

DRIVING PRODUCTIVITY IN BEVERAGE PACKAGING





01

Industry Overview

Why Productivity in Packaging Matters Now? | Packaging under pressure to perform

Productivity is now the strategic lever for balancing sustainability mandates, cost inflation, and competitive pressures making it the differentiator for packaging players



MAJOR REGULATORY SHIFTS

- Global bans on single-use plastics accelerating change
- Mandatory rPET quotas and recyclability promotions disrupting design choices
- Push toward innovations in PET formats across primary, secondary, and tertiary packaging

SUSTAINABILITY VS. COST PRESSURES

- Virgin plastic (€1,000/tonne) significantly cheaper than rPET (€1,800/tonne) → margin squeeze
- Regulations forcing adoption despite unfavourable cost dynamics
- Supply chain volatility is adding to conversion complexity

MARKET and COMPETITIVE DYNAMICS

- Emerging markets (China) driving price competitiveness → margin erosion for incumbents
- CSD category stagnation in US and Europe → shift to hot-fill aseptic lines and PET/Glass hybrids
- Brands demanding greater efficiency, flexibility, and faster line changeovers.



Primary Insights

“We are facing margin pressures across the board, and the biggest trend today is reducing packaging costs to offset rising tariffs and input costs.... [we] therefore are looking for innovation in packaging design to overcome [these] cost pressures...”

– Top Coca-Cola Executive

Stringent single-use plastic regulations in major markets are reshaping the PET container industry



The **European Union** is implementing stringent regulations to combat plastic waste, focusing on recyclability, recycled content, and reusability. These directives aim to significantly reduce the environmental impact of single-use plastics across member states.



Packaging and Packaging Waste Regulation (PPWR) 2025/40

Entered into force on 11 February 2025, setting strict requirements for packaging recyclability and recycled content.

Recycled Content Targets

PET beverage bottles: 25% recycled plastic by 2025; all plastic beverage bottles: 30% by 2030.

Reusable Packaging Targets

10% of beverages in reusable formats by 2030, increasing to 40% by 2040 (dairy, wine, spirits excluded).

Tethered Caps Mandate

All beverage packaging must feature a tethered cap by 2027 to prevent litter.

Deposit Return Schemes (DRS)

Mandatory by 1 January 2029 for member states to ensure post-consumer PET supply, unless high collection rates are met.

- **APAC countries** are progressively tightening regulations on PET and single-use plastics, with China and India enforcing nationwide bans, Japan and South Korea focusing on reduction and recycling targets, and Australia/New Zealand leading comprehensive phase-outs
- **Latin America** and the Caribbean are advancing plastic bans with a strong focus on coastal and tourism protection, led by Chile's nationwide ban and widespread restrictions across Caribbean islands
- The **Middle East** is at an early stage with partial measures in the UAE and Israel, and limited progress in Saudi Arabia



The **United States** lacks a single federal mandate for recycled plastic content. Instead, individual states are driving legislative changes to increase Post-Consumer Recycled (PCR) Resin in plastic containers.



Washington

- **Plastic Beverage Bottles** - 15% by 2023, 25% by 2026, 50% by 2031 (SB 5022).
- **Wine and Dairy Containers** - 15% by 2028, 25% by 2031, 50% by 2036 (SB 5022).
- **Household and Personal Care** - 15% by 2025, 25% by 2028, 50% by 2031 (SB 5022).

California

- **Beverage Bottles** - 15% by 2022, 25% by 2025, 50% by 2030 (AB 793).
- **Rigid Plastic Packaging** 25% by 1995 (exemptions apply).

Maine (LD 1467)

- Plastic beverage containers: 25% by 2026, 30% by 2031.

Connecticut

- Plastic beverage containers: Report by end of 2023, 25% by 2027, 30% by 2032.

New Jersey

- **Plastic Beverage Containers** - 15% by 2024, increasing by 5% every 3 years to 50% (S2515).
- **Other Rigid Plastic Containers** - 10% by 2024 (food exempted until 2027), increasing by 10% every 3 years to 50% (S2515).

