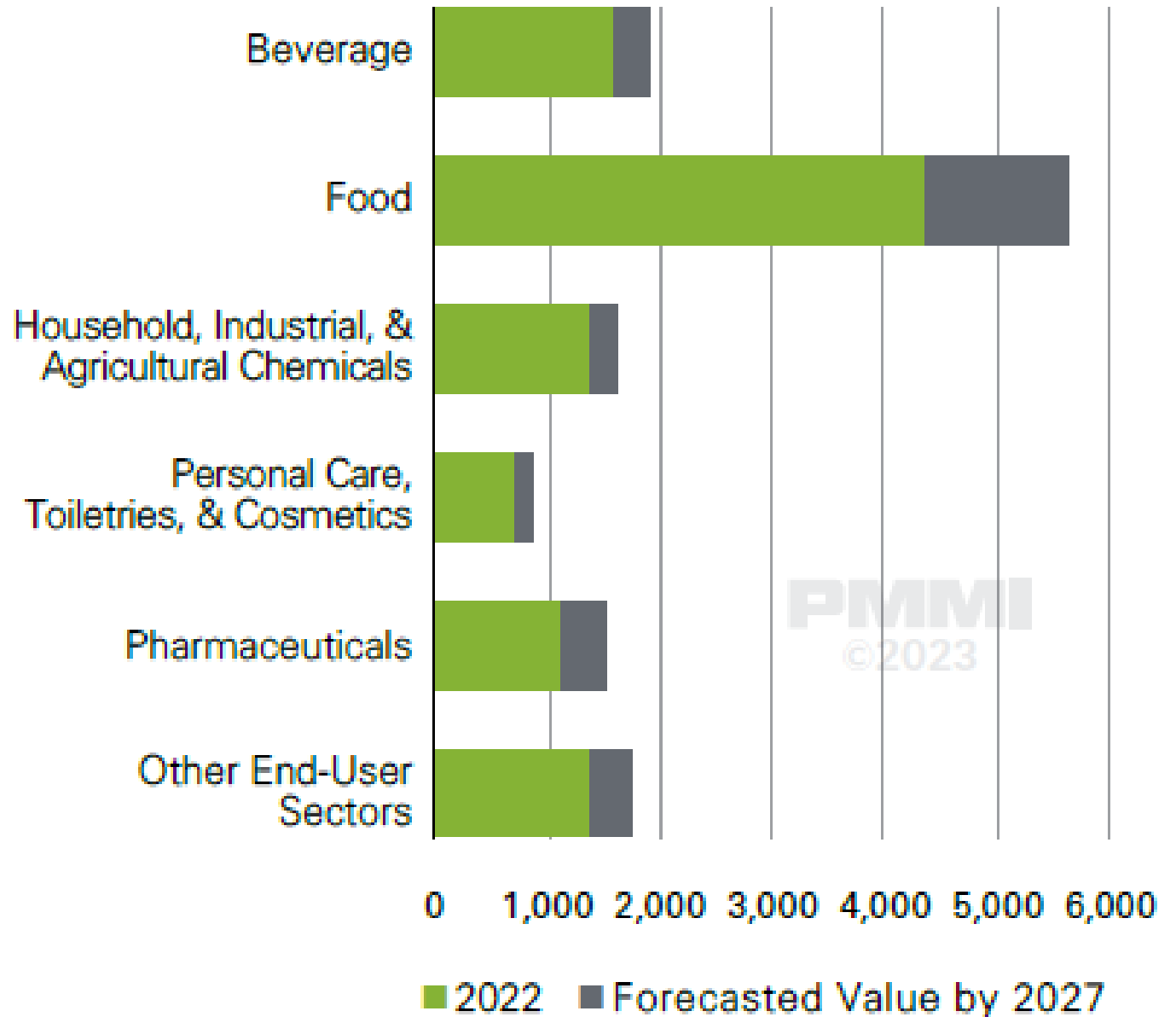
— Supply Chain Problems

Packaging Machinery Shipments by Industry



- Beverage
- Food
- Household, Industrial, and Agricultural Chemicals
- Other End-User Sectors
- Personal Care, Toiletries & Cosmetics
- Pharmaceuticals

