CUSTOM RESEARCH

The New Material World:

Packaging's Path Toward Sustainability, a Compass Update

SEPTEMBER 2025

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Introduction

Packaging is everywhere. Without packaging, basic parts of our daily lives would be completely different. Packaging plays an integral part in delivery, protecting different objects or products like food, and maintaining the hygiene of health products. However, it's successful execution is hardly acknowledged, especially in comparison to when it fails.

The main goals of packaging, which are to market the product and protect it from damage promoting the integrity, health and safety of the product cannot be dismissed completely to satisfy recycling and composting needs. It is also not as simple as changing the design. Any changes made to a package itself must also be coordinated with product filling systems, distribution channel needs and consumer packaging demands. Finding the right balance will require collaboration at both the design and recovery phases.

Reflecting on our work for this topic from 2023, we aim to support and promote that dialogue and to measure what's changed in this dynamic industry. This paper begins a conversation on trends, forecasting a 3-5 years ahead, looking at the OEM point of view.

Who We are and What We Do

PMMI is a trade association for the packaging and processing industry, unifying the industry across the manufacturing community. PMMI members create answers to meet evolving consumer demands by advancing manufacturing. Over 1000 North American manufacturers and suppliers of equipment, components, and materials are members of PMMI, along with many providers of related equipment and services to the packaging and processing industry.

PMMI Business Drivers support the industry by delivering a variety of valuable resources, such as in-depth market research, practical best-practice tools and reports, specialized technical training, networking events, and other essential services.

PMMI brings consumer goods companies together with our members' manufacturing solutions through the premier PACK EXPO portfolio of trade shows, including PACK EXPO International, PACK EXPO Las Vegas, PACK EXPO East, PACK EXPO Southeast, EXPO PACK México, and EXPO PACK Guadalajara.

Year-round, PMMI Media Group keeps manufacturers informed about the latest solutions, trends, and innovations in packaging and processing through a wide range of print and digital platforms, such as Packaging World, Healthcare Packaging, Contract Packaging, ProFood World, Mundo PMMI, and OEM.

Report by PMMI Media Group Custom Research

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Methodology

Methodology

In this study, the quantifiable data on projected packaging trends and design preferences were based on survey responses collected between late 2024 and early 2025. PMMI Media Group Custom Research received responses from 222 individuals representing 201 CPG companies and 80 respondents from over 55 OEM companies, for a total of 302 participants.

Among these 302 respondents, 15 individuals participated in follow-up qualitative interviews. These interviews provided deeper context to support the quantitative findings and offered insights that were not always evident in survey data alone.

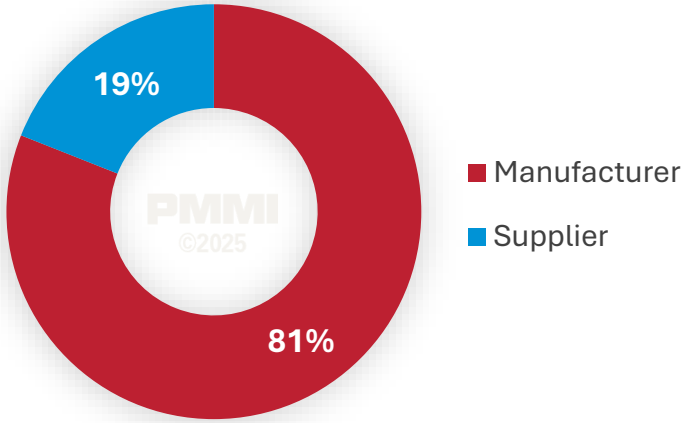
To identify shifts over time, PMMI Media Group Custom Research compared the current findings with 2022 data from the 2023 Compass Report, which was developed in collaboration with AMERIPEN.

Quantitative & Qualitative

PMMI Media Group Custom Research gathered quantitative insights on sustainability and the transition to alternative materials in the industry by conducting two separate surveys—one focused on End Users and the other on OEMs.

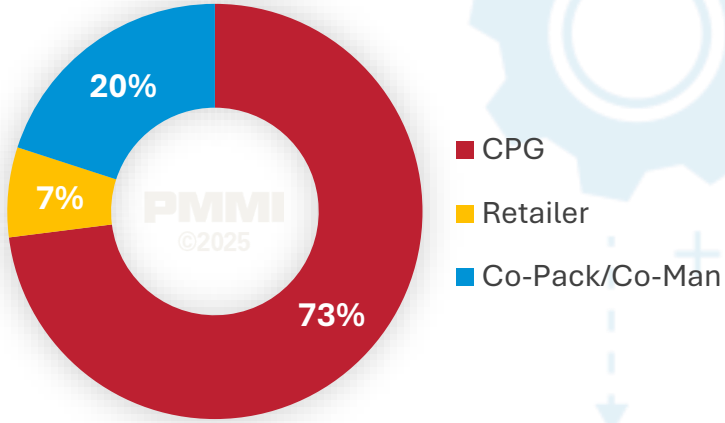
Suppliers

n = 80



End Users

n = 222



After the survey, PMMI Media Group Custom Research sought to further explore sustainability by collecting qualitative data. To achieve this, they conducted fifteen in-depth interviews with OEMs and End Users, each lasting between 30 and 60 minutes.