Packaging Industry Landscape

PRIMARY PACKAGING

PET packaging (Beverages and Liquid Foods)

Still and CSD Beverages

Aseptic PET Bottles

Hot-Fill PET Bottles



FFS (Form-Fill-Seal) Packaging

Flexible Pouches

Sachets / Stick Packs



Glass Packaging (FandB)

Glass Bottles

Glass Jars



Metal Packaging (FandB)

Aluminium Cans

Steel/Tinplate Food Cans



Flexible and Pouch Packaging (Non-FFS formats)

Spouted Pouches

Vacuum/Retort Pouches

Lidding Films and Sachets



Carton-Based Packaging (Liquid and Semi-Liquid)

Aseptic Cartons

Gable-Top Cartons



SECONDARY PACKAGING

Carton-Based Secondary Packaging



Trays (Corrugated trays or Plastic returnable trays)



Shrink-Wrapped Multipacks



Multipack Solutions (Carton/Board-Based)



Strapping and Banding (Plastic or Plant-Fiber Straps or Paper-based banding)



TERTIARY PACKAGING

Automated Robotic Palletizing



Returnable Transit Packaging (RTP)



Shrink film + Pallet Tray

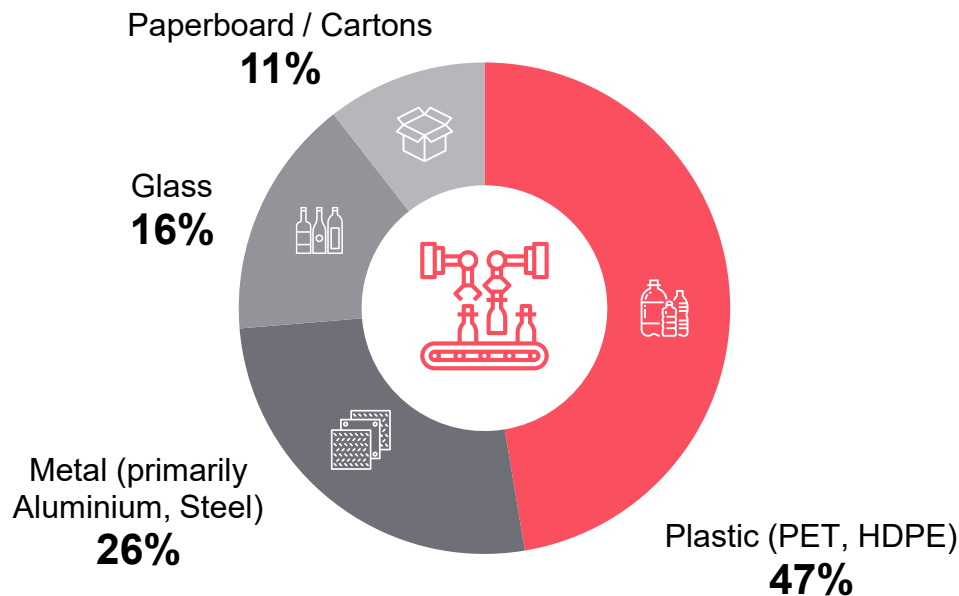


Returnable and Pooling Systems (Returnable plastic crates or reusable pallets/trays)



Materials Splits in Primary Packaging of Beverages

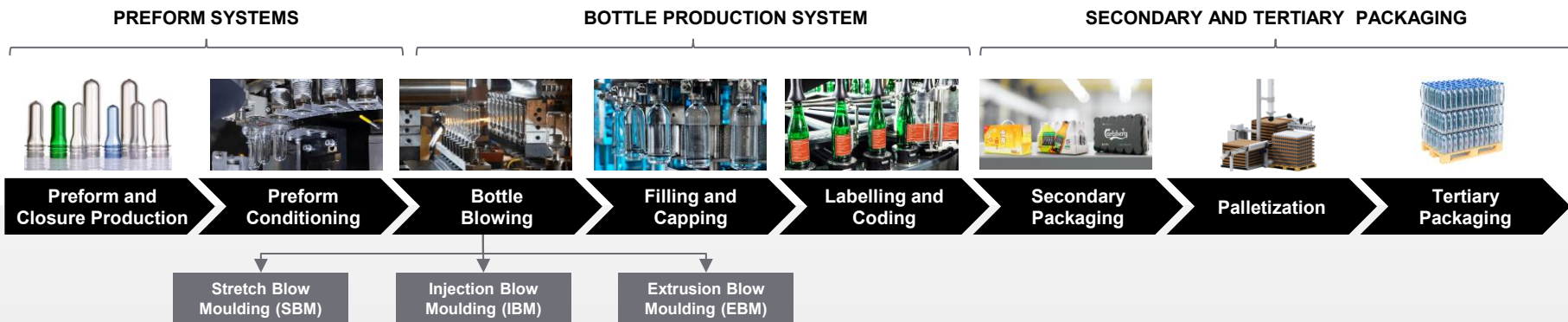
In the beverage industry, packaging materials primarily include plastics, paperboard, and metals, with the choice often varying by product type such as bottled water, carbonated soft drinks, juices, or alcoholic beverages