Shipment Value by Machine Type 2022 Value vs Forecasted 2027 Value

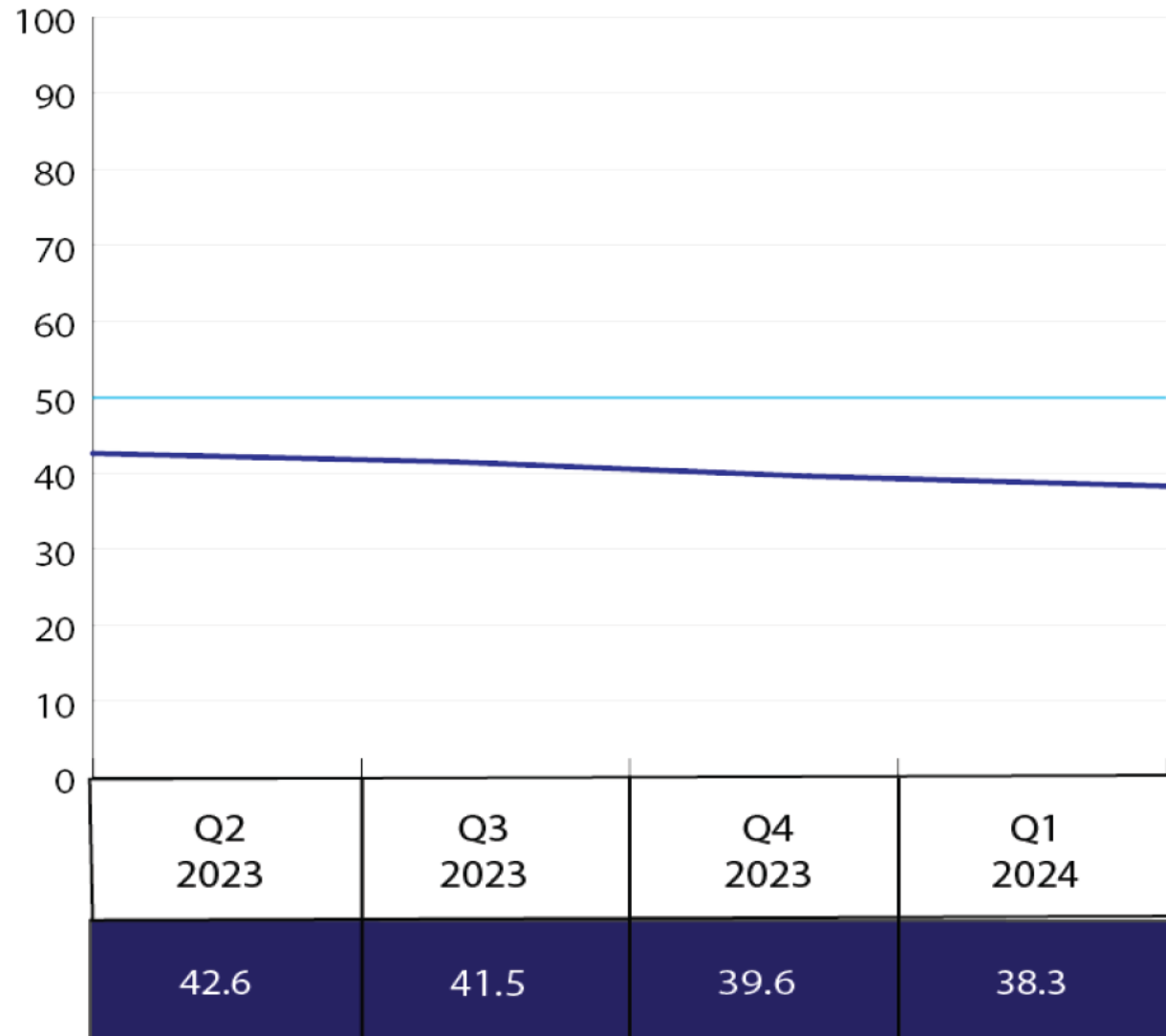


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Industry Today

BACKLOG INDEX Q2 2023 TO Q1 2024

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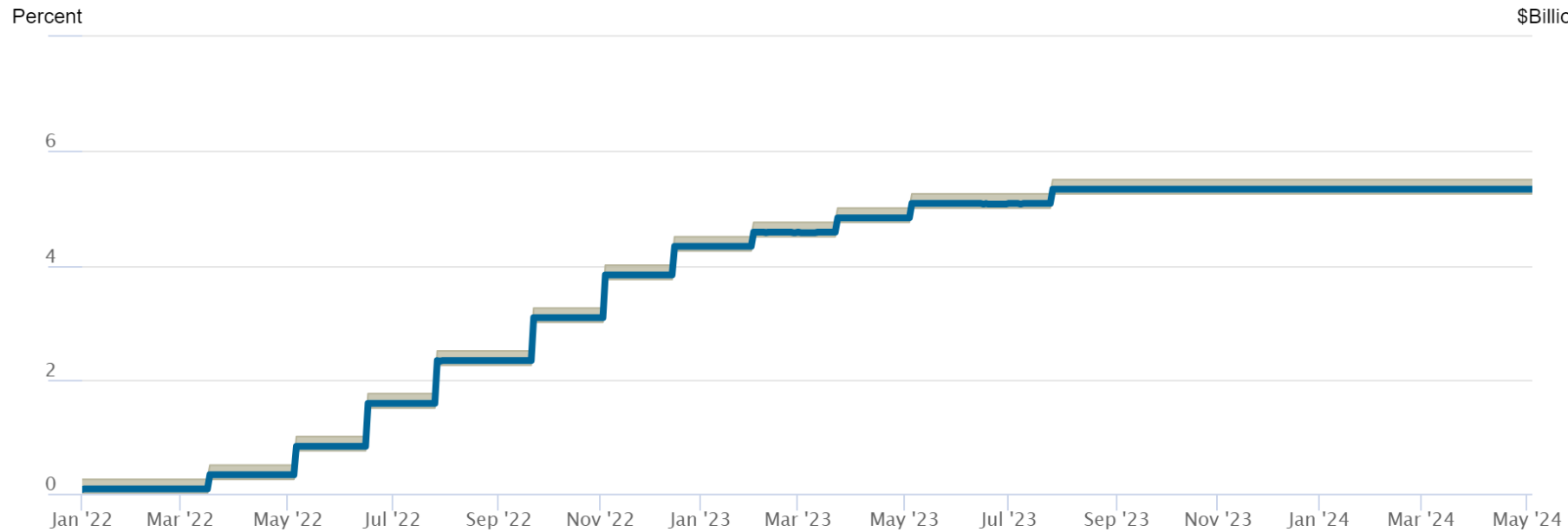
Higher Interest Rate Environment Affects End-User Demand Disproportionately

FEDERAL FUNDS CHART

1m 3m 1y All

From To

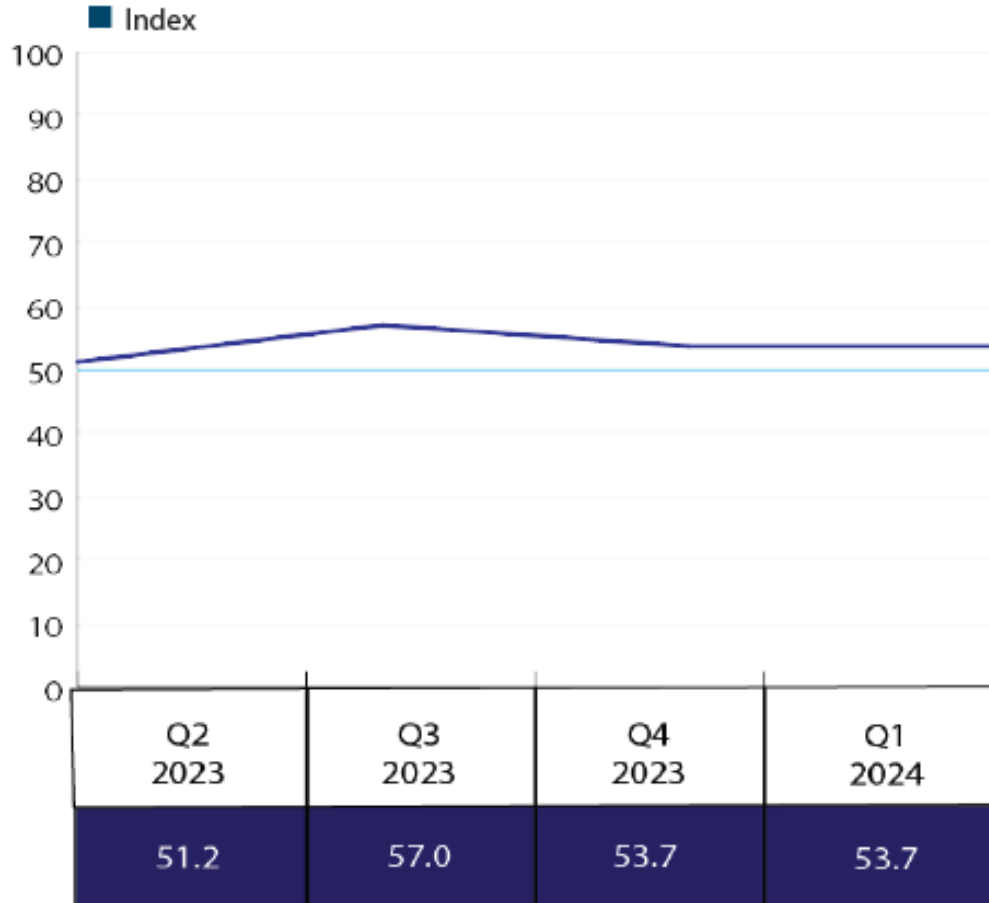
● Target Rate/Range — EFR — Volume
 Percent \$Billions