5

OEM Interviews

4 manufacturers & 1 supplier

10

End User Interviews

5 CPGs, 4 Co-Pack/Co-Man & 1 Retailer

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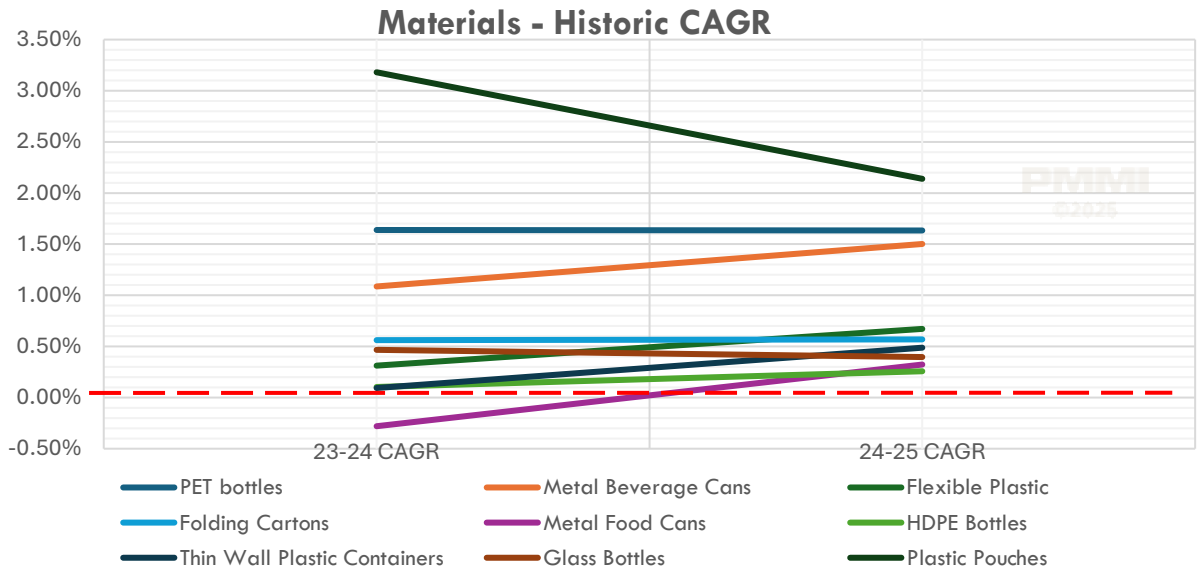
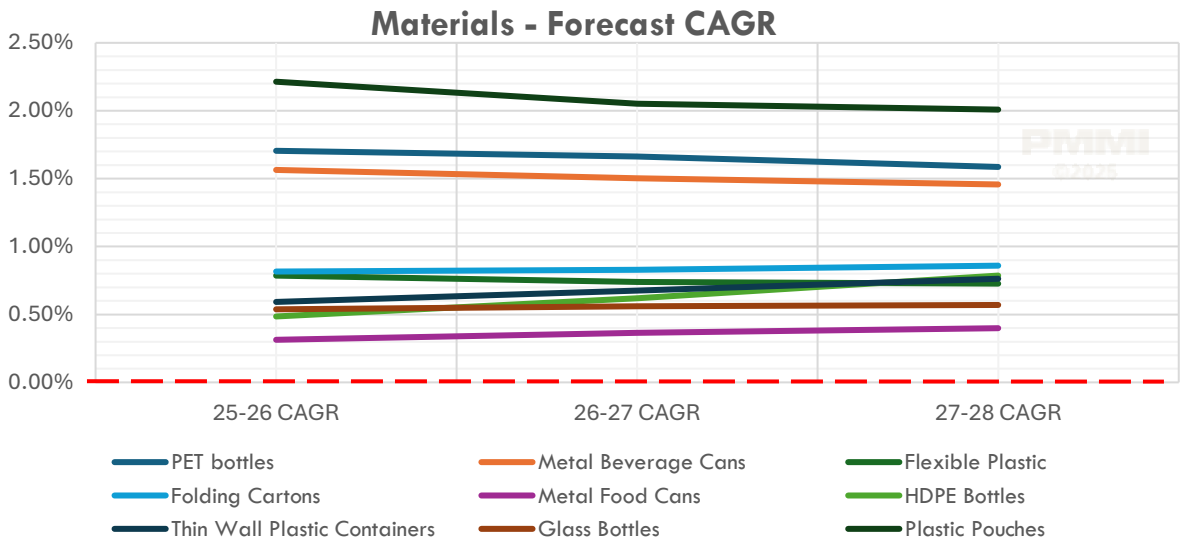
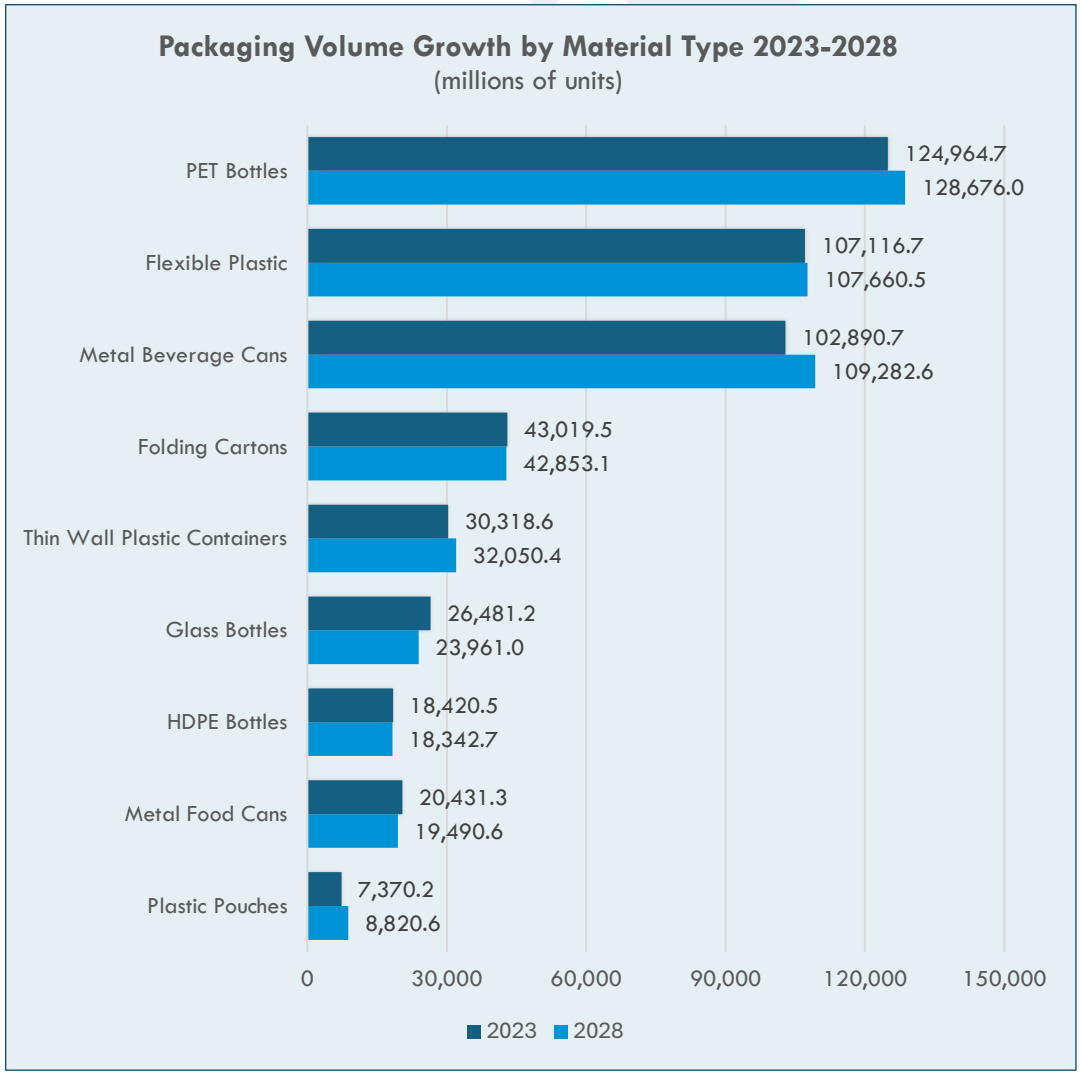
PMMI 2023 Compass Report & 2025 State of the Industry (SOTI)

2023 Compass Report – What's Changed?







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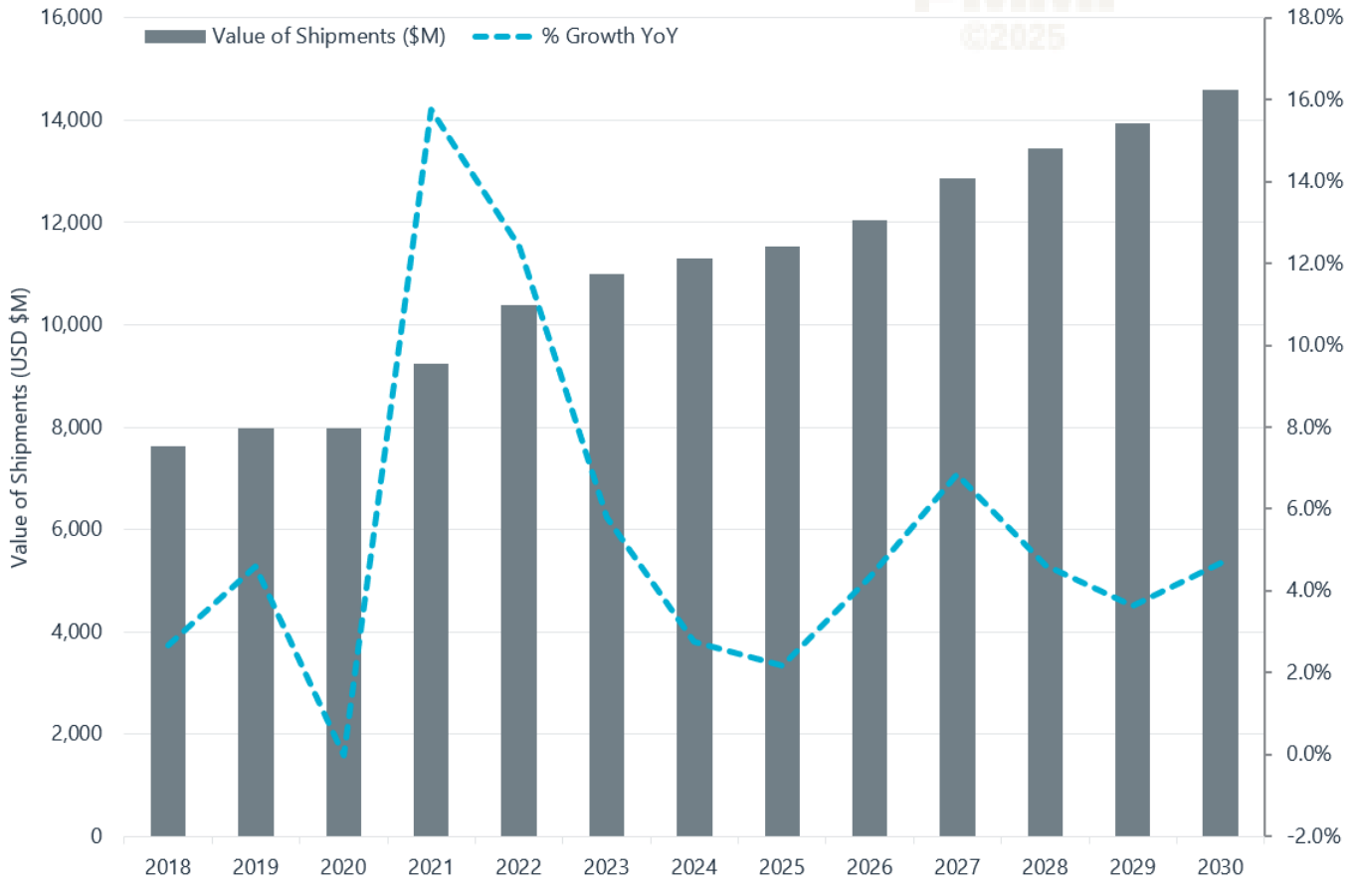
2025 SOTI

In 2024, US Packaging Machinery Sales reached

$11.3bn

As 2025 unfolds, the packaging machinery market is projected to grow 2.2%, reaching $11.5 billion in shipments. Although more modest compared to the past couple of years, this growth reflects steady investment in automation, especially in sectors navigating workforce shortages and demand for more flexible machinery.