- Plastic (PET) leads the market thanks to flexibility, durability, and lightweight strength.
- Paperboard poised for fastest growth as eco-friendly demand drives recyclability, reusability, and biodegradability.
- Aluminium cans push sustainability with ultra-lightweighting, infinite recycling alloys, and bio-based coatings.
- Glass bottles optimized via finite element analysis and modeling to cut material without losing strength.

Process Map for PET Packaging for Beverages

Plastic, particularly PET, has dominated beverage packaging as the most widely used and cost-effective material, serving as the primary choice for soft drinks, bottled water, juices, and other ready-to-drink products



MACHINES AND EQUIPMENT DEPLOYED IN EACH PROCESS

- PET Injection Molding Machines
- Cap compression/injection molding machines

- Preform unscramblers
- Orienters
- Feeding systems

- Stretch Blow Molding (SBM) – rotary or linear

- Rotary fillers (still/isobaric)
- Cap elevators
- Sorters
- Applicators

- Pressure-sensitive labelers
- Shrink-sleeve applicators
- OPP labelers
- Date coding and batch printers (laser/inkjet)

- Shrink wrapping machines
- Wrap-around case packers
- Basket/carton packers
- Adhesive/clip applicators for sustainable multipacks

- Robotic Handling Systems

- Stretch wrapping/hooding machines
- Pallet conveyors
- AGVs for intralogistics

Packaging Industry Landscape

While plastics continue to dominate as the preferred packaging material, the industry is increasingly shifting towards hybrid solutions that integrate a broader mix of emerging materials

Packaging Material	Conversion / Processing Technologies	Machine Functions	End-Use Industries
 Plastics (PET, HDPE, Films, Bioplastics)	- Injection molding (preforms, caps) - Stretch blow molding (SBM bottles) - Extrusion (films, sheets) - Thermoforming (trays, cups)	- Forming/Conversion - Filling (still, CSD, hot-fill, aseptic) - Sealing (heat/induction sealing) - Secondary/Tertiary Packaging (shrink wrapping, case packing) - Inspection (leak testing, vision, X-ray)	Food and Beverages, Pharma, Personal Care, Household Chemicals
 Paper and Board (Carton board, Corrugated, Molded Fiber)	- Corrugators (fluting + liner) - Carton die-cutting and folding/gluing - Digital/Flexo printing - Barrier coating (plastic-free, bio-based)	- Forming/Conversion - Sealing (adhesive, glue) - Secondary/Tertiary Packaging (carton erection, case packing) - Inspection (print quality, dimensions)	Food and Beverages, E-commerce, Pharma, Industrial Packaging
 Glass	- IS forming machines - Hot end coating - Cold end inspection and packaging	- Forming/Conversion - Filling (beverages, pharma vials) - Sealing (closures, capping) - Inspection (crack, stress testing)	Beverages, Pharma, Cosmetics
 Metal (Aluminum, Steel, Tinplate)	'Metallic Can' body makers and neckers - Aerosol can forming - Foil rolling and laminating	- Forming/Conversion - Filling (cans, aerosols) - Sealing (can seamers, closures) - Secondary Packaging	Food and Beverages (CSD, beer), Household Chemicals, Industrial
 Hybrid / New Materials (Compostables, Laminates, Reusables)	- Bioplastic conversion - Compostable packaging lines - Laminates and multilayer coatings - Reusable packaging washing/sorting	- Forming/Conversion - Filling - Sealing - Logistics and Recycling (crate washers, balers, sorters)	Food and Beverages, Retail, Pharma, Circular Economy Systems