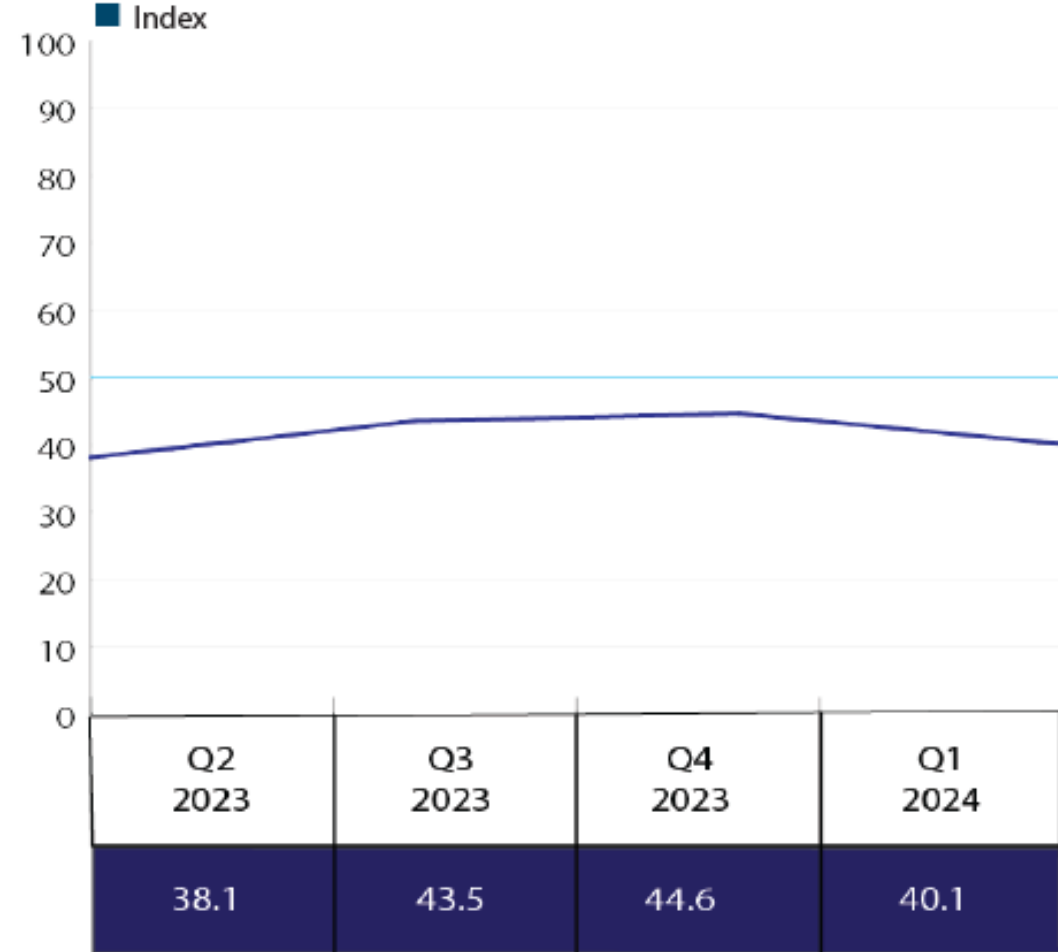
Reference Rates Historical Data Search

2024 Proposals and New Orders Index

QUOTATIONS/PROPOSAL ACTIVITY Q2 2023 TO Q1 2024



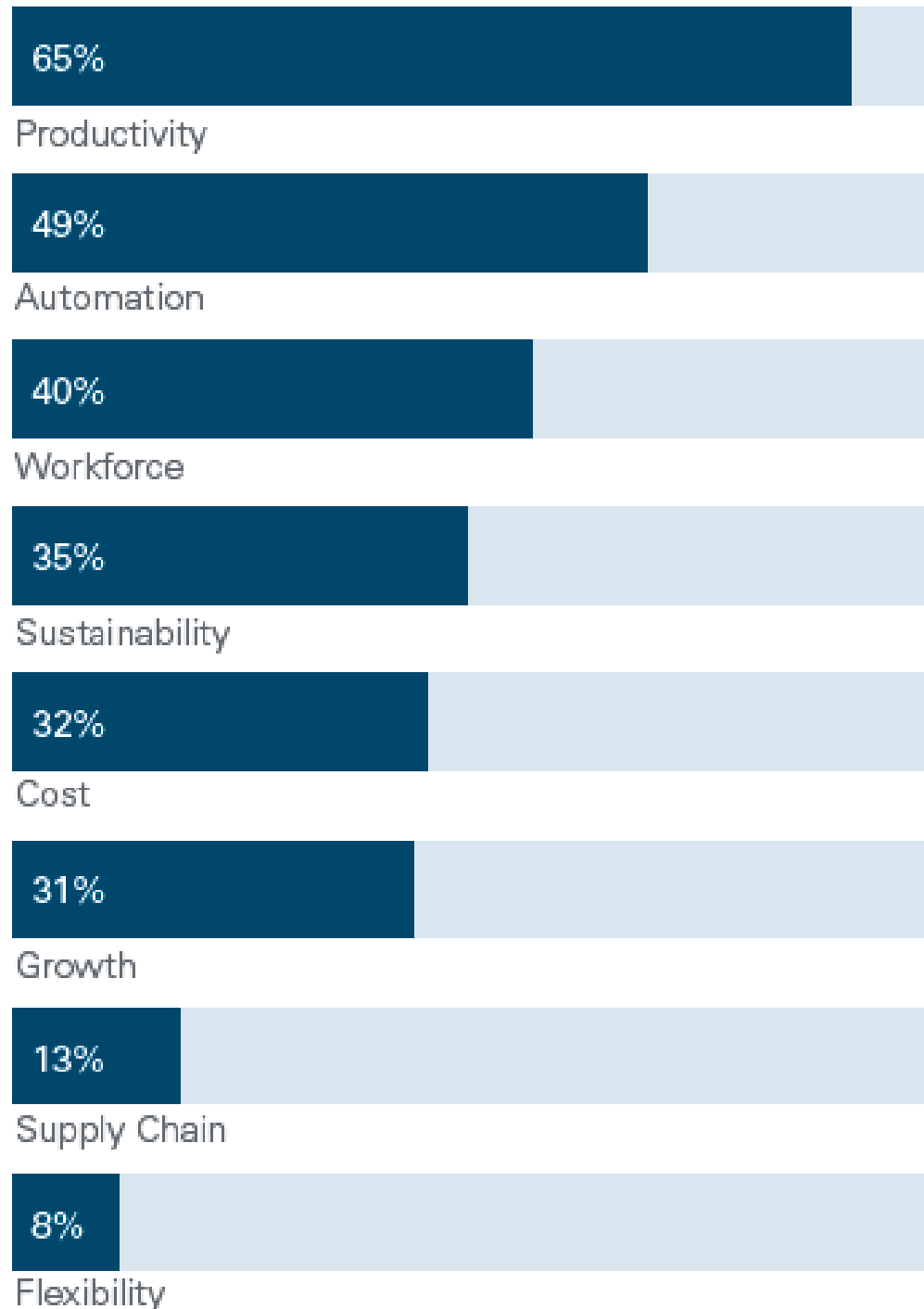
NEW ORDERS Q2 2023 TO Q1 2024



An index of 50 represents the midpoint, no change. A reading above 50 indicates that activity is generally expanding. Below 50 indicates that it is generally contracting.