Fig. 24 US Packaging Machinery Forecast - Value of Shipments & % Growth YoY



The State of the Industry graph was made and provided by Interact Analysis

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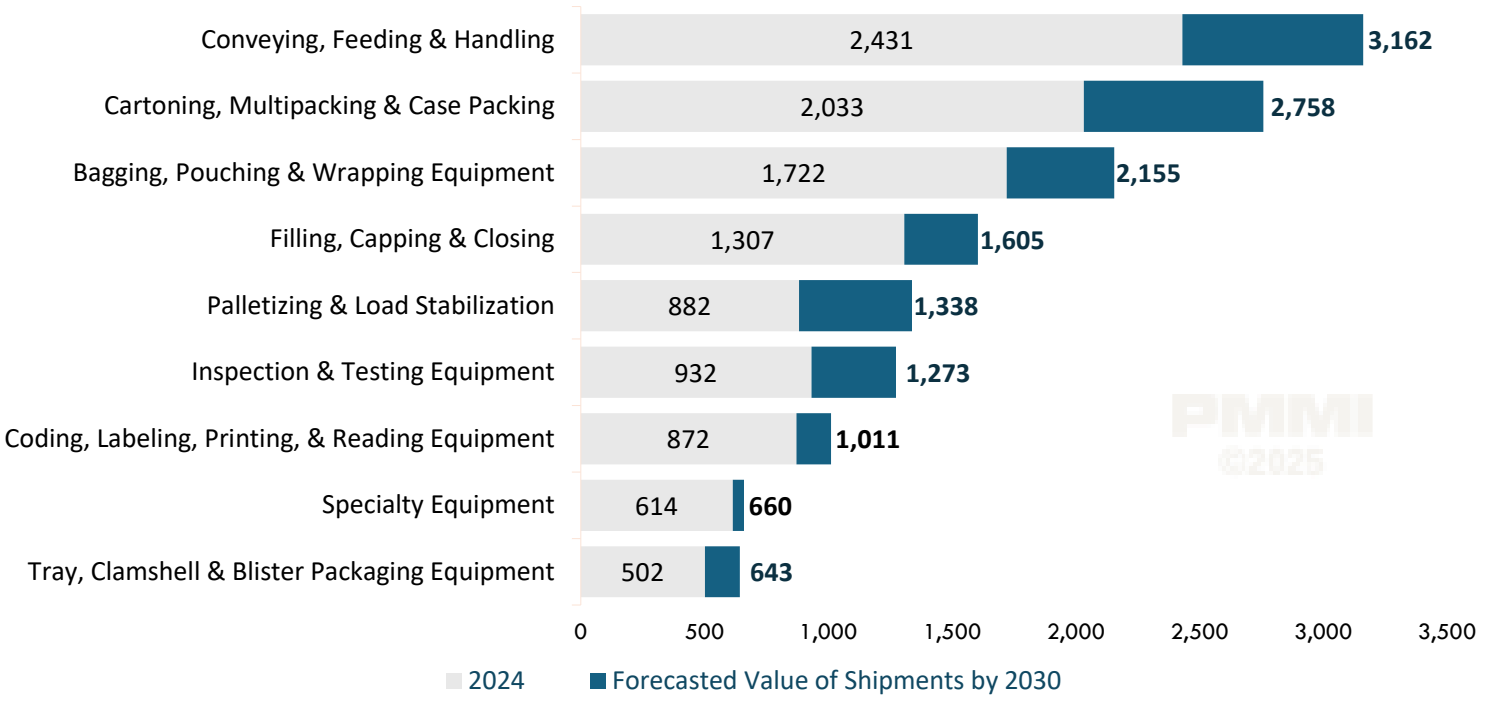
2025 SOTI

Fig. 7 US Value of Shipments by Machine Categories - 2024 - 2030 - ($USD)



The State of the Industry graph was made and provided by Interact Analysis

Machine shipments are forecasted to increase across all segments. There is an especially strong demand for conveying, feeding, and handling as well as cartoning, multipacking, and case packing. While growth is evident in every category, expansion is especially pronounced in areas driven by automation and retailer requirements, which are leaning toward more sustainable solutions.

By 2030

Conveying, Feeding, and Handling is expected to grow significantly, reaching **$3.2 billion**

Cartoning, multipacking, and case-packing is expected to grow significantly, reaching **$2.8 billion**

Inside the CPG Reality

What guidelines, active or impending legislation, if any, are influencing your current strategy?

(select all that apply)

During interviews, End Users repeatedly highlighted the lack of strong federal guidance, noting that their decisions are instead shaped by more immediate pressures—state mandates and retailer requirements. States like California, with more aggressive regulations, are setting the standard, prompting End Users to monitor federal activity while ultimately prioritizing state laws and retailer demands.

OEMs feel the ripple effects of these pressures. As governments and retailers push CPG companies toward more sustainable practices, End Users turn to OEMs for equipment capable of handling sustainable materials. Additionally, as carbon footprint reporting expands to include OEMs, they are increasingly drawn into the sustainability equation.

> I think right now there's a lot of questions as to what's going to happen with the government and its oversight of corporations and the things that we do.
> *- Director of Engineering, CPG*

> From a state or federal standpoint, nobody's telling us we have to build a machine a certain way to meet any type of sustainability criteria. It's the CPG that's telling us.
> *- Managing Director, PMMI Member*

Top 5 Selected by **End Users** Shown Below

Top 5 Selected by **Suppliers** Shown Below

Question: What guidelines, active or impending legislation, if any, are influencing your current strategy?
(select all that apply)

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The CPG Perspective on Trade-offs

As companies transition to sustainable materials, trade-offs are almost guaranteed—only 7% of survey respondents reported no trade-offs. The most common challenges include higher production costs and diminished product protection and product quality. These findings were echoed in qualitative interviews, where CPGs of all sizes cited cost and performance risks as top concerns. Economic pressure, especially cost implications, has been the primary barrier to adoption. End Users are wary not only of direct material cost increases but also of downstream risks such as product damage or failure. Whether rooted in experience or perception, these risks remain key deterrents to accelerating sustainability efforts.

> Maybe a recycled plastic pallet wrap is bought, and it doesn't stick or just doesn't work as effectively or recycled plastic bags and it doesn't hold well enough, especially under certain temperature circumstances. I don't mind adopting something that's new. I think right now we just can't afford to have a lost batch or a lost pallet in that type of way.
>
> *- President, CPG*

In the adoption of sustainable packaging, what trade offs, if any, do you see the most? In other words, what would you be (or are you) giving up in adopting sustainable packaging? (select multiple)

- **66%** Lower cost of production
- **33%** Product quality
- **28%** Product protection
- **27%** Shelf life of product
- **18%** Branding and/or marketing
- **10%** Shelf space
- **7%** No trade offs

Q17: In the adoption of sustainable packaging, what trade offs, if any, do you see the most? In other words, what would you be (or are you) giving up in adopting sustainable packaging? *(select multiple)*

The OEM Perspective on Trade-offs for CPGs

As End Users move toward sustainability, they must juggle trade-offs while adopting new strategies and materials. In response, OEMs and suppliers are adapting their machinery and parts to work with these sustainable materials. From the OEM perspective, the most common trade-offs End Users face are packaging performance and equipment performance—both often requiring new innovations or modifications to handle current and emerging materials. Compared to End Users themselves, OEMs are less likely to cite higher production costs as a barrier. Other trade-offs OEMs observe include shortened product shelf life (28%), slower ROI (23%), and reduced machinery flexibility (22%). Yet, 16% of OEMs report seeing no trade-offs at all—nearly double the rate reported by End Users (7%). This gap suggests that End Users may be experiencing more trade-offs than OEMs recognize.

> Board machines in general are very sensitive, and the machines typically run more efficiently when you get the exact same criteria on your board for every single run. But when you get one pallet of 50% recyclable, the next one is 25, next one is zero, next one is 100, it's sometimes either we have to make changes on the fly or once again, we've got to build in factors to make the machine more forgiving.
>
> *- Managing Director, PMMI Member*

What trade offs do you see, if any, in the adoption of equipment that uses sustainable materials? In other words, what would your customers be giving up by using machinery designed for sustainable materials?

42% Packaging performance

34% Performance of equipment

29% Lower cost of production

28% Shelf life of product

23% Faster ROI

22% Machinery loses flexibility

16% No trade offs

Q12 - What trade offs do you see, if any, in the adoption of equipment that uses sustainable materials? In other words, what would your customers be giving up by using machinery designed for sustainable materials? - *Selected Choice*

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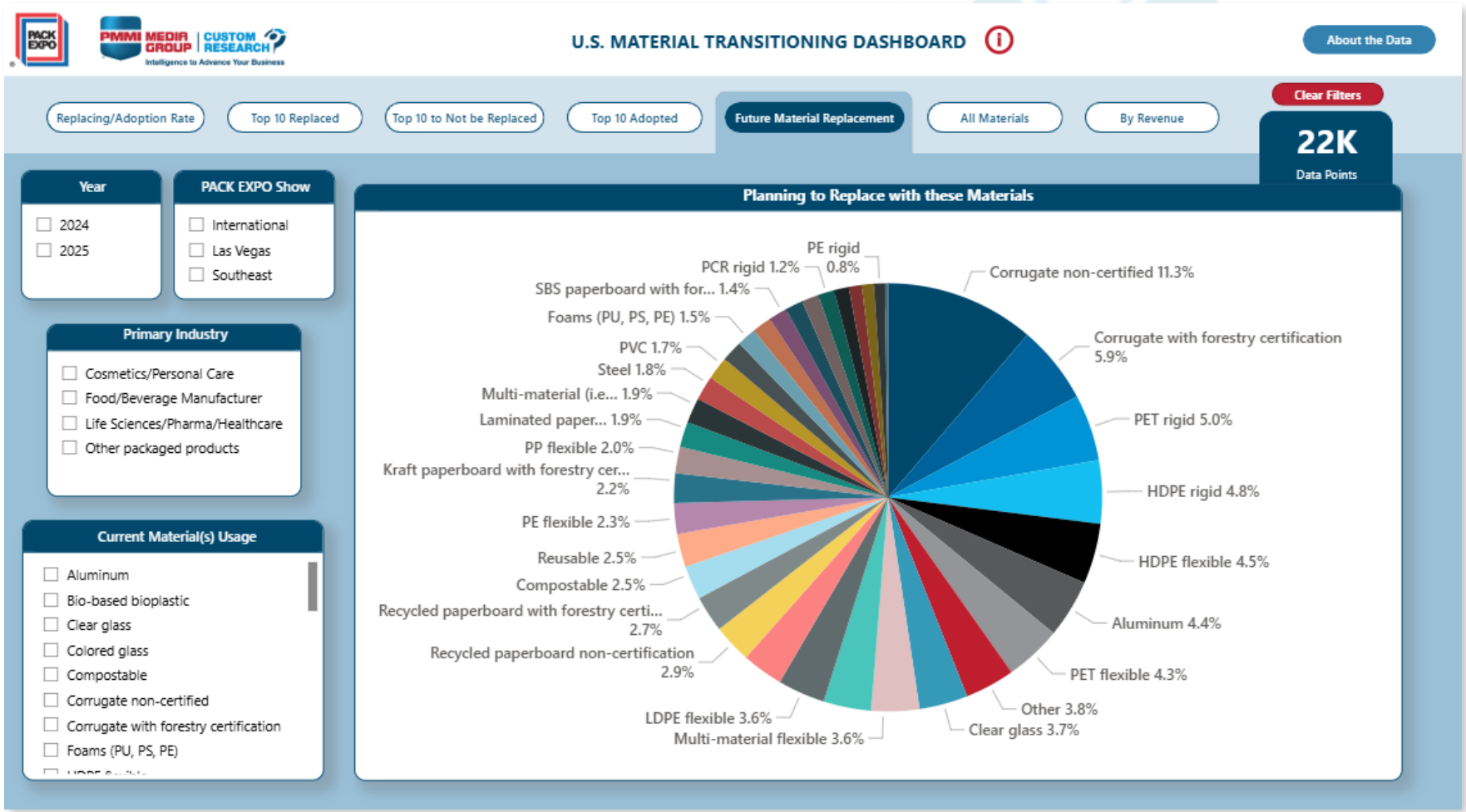
Evolving Packaging Materials

PMMI Materials Dashboard

The data shown in the dashboard was collected directly from PACK EXPO attendees and is based on the U.S. only. During registration, our attendees, who are comprised of CPG companies, contract packagers/manufacturers, and other end users, were asked to select up to three materials their company will replace in the next three to five years, if any, which was then used as a starting point in the measurement of where materials are headed.

These percentages are comprised of more than 20,000 data points, which represent the total number of *responses* collected. For example, if one person selected three materials to replace, that would count as three data points.

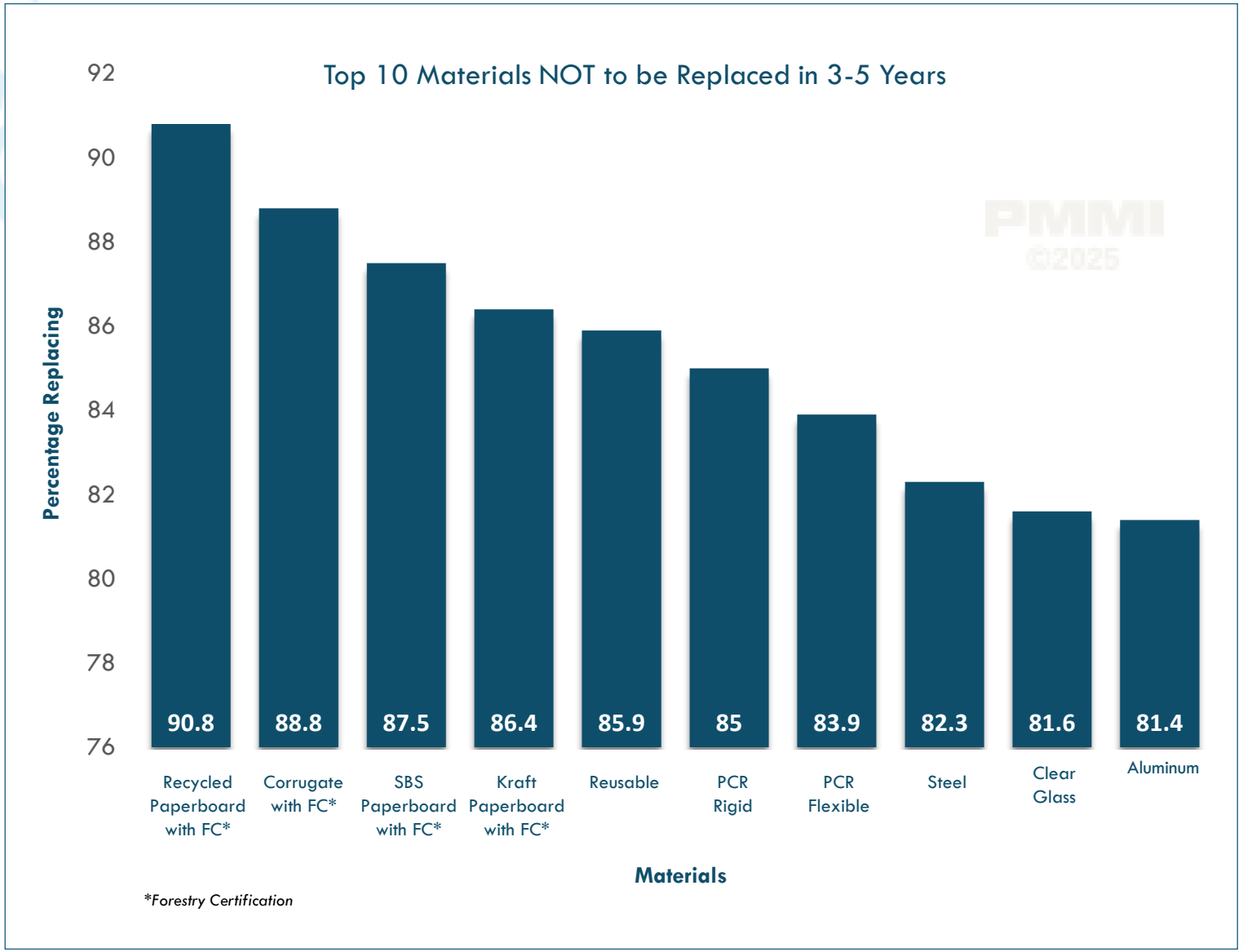
See this information and more at: ***www.pmmi.org/business-intelligence/material-transitioning-dashboard***



PMMI Materials Dashboard: Materials NOT to be replaced in 3-5 years

Lastly, the chart on the left is showing the top 10 materials CPGs are NOT planning to replace within the next three to five years as of mid-March 2025. This means they will most likely continue to incorporate these materials in their packaging. The material that is most likely to remain in usage is recycled paperboard with forestry certification (91%). Overall, a large number companies are planning to adopt paper in their packaging materials.

See this information and more at:
www.pmmi.org/business-intelligence/material-transitioning-dashboard