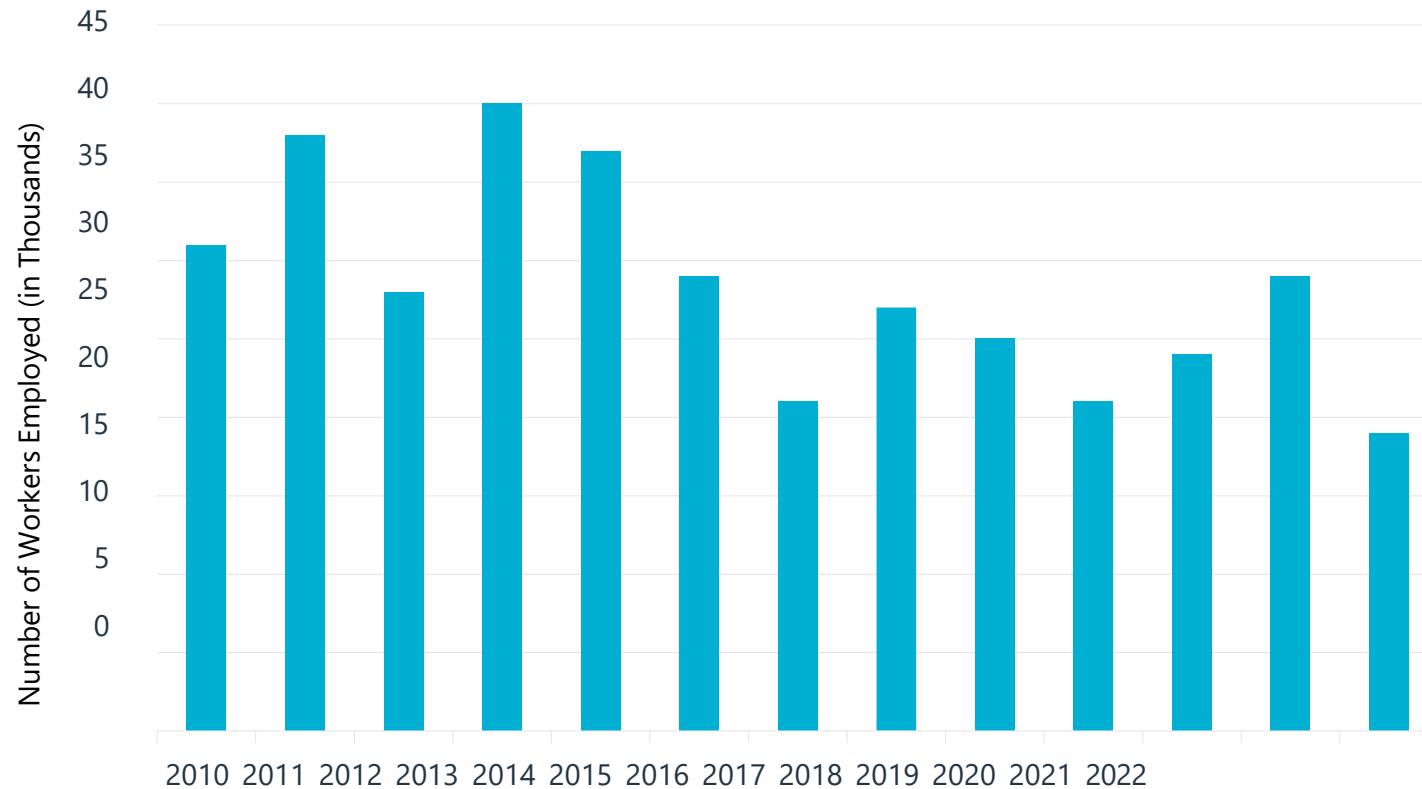
CPG Priorities

Key priorities in packaging and processing operations



The Labor Shortage of Service Technicians Has Gotten Worse Post Pandemic

Fig. 9. Number of Employed Machinery Maintenance Workers



Source: US Bureau of Labor Statistics

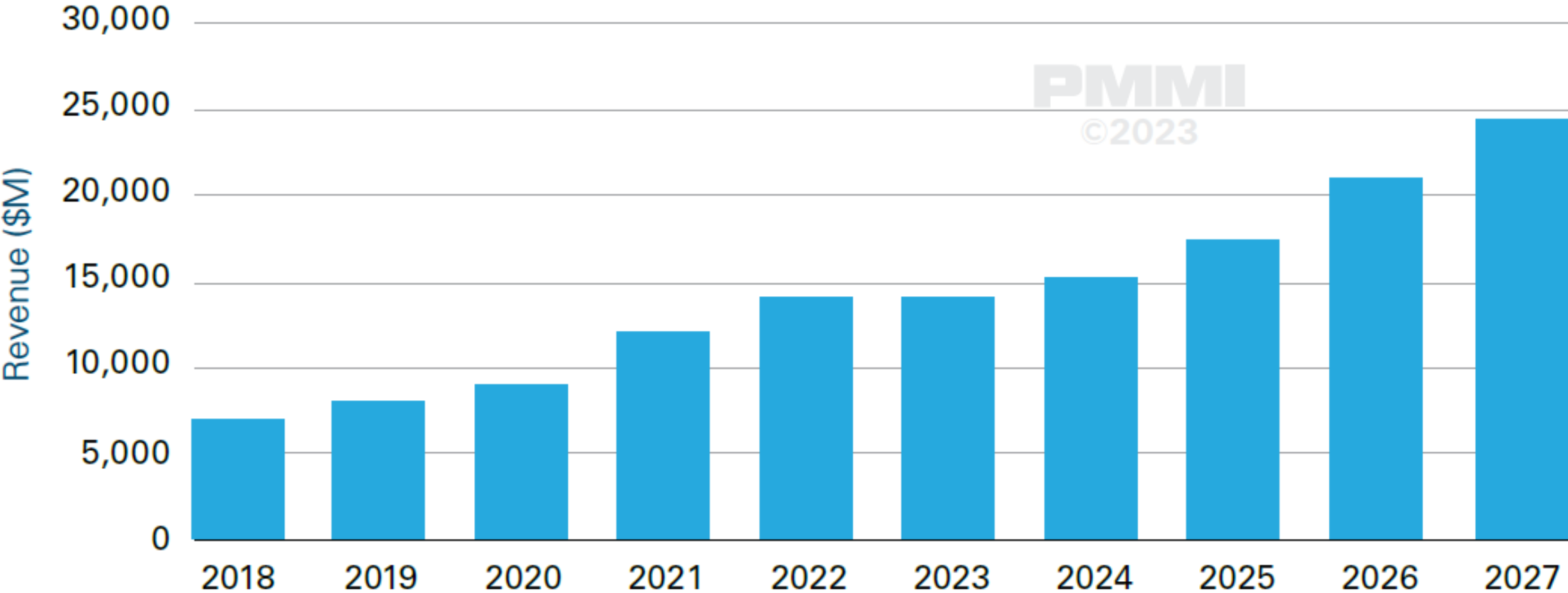
Areas of Opportunity

- Ecommerce and Warehousing Automation
- End-of-Line Machinery Growing Above Market Average
- Ongoing adoption of IIOT Technologies
- AI
- Sustainable Packaging Continues to Drive Machine Design
- Technologies to Help Fill the Skill Gap
- Robots Continue to Grow in Use

Packaging and Automation in the Warehouse



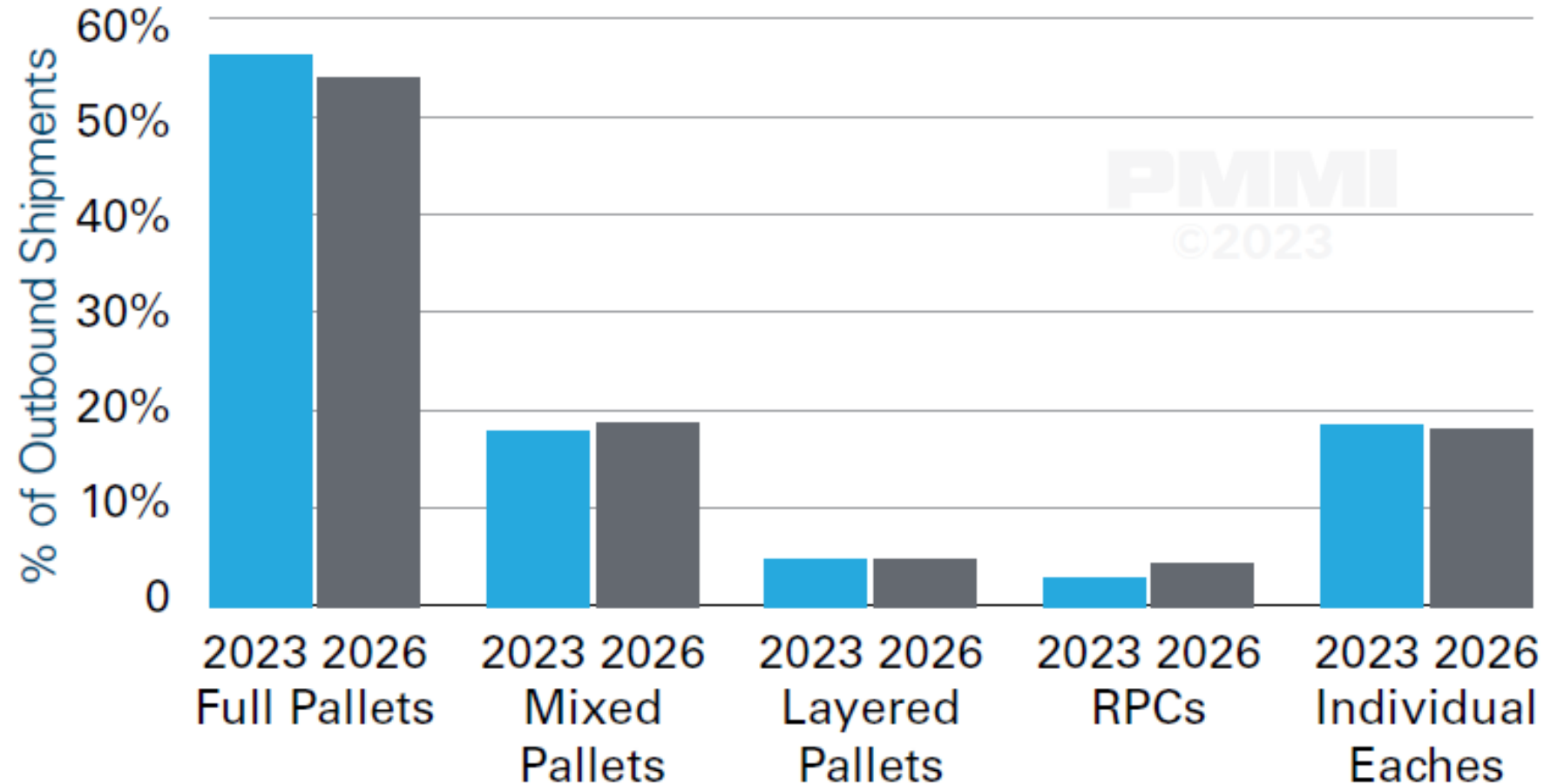
United States Warehouse Automation Forecast



Outbound shipments break down by handling unit?



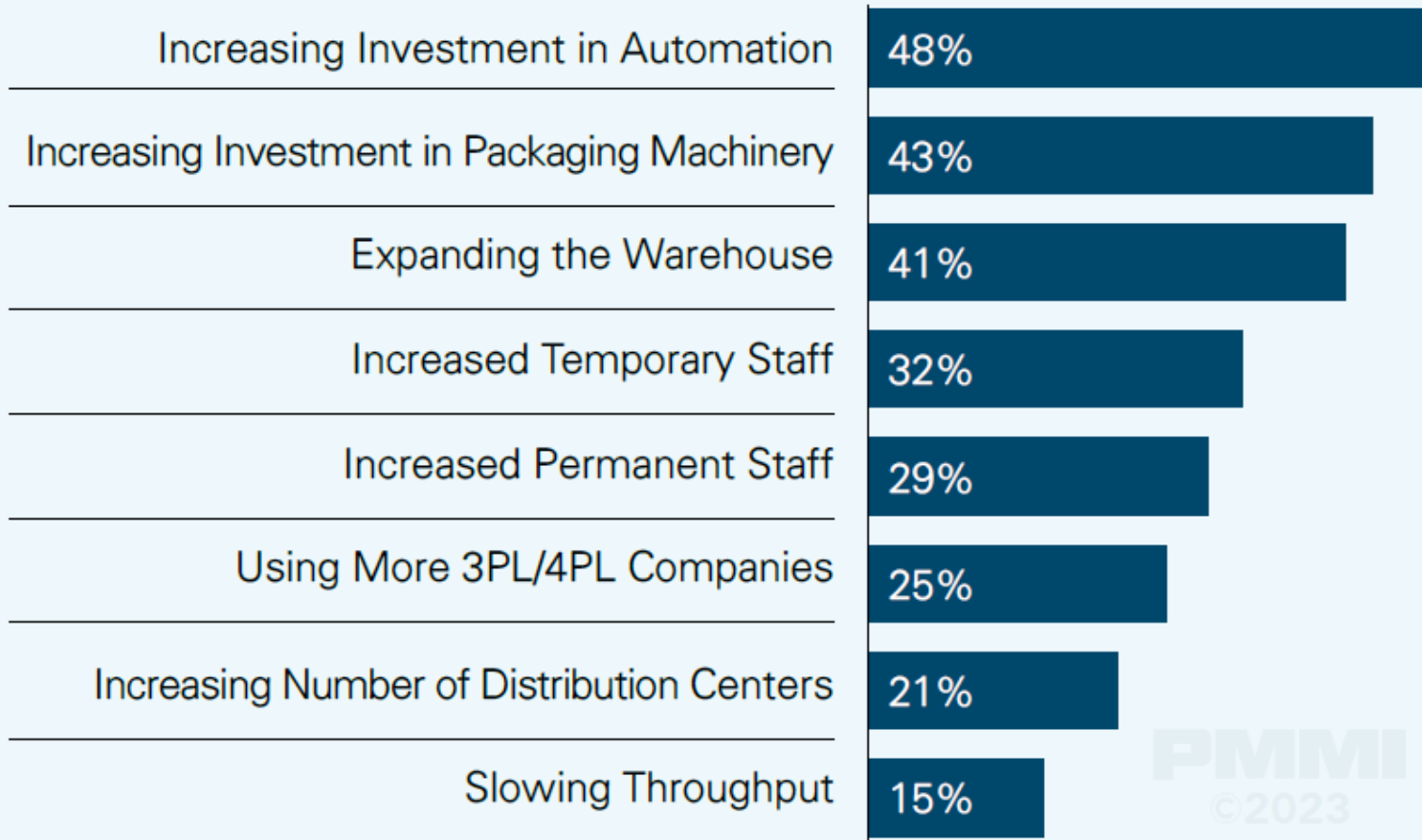
Average proportion of outbound shipments by handling unit