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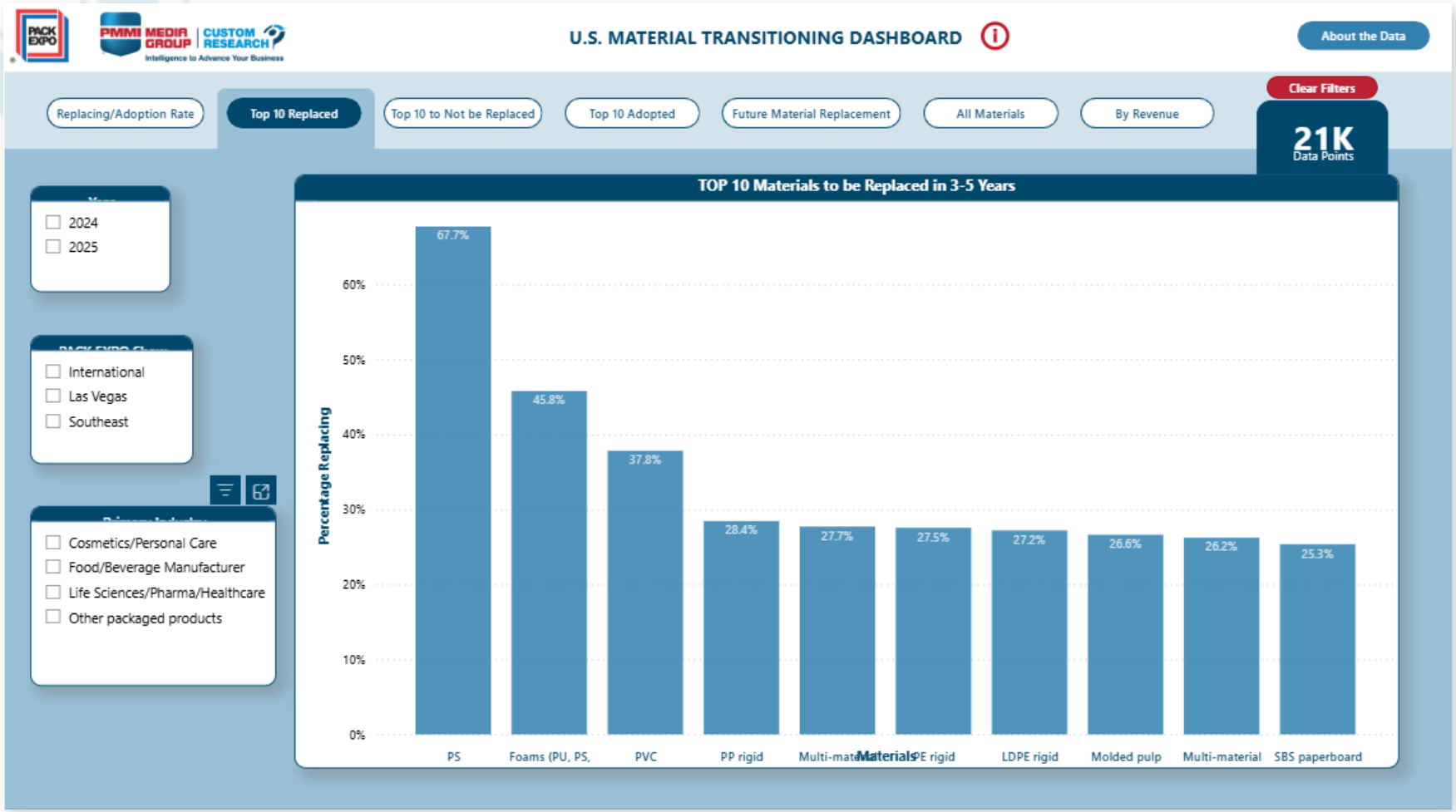
PMMI Materials Dashboard: Materials to be replaced in 3-5 years

CPG companies are planning to replace currently used materials with the materials in the pie chart as of mid-March 2025. Corrugate is the leading material CPGs are looking at using in the future. Although, respondents who are able to use PCR (which can be industry- dependent) are indicating that they will incorporate more of this material into their packaging in the future.

See this information and more at:
www.pmmi.org/business-intelligence/material-transitioning-dashboard

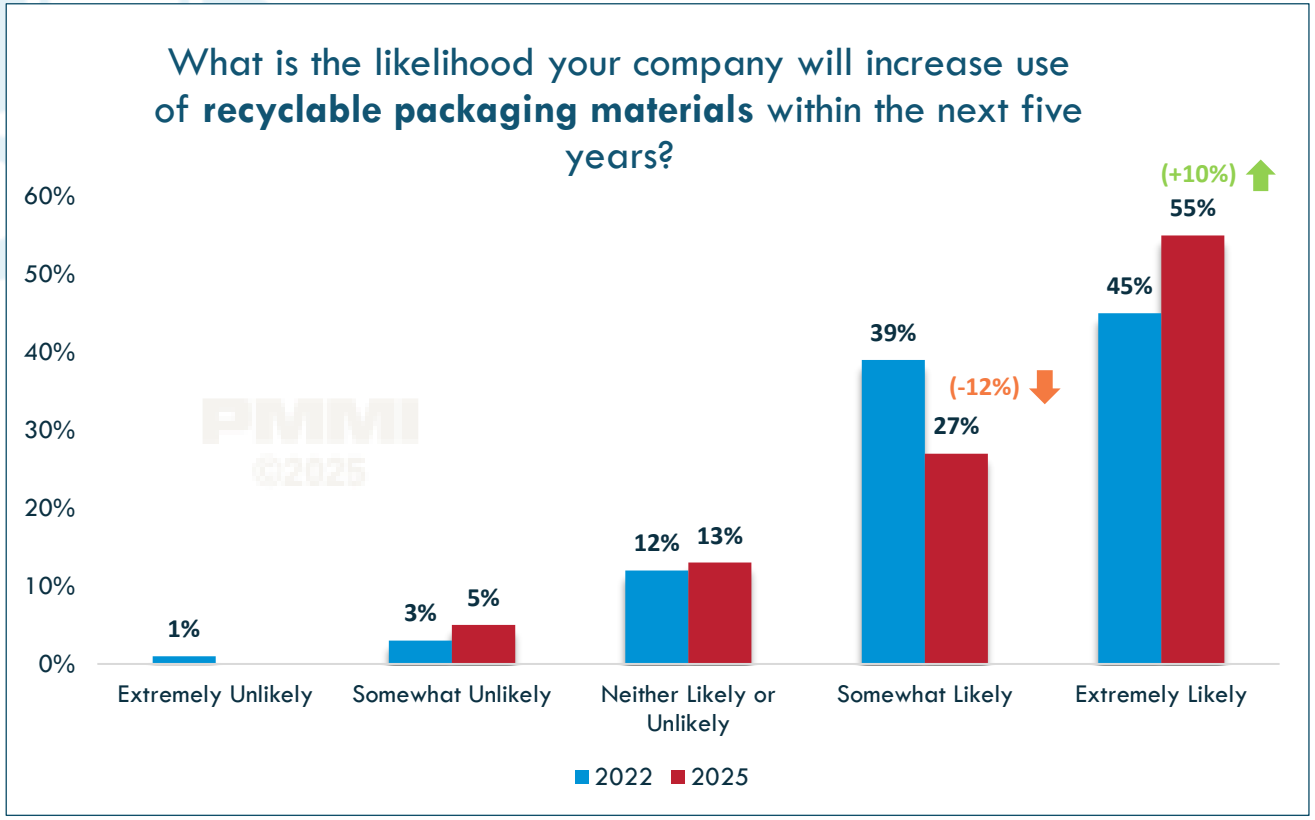


Recyclable Materials

The most notable shift in likelihood to use recyclable packaging materials was an increase from "Somewhat Likely" to "Extremely Likely," indicating a strengthening in commitment. In both years, over net 80% of respondents indicated that their company was likely to increase the use of recyclable materials within the next five years.

Between 2022 and 2025, there was minimal change in the proportions of respondents who selected "Extremely Unlikely," "Somewhat Unlikely," or "Neither Likely nor Unlikely" suggesting in the past few years, those who were already committed have only strengthened their commitment, and those who were not committed, remain non-committed. However, the 2025 data suggests that respondents have become more confident in this trajectory over time.

Quantitative findings confirm that recyclable materials remain the top sustainability priority for most companies, particularly in cases where retailers require their use. While adoption is expected to grow, cost remains a significant barrier—especially for smaller or cost-sensitive brands—unless material prices decline or regulatory pressures intensify.



Highlighting percentages with a five or more-percentage change

Q20: What is the likelihood your company will increase use of recyclable packaging materials within the next five years?

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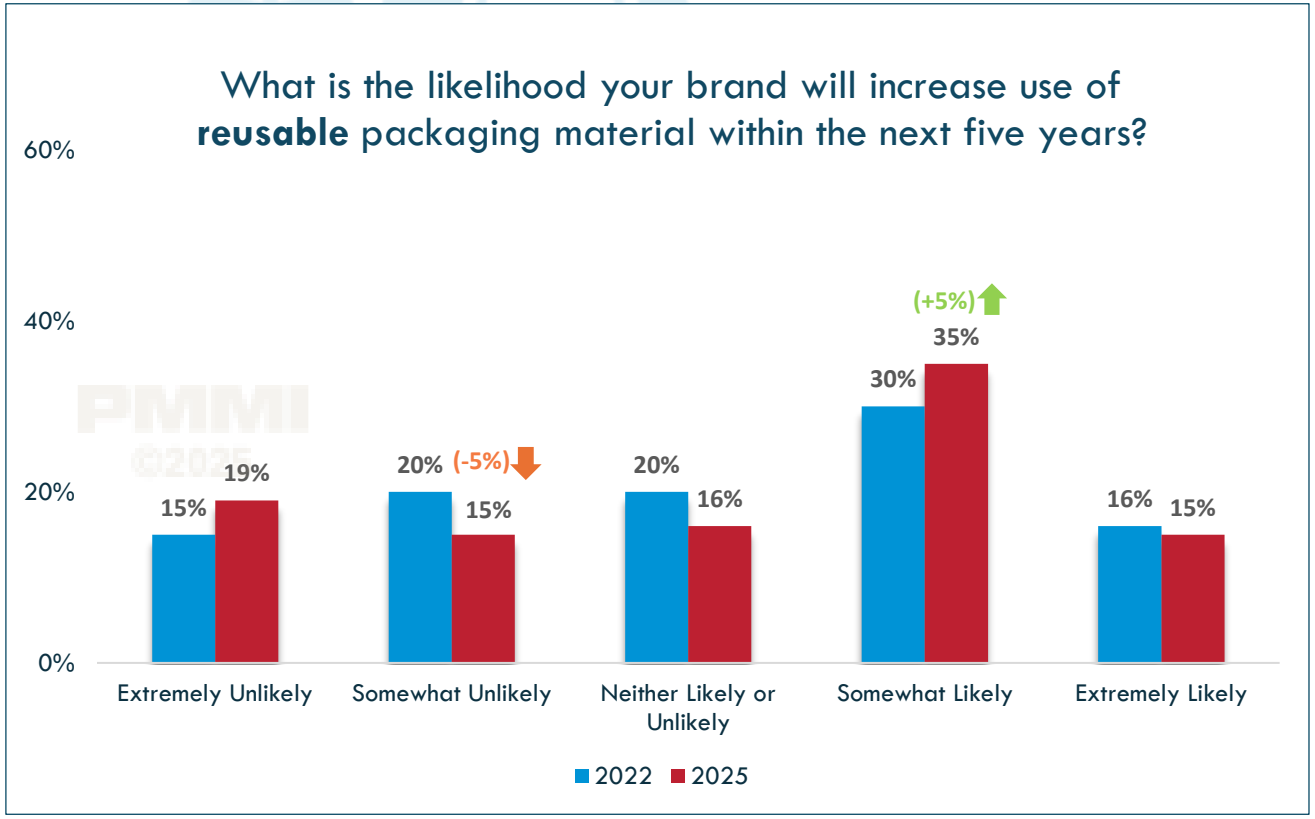
Reuseable Materials

From 2022 to 2023, likelihood of increasing use of reusable packaging materials remained relatively constant. A key hurdle for reusable materials, highlighted in the 2023 Compass Report, is the lack of reusability infrastructure. While interest in building this infrastructure is growing, cost and development remain major barriers.

Qualitative insights indicated that most End User companies reported a low to moderate likelihood of increasing their use of reusable materials. While reusable options are employed in select applications, they still face structural, logistical, and cost-related challenges that hinder broader implementation. Consequently, recyclable materials continue to be the primary focus for packaging innovation and sustainability initiatives.



Highlighting percentages with a five or more-percentage change

Q23: What is the likelihood your brand will increase use of reusable packaging material within the next five years?

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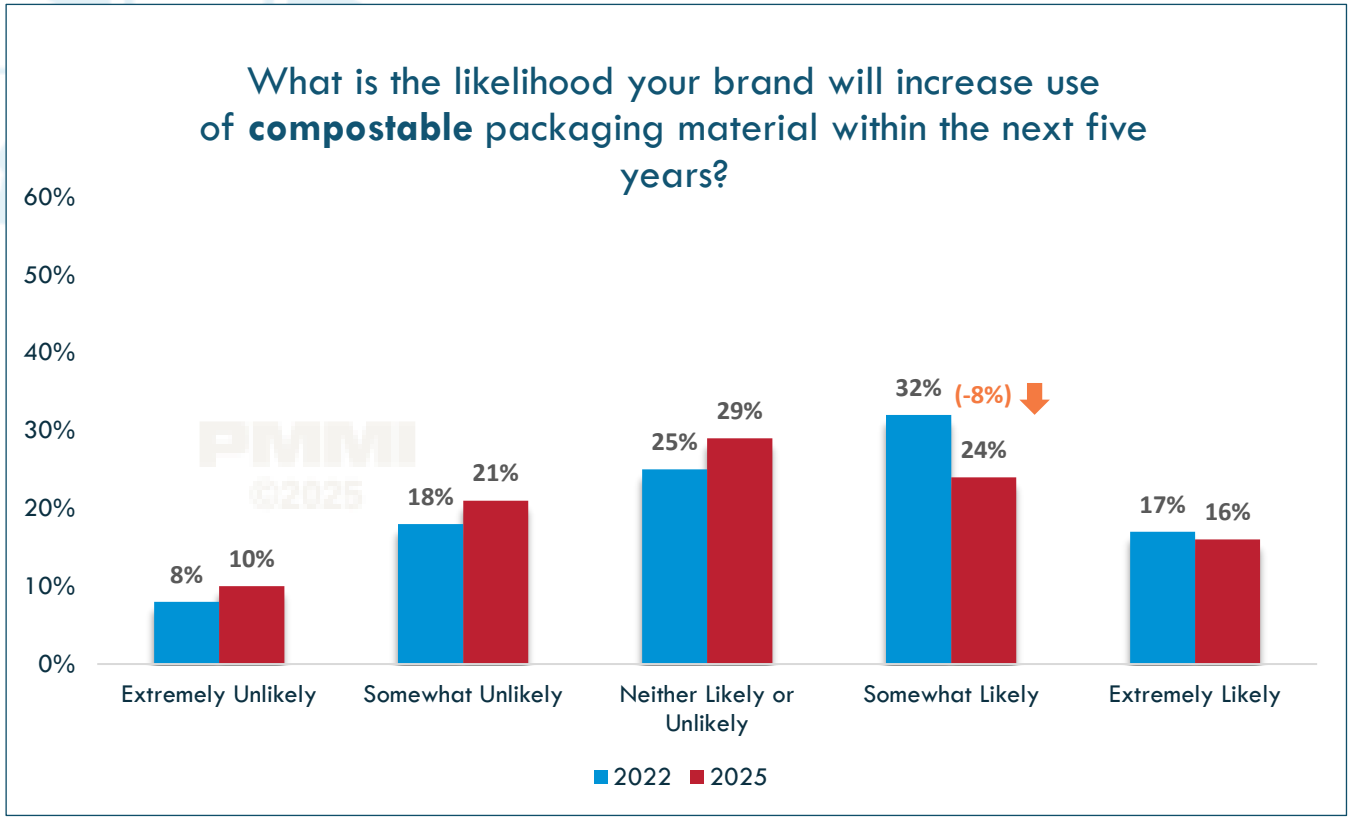
Compostable Materials

In the 2023 Compass Report, a key finding highlighted growing momentum in the industry toward the adoption of compostable materials. By 2025, that trajectory has slowed, with a modest rise in respondents currently viewing adoption as unlikely—perhaps due to limited infrastructure supporting compostables.

The most notable shift is an 8% drop since 2022 in those "Somewhat Likely" to adopt compostable packaging within the next five years, reflecting growing uncertainty.

During the interviews, most End User companies expressed an overall reluctance to implement compostable materials. Key challenges cited include material performance limitations under food-grade conditions, lack of cost competitiveness, inadequate composting infrastructure, and limited consumer demand. As a result, the industry trend currently favors recyclable materials, with compostables remaining a developing and exploratory area.



Highlighting percentages with a five or more-percentage change

Q22: What is the likelihood your brand will increase use of compostable packaging material within the next five years?

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CPG & OEM Alignment: Are We Closer Than We Think?

Current Sustainability Strategies by CPGs & OEMs

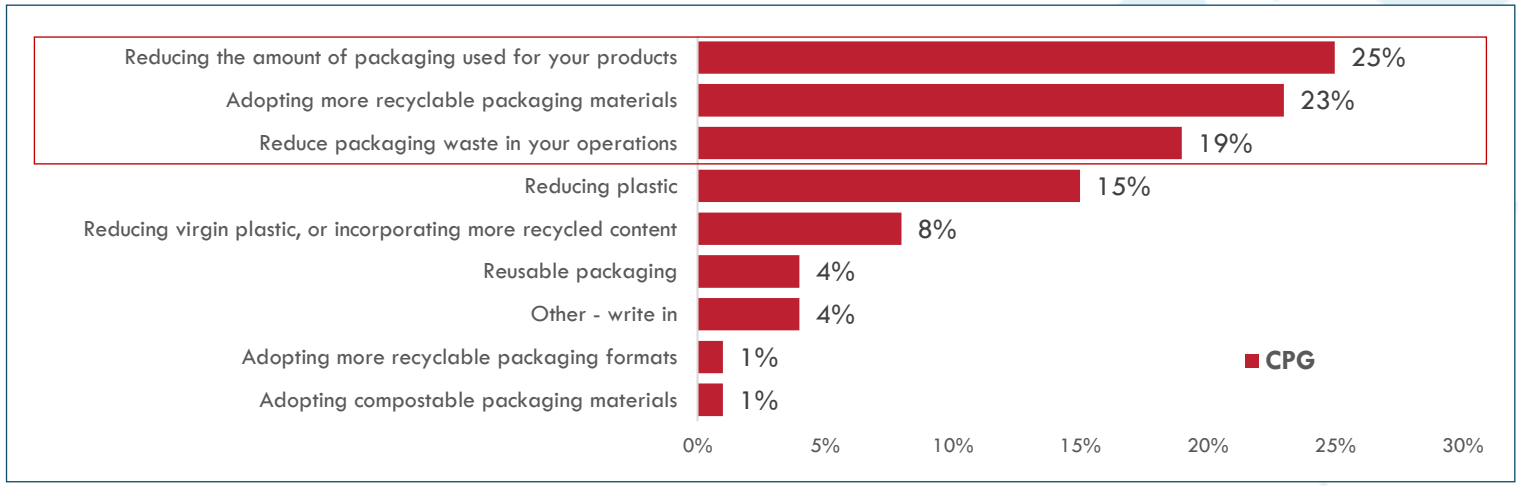
Top 3 strategies placed in the number 1 position by **CPGs**