D2C fulfillment is pushing up investment by CPGs in automation



What impacts are the increase of D2C fulfillment having on your business?



Source: PMMI, The Association for Packaging and Processing Technologies – 2023 Packaging and Automation in the Warehouses of the Future Survey

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Where do you think AI will be most impactful

72%

Using AI for Predictive Maintenance

39%

Leverage AI for Optimizing Analytics

30%

Uncovering and Explaining the "Unknowns" in the Data We are Capturing

28%

Creation of Workforce Tools, Including SOPs, etc.

26%

Speed Up Programming Processes and Create Programs for PLCs and Robotics

25%

AI as Navigational Tool for Operators/Maintenance Personnel

22%

Summarization of Large Data Sets

16%

AI for Prioritization in Various Programs, Including Capex Decisions, P&L Decisions

12%

Offering Tailored Training

4%

24/7 Customer Service Offering

Material Replacement Continues to Drive Machine Design

- Sustainability
- Supply Chain
- Prices of Raw Materials

MARCH 2023

PACKAGING COMPASS:
Evaluating Trends in U.S. Packaging Design Over the Next Decade and Implications for the Future of a Circular Packaging System

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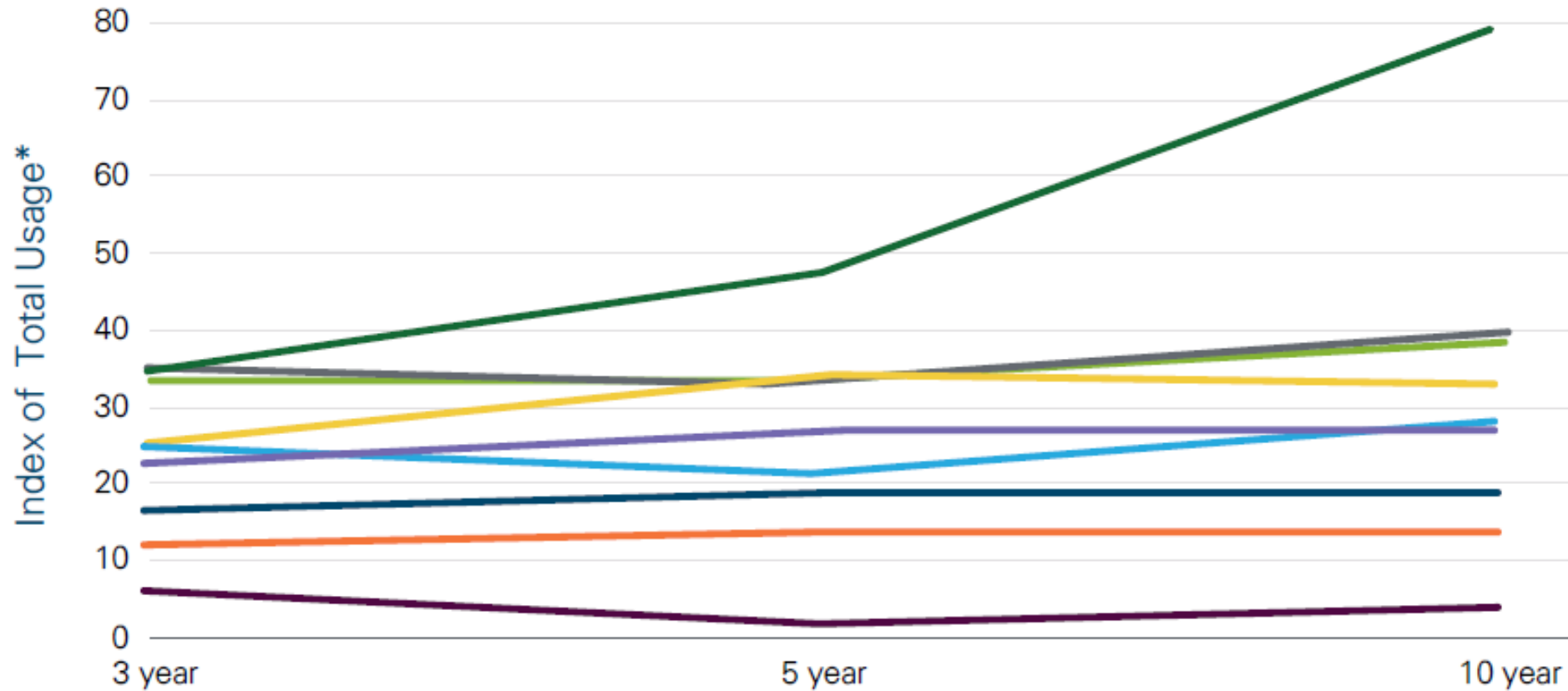
SUMMER 2023

BEST PRACTICE
Transitioning Flexible Materials

OpX Leadership Network
PMMI
FPA Flexible Packaging Association
Connecting. Advancing. Leading.

Change in Materials Use

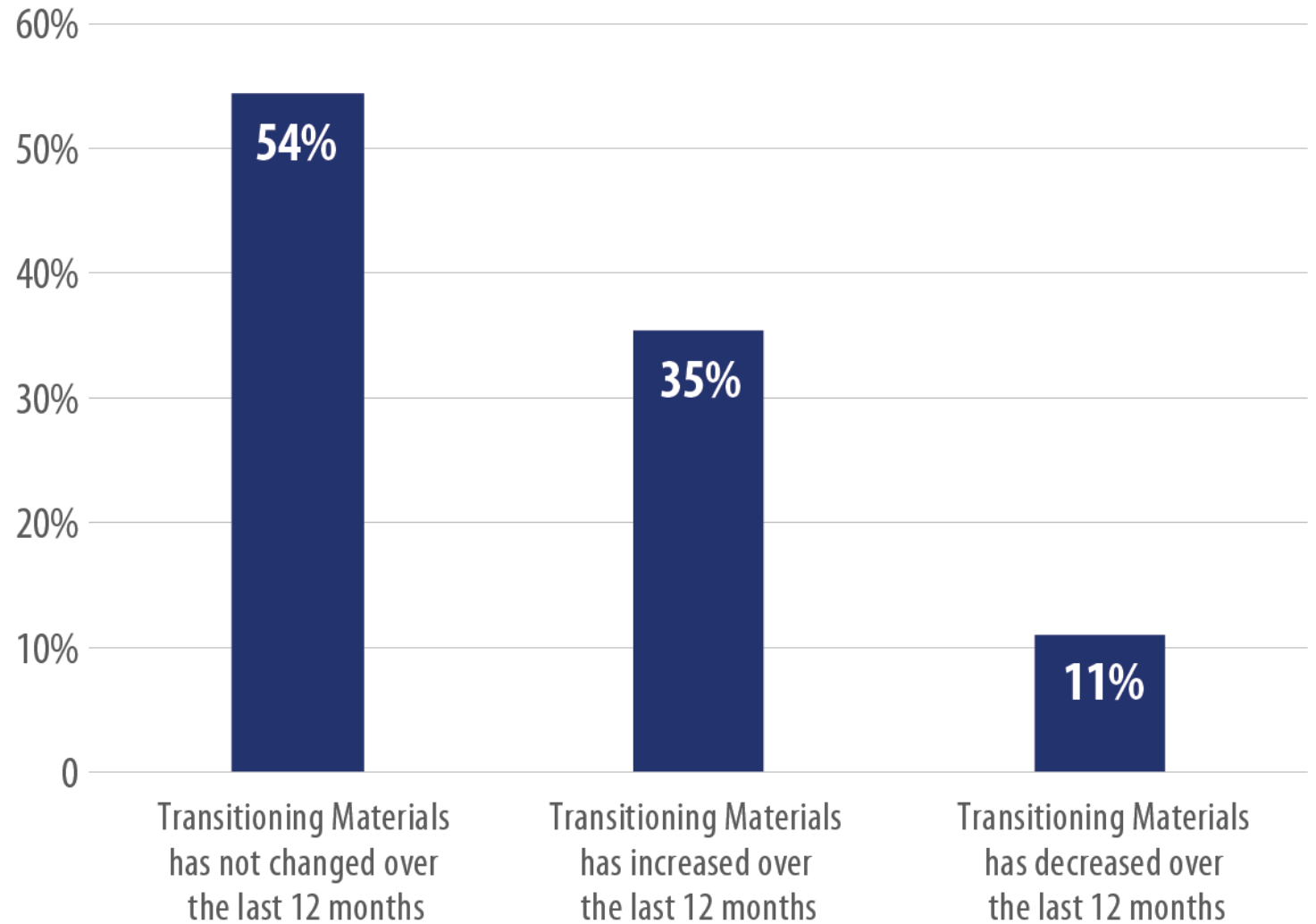
As planned over the next three, five, and ten years



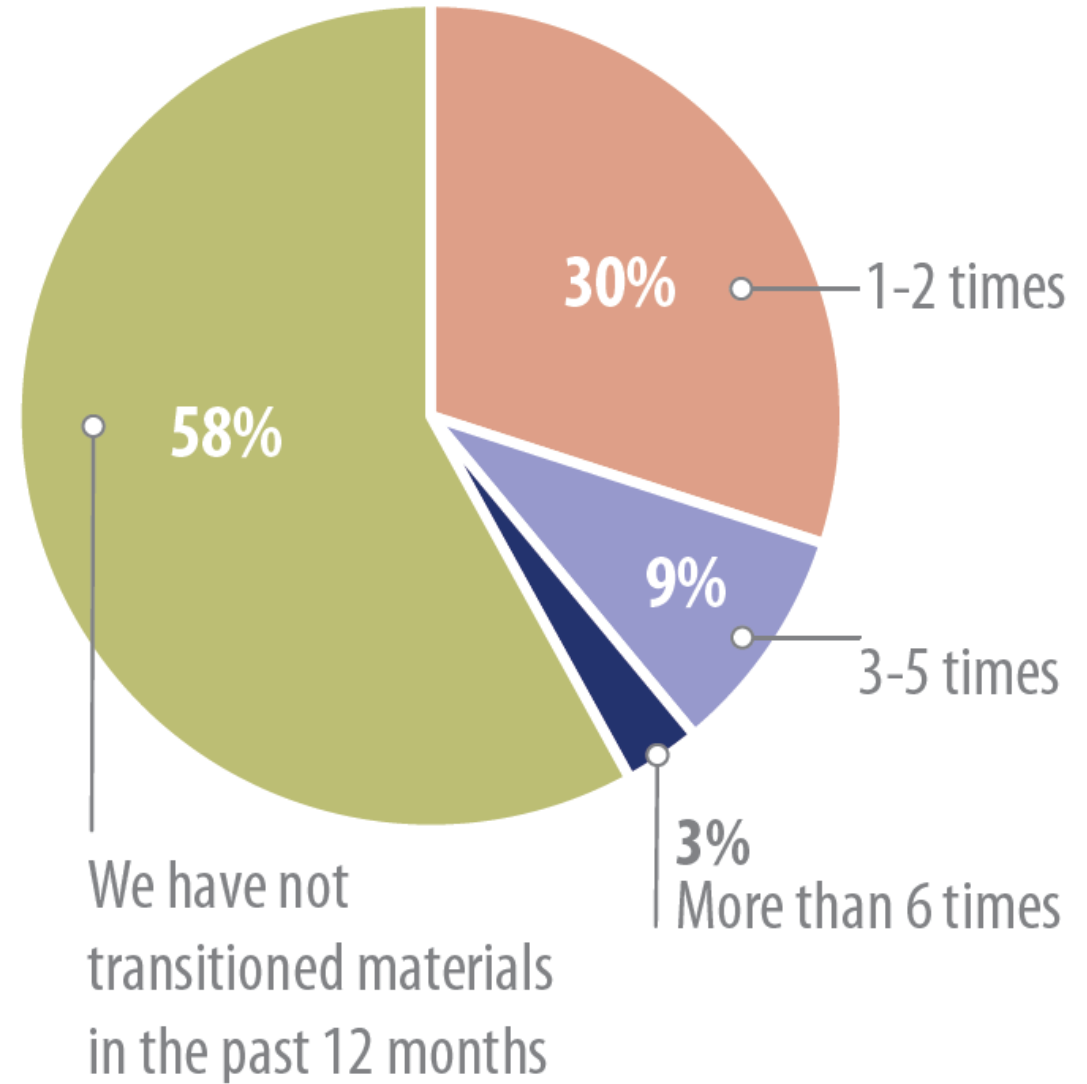
Change in Total Usage

- Compostable
- Bio-Based Bioplastic
- Kraft Paperboard - Certified
- Corrugate - Certified
- Recycled Paperboard - Certified
- PCR Rigid
- PCR Flexible
- Multi-Material (Cartons/ Composite Cans)
- Clear Glass

In the last 12 months, how has transitioning materials changed as compared to the last five years?



In the last 12 months, how often have you transitioned materials in your operations?



What Materials is Your Industry Replacing?

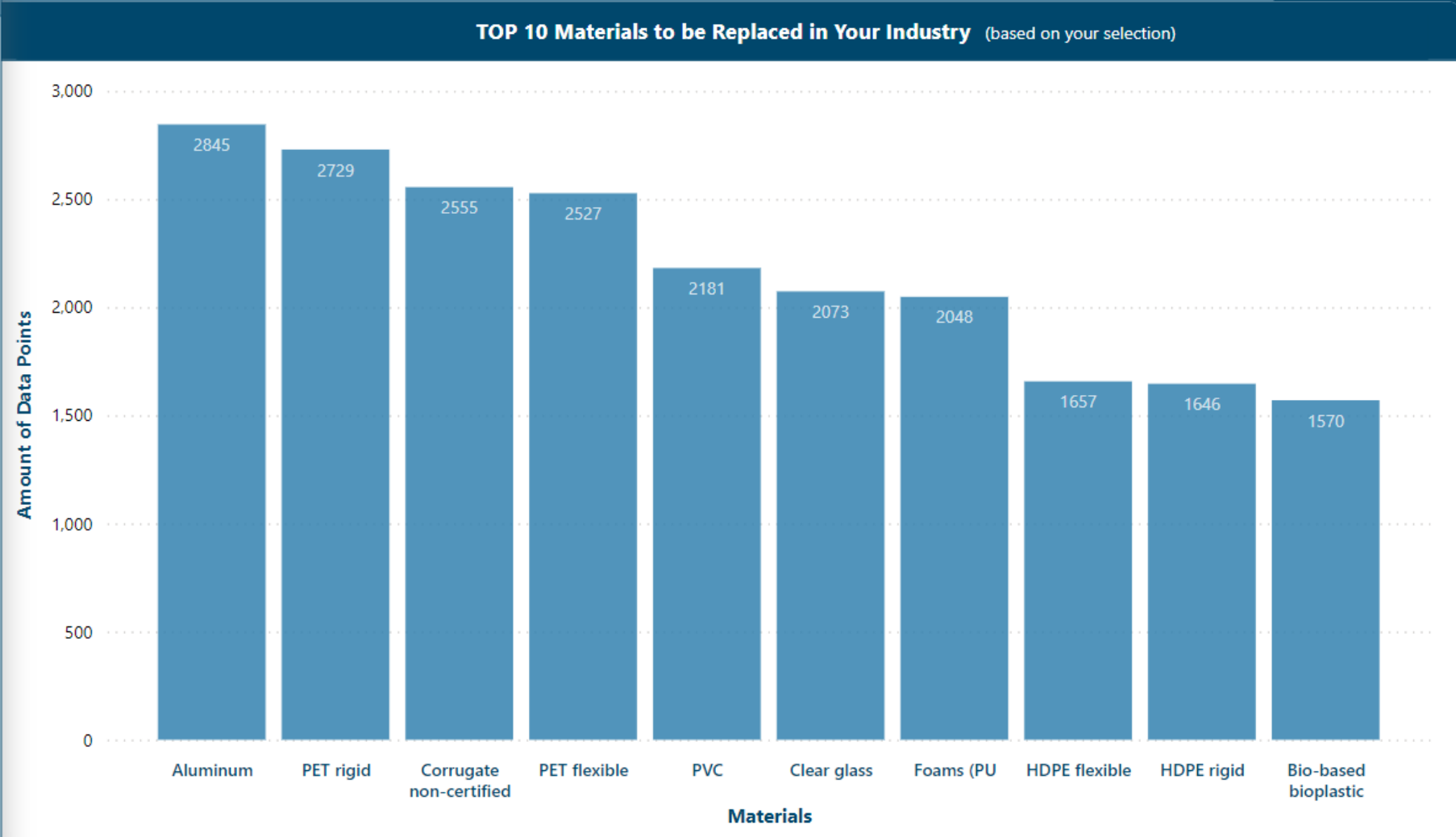
What are Materials being Replaced with?