1. Reducing the amount of packaging used for your products
2. Adopting more recyclable packaging materials
3. Reduce packaging waste in your operations

Less Packaging

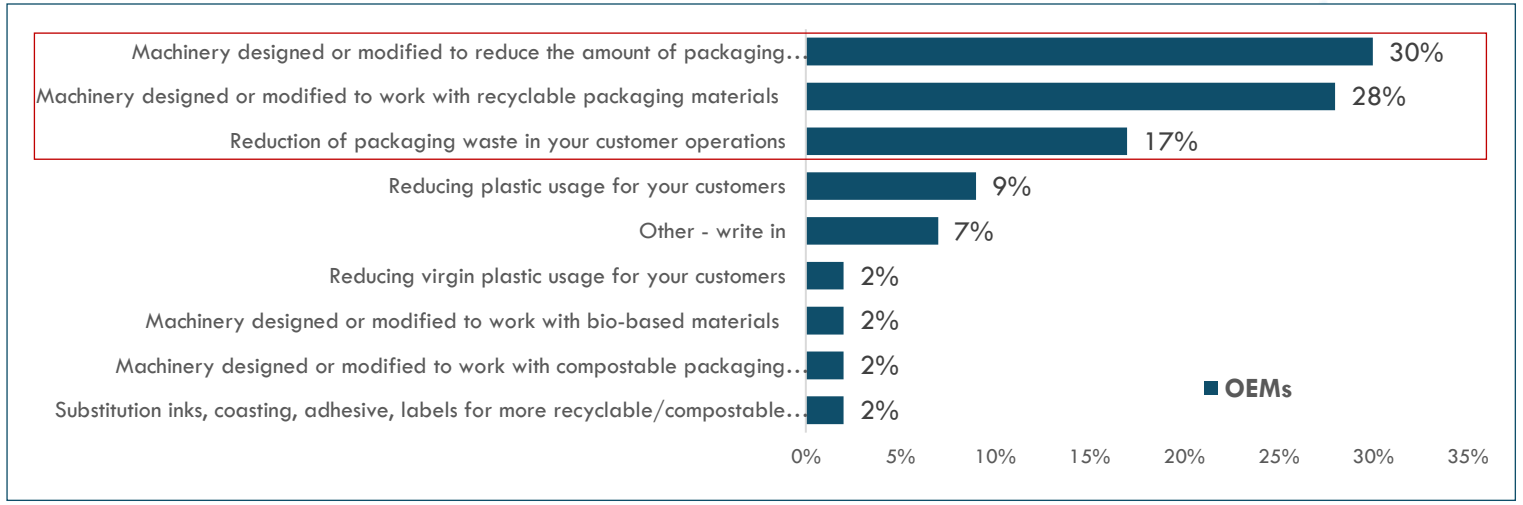
More Recyclable Packaging

Reducing Packaging Waste



Top 3 strategies placed in the number 1 position by **OEMs**

1. Machinery designed or modified to reduce the amount of packaging used for your products
2. Machinery designed or modified to work with recyclable packaging materials
3. Reduction of packaging waste in your customer operations



Q5: Please rank your selected strategies in order of importance by clicking and dragging your choices into position. Your most important sustainability design strategy should be in the number 1 position.

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Existing packaging machinery is one of the biggest technical barriers to adopting sustainable materials in End User operations.

End Users are constrained by:

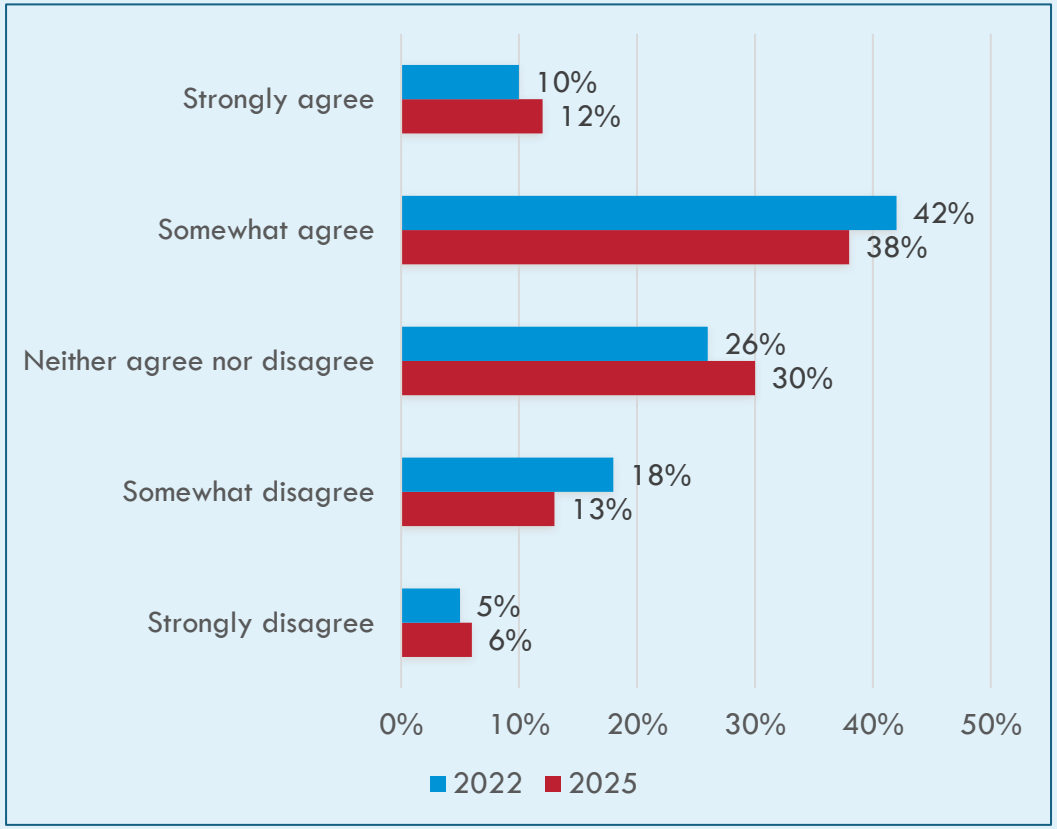
- Material incompatibility
- Performance issues (sealing, shelf-life, durability)
- Cost of upgrades
- Operational efficiency trade-offs

Until equipment is updated/replaced, or materials evolve to become more compatible with legacy lines, companies will continue to make incremental changes rather than transformative shifts in sustainable packaging.

> We either really do what we can to make it work and maybe run at a slower speed and explain that, or we'd say it's not feasible.
>
> - *Industrial Engineer, Co-Packager/Co-Manufacturer*

Q15: To what extent do you agree or disagree that limitations of packaging machinery are preventing you from accomplishing your sustainability goals?

To what extent do you agree or disagree that limitations of packaging machinery are preventing you from accomplishing your sustainability goals?



50%

Of End Users in 2022 and 2025 agree that limitations of packaging machinery are preventing them from accomplishing their sustainability goals.

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Machinery & Sustainable Materials

Q13: Are you currently manufacturing machinery that has been redesigned/modified to work with more sustainable materials?

64%

Of OEMS are currently manufacturing machinery that has been redesigned or modified to accommodate more sustainable materials.

Q14: Currently, what percentage of your machinery are you designing or modifying for enabling usage with sustainable materials?

49%

Of OEMS say up to a quarter of their machinery is designed or modified to enable usage with more sustainable materials.

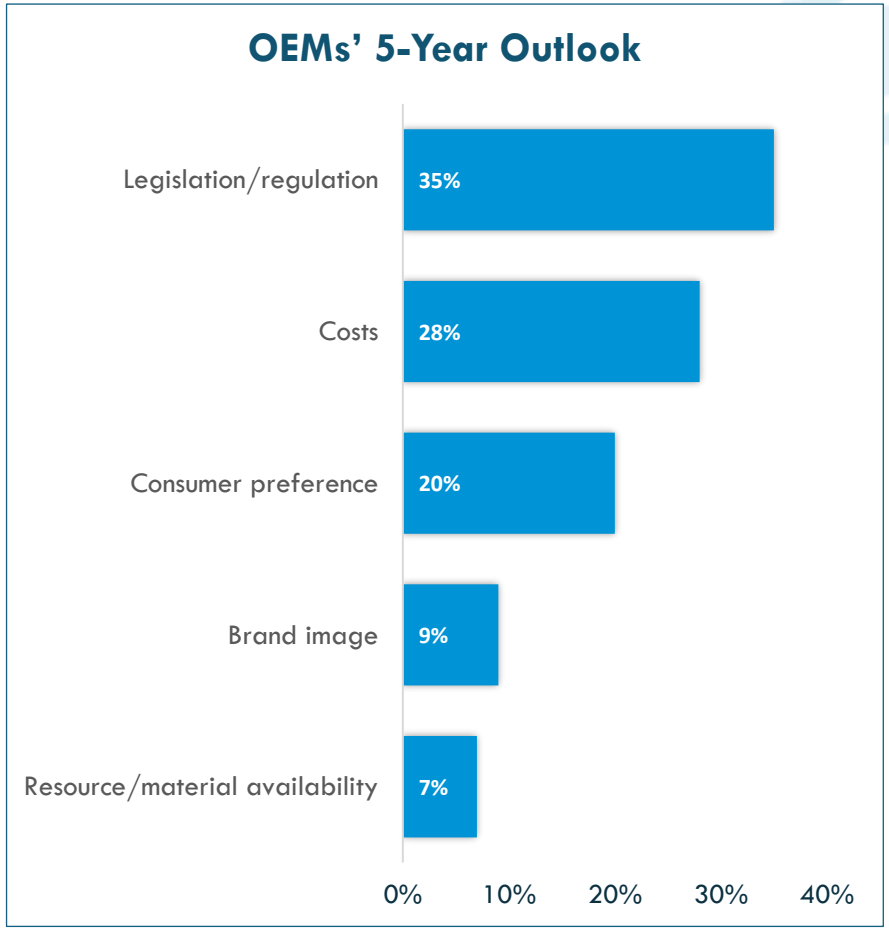
The Future & Implications for Packaging Industry

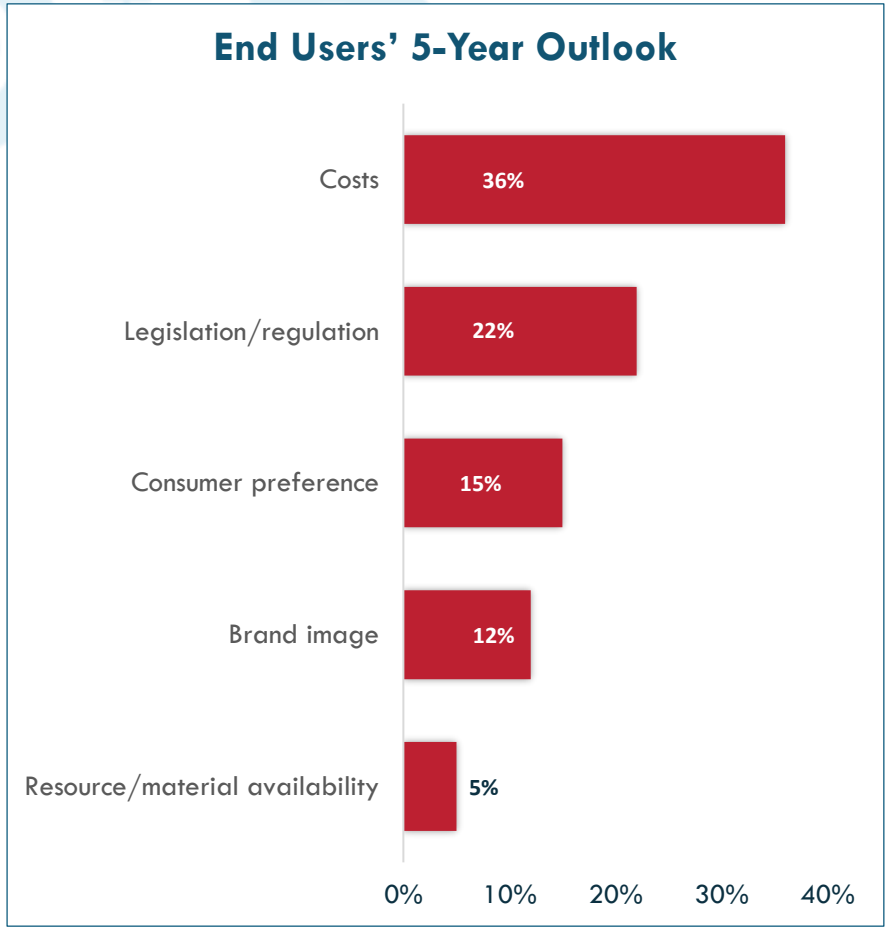
Looking Ahead with Sustainability

Factors Ranked **First** By End Users and OEMs When Asked to Put in Order of Greatest Influence on their 5-Year Outlook.

End Users and OEMs shared the same factors in their top three for the greatest influence on their 5-year outlook.

- Consumer Preference
- Cost
- Legislation/ Regulation





Question: Please rank your selected factors in order of greatest influence on your 5-year outlook by clicking and dragging items into position. The factor with the highest influence should be in the number 1 position.

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Key Points

2022 data to 2025 data

- In the 2023 Compass, compostable materials were on the rise, but interest has since shifted toward recyclable materials—likely due to cost concerns and limited infrastructure.
- From 2022 to 2025, only a slight decline (-2%) was observed in end users citing machinery limitations as a barrier to sustainability.
- Cost remains the top trade-off for end users pursuing sustainability, followed by product quality and protection. For OEMs, packaging and equipment performance are the primary trade-offs, with cost being less significant. Despite these differing priorities, a large majority of both OEMs and end users report facing trade-offs when adopting sustainable packaging.

Material Dashboard

To be replaced in 3-5 years

- 70% to replace polystyrene (PS)
- 46% to replace Foams
- 38% to replace PVC (polyvinyl chloride)

Not to be replaced in 3-5 years

- 91% plan for recycled paperboard with forestry certification to remain in usage

Top future Influences on OEMs & End Users affecting their 5-year Outlook

- Cost
- Regulation
- Consumer preference
- *Strong interest in greater End User–OEM collaboration to meet sustainability goals*

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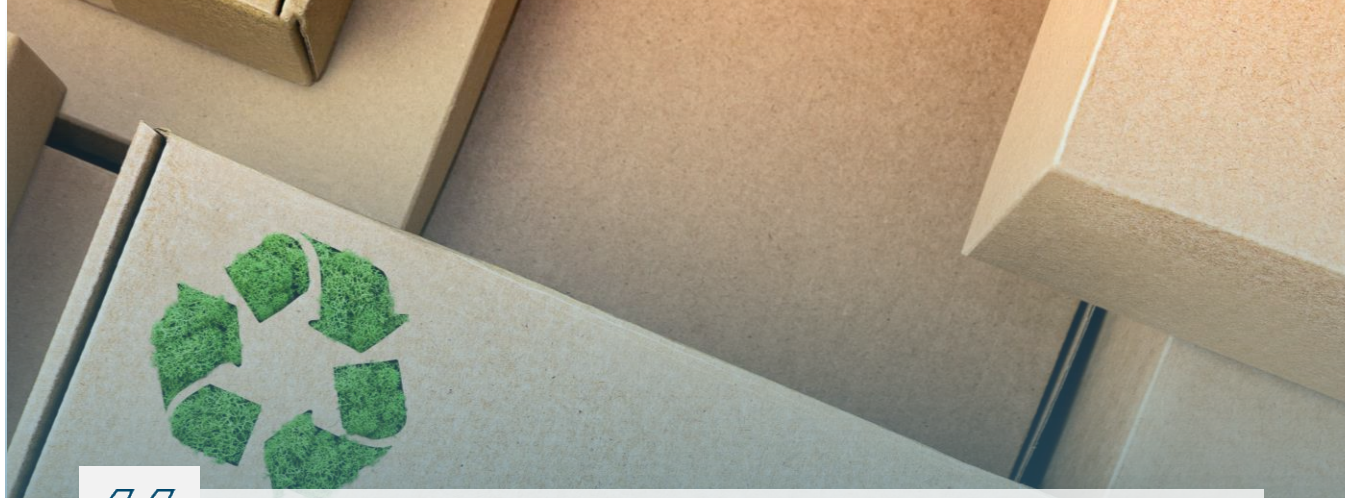
Future Collaboration Opportunities Between OEMs and End Users

As sustainability efforts continue, OEMs and End Users face connected but distinct pressures. For End Users, the rising costs of sustainable materials—paired with concerns about product quality and performance—make packaging decisions increasingly difficult. OEMs, meanwhile, are tasked with modifying or redesigning equipment to handle these new and emerging materials without compromising machine performance or production efficiency. Adding to this complexity is a fragmented regulatory landscape. State laws and retailer mandates now carrying more influence than federal guidelines in the effort towards sustainability. Sustainable packaging strategies are becoming regionally reactive rather than nationally consistent. This shifting policy environment demands greater agility from both equipment manufacturers and their customers.

End Users are seeking more than technical fixes; they need strategic insight, foresight, and partnership. OEMs are uniquely positioned to step into that role by helping customers navigate material transitions, anticipate future machine requirements, and co-develop solutions that align with emerging standards and consumer expectations.

To move forward, both groups must shift from operating in parallel to working toward strategic planning together. With this partnership, OEMs and End Users can move beyond reactive adaptation to become leaders in building a more sustainable and resilient packaging future.



> I feel like an expectation that I have would be for the OEMs to tell me what their products are able to do and if they would be able to align with future sustainability changes.
> *- President, CPG*

> My hope would be that they [OEMs] are also prepping up and are understanding that the trend is going this way and getting ahead of it and purchasing and designing tooling on their end or thinking ahead of what their machines might struggle with that they can then offer us for that solution.
> *- Industrial Engineer, Co-Packager/Co-Manufacturer*

> I could see us being more proactive in reaching out to help....we're not going to be initiating the projects but letting our customers know that we can support them is going to be very important moving forward and then obviously providing that support.
> *- Design Engineer, PMMI Member*

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