All Materials

Clear Filters

41K
Data Points

- Select Your Industry or Industries:
- Fruits
 - Grains
 - Hardware/Tools
 - Ingredients
 - Juice
 - Meat/Poultry/Seafood
 - Medical Devices
 - Medical/Dental Instruments or Supplies
 - No Response
 - Nutraceutical
 - Other Beverage Products
 - Other Food Products
 - Other Healthcare Products
 - Other Packaged Products
 - Over-the-counter Products
 - Paper/Printing
 - Pet Food/Pet Care
 - Pharmaceutical
 - Plant-based Foods
 - Powdered Beverages
 - Prepared Foods
 - Soft Drinks
 - Soups/Condiments/Sauces/Spices/Dips/...
 - Spirits/Liquors



What Materials is Your Industry Replacing?

What are Materials being Replaced with?

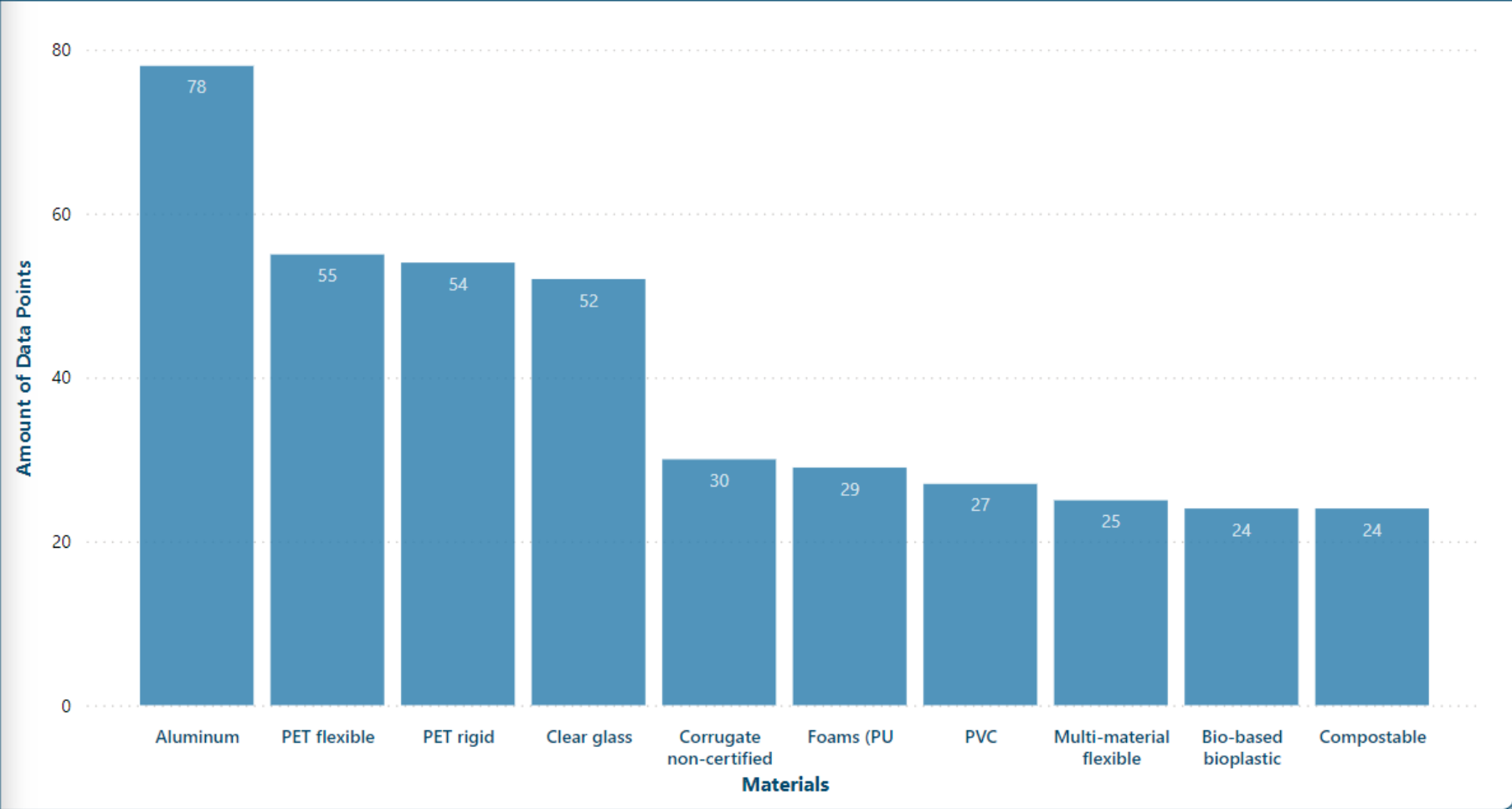
All Materials

Clear Filters

698
Data Points

- Select Your Industry or Industries:
- Select all
 - Automotive Products
 - Bakery/Snack
 - Beer
 - Biological/Biopharmaceutical
 - Building/Construction/Home Improvem..
 - Cannabis/CBD/Hemp Products
 - Cereals
 - Chemical
 - Coffee
 - Confection
 - Consumer Electronics and Appliances
 - Contract Manufacturing Organization-P...
 - Dairy
 - Dairy Products
 - Detergents
 - Drinks
 - Frozen/Refrigerated Foods
 - Fruits
 - Grains
 - Hardware/Tools
 - Ingredients
 - Juice
 - Meat/Poultry/Seafood

TOP 10 Materials to be Replaced in Your Industry (based on your selection)



What Materials is Your Industry Replacing?

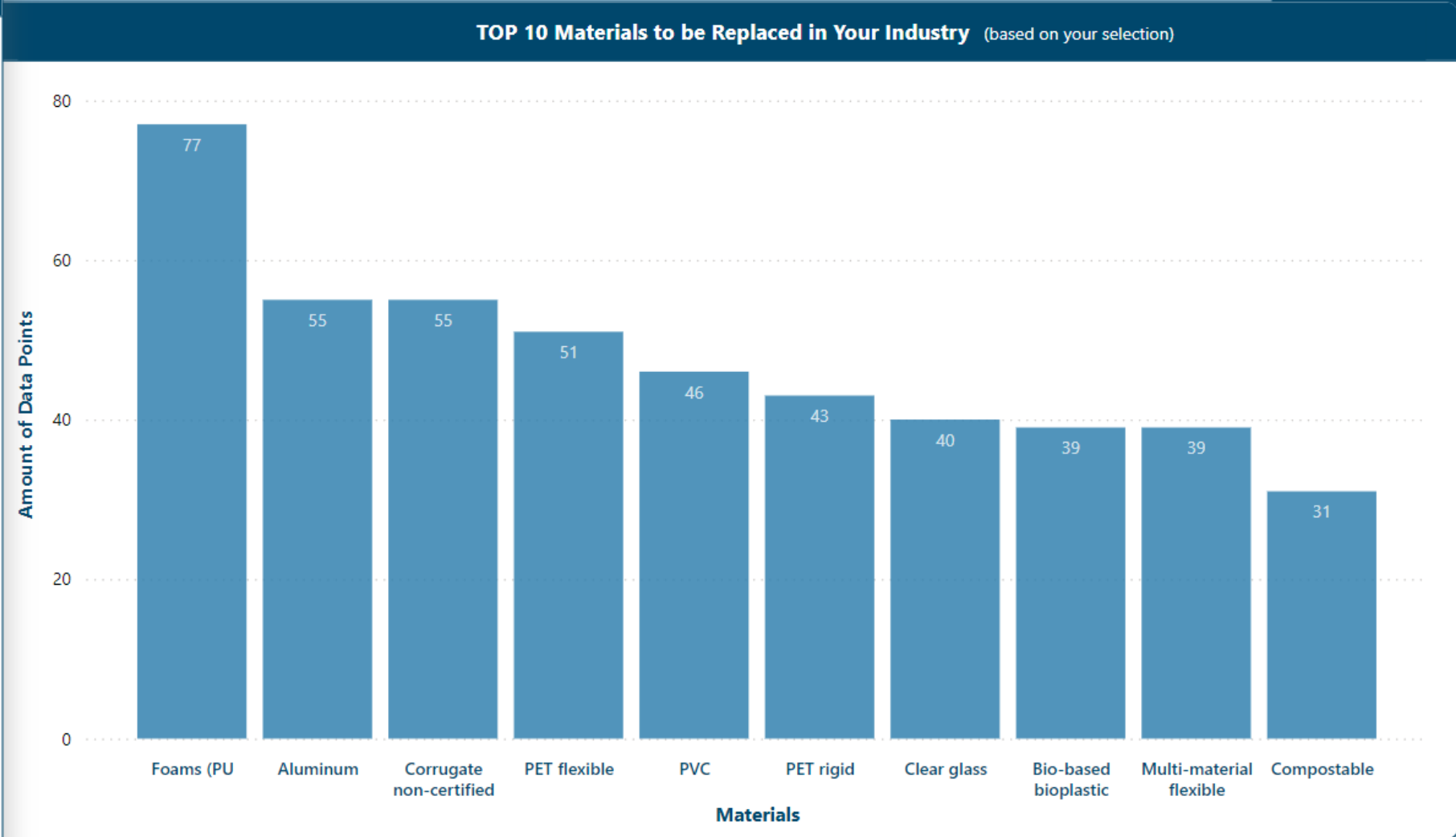
What are Materials being Replaced with?

All Materials

Clear Filters

835
Data Points

- Select Your Industry or Industries:
- Dairy Products
 - Detergents
 - Drinks
 - Frozen/Refrigerated Foods
 - Fruits
 - Grains
 - Hardware/Tools
 - Ingredients
 - Juice
 - Meat/Poultry/Seafood
 - Medical Devices
 - Medical/Dental Instruments or Supplies
 - No Response
 - Nutraceutical
 - Other Beverage Products
 - Other Food Products
 - Other Healthcare Products
 - Other Packaged Products
 - Over-the-counter Products
 - Paper/Printing
 - Pet Food/Pet Care
 - Pharmaceutical
 - Plant-based Foods
 - Powdered Beverages



What Materials is Your Industry Replacing?

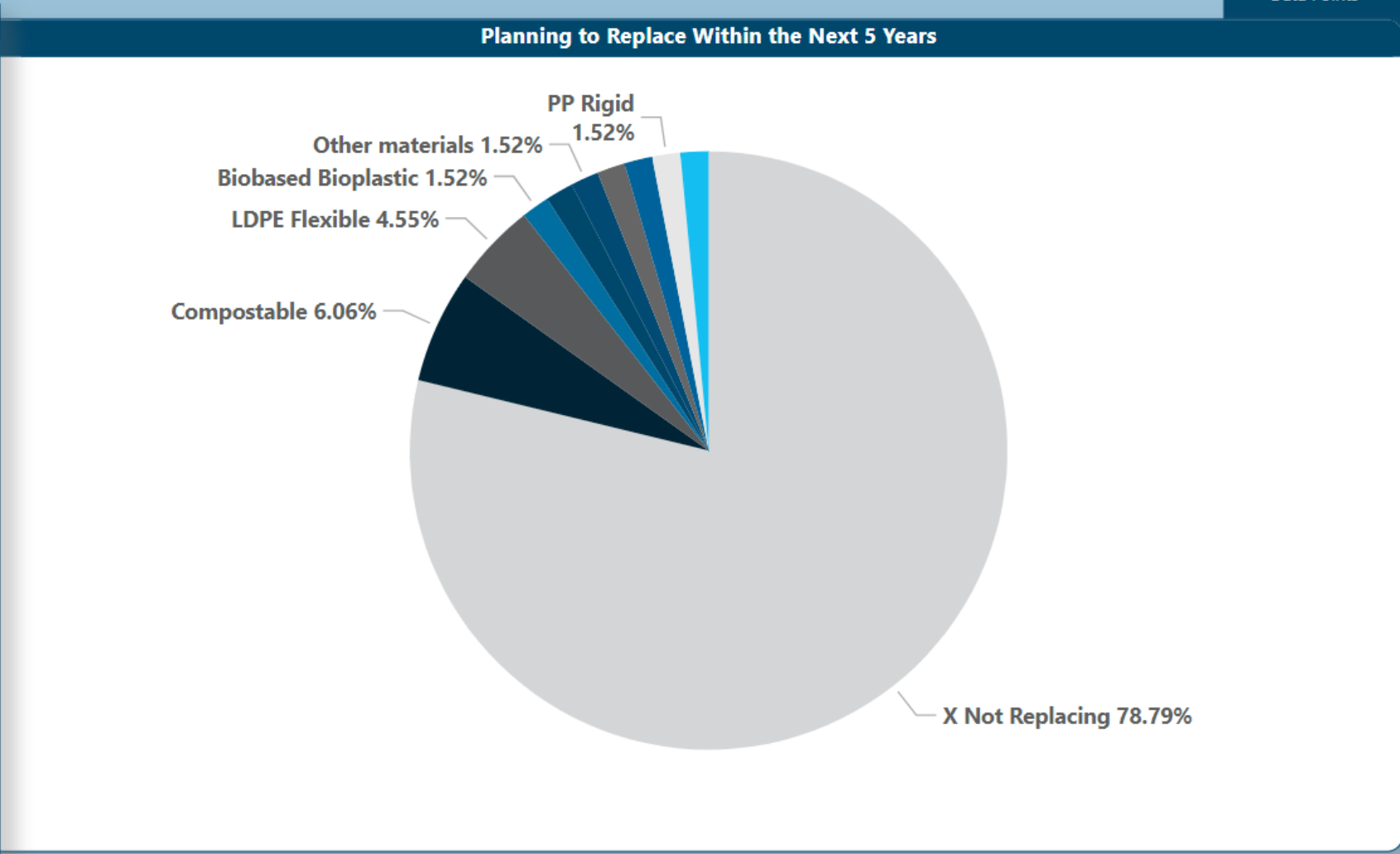
What are Materials being Replaced with?

All Materials

Clear Filters

66
Data Points

- ### Materials Currently Using
- Aluminum
 - Bio-based bioplastic
 - Clear glass
 - Colored glass
 - Compostable
 - Corrugate non-certified
 - Corrugate with forestry certification
 - Foams (PU, PS, PE)
 - HDPE Flexible
 - HDPE Rigid
 - Kraft Paperboard non-certified
 - Kraft paperboard with forestry certification
 - Laminated paperboard
 - LDPE Flexible
 - LDPE Rigid
 - Molded Pulp
 - Multi-material (i.e. cartons or composite cans)
 - Multi-material Flexible
 - Multi-material Rigid
 - Other
 - PCR Flexible
 - PCR Rigid



What Materials is Your Industry Replacing?

What are Materials being Replaced with?

All Materials

Clear Filters

1258
Data Points

Materials to be Replaced with

Current Materials	Aluminum	Biobased Bioplastic	Colored glass	Compostable	Corrugate with forestry certification	Foams (PU, PS, PE)	HDPE Flexible	Kraft Paperboard non-certified	Kraft paperboard with forestry certification	Laminated paperboard	LDPE Flexible
Aluminum											
Bio-based bioplastic		5.26%									5.26%
Clear glass			3.85%								
Colored glass	14.29%										
Compostable											
Corrugate non-certified					6.15%						
Corrugate with forestry certification											
Foams (PU, PS, PE)		4.76%		4.76%							
HDPE Flexible		1.52%		6.06%							4.55%
HDPE Rigid		3.66%		3.66%			3.66%			1.22%	
Kraft Paperboard non-certified									4.76%		
Kraft paperboard with forestry certification											
Laminated paperboard				4.55%							
LDPE Flexible		2.74%		5.48%							
LDPE Rigid				5.26%			5.26%				
Molded Pulp											
Total	0.24%	1.11%	0.08%	2.78%	0.40%	0.08%	0.48%	0.08%	0.32%	0.08%	0.08%

THANK YOU!

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pmmi.org/research
pmmi.org/materials
packexpo.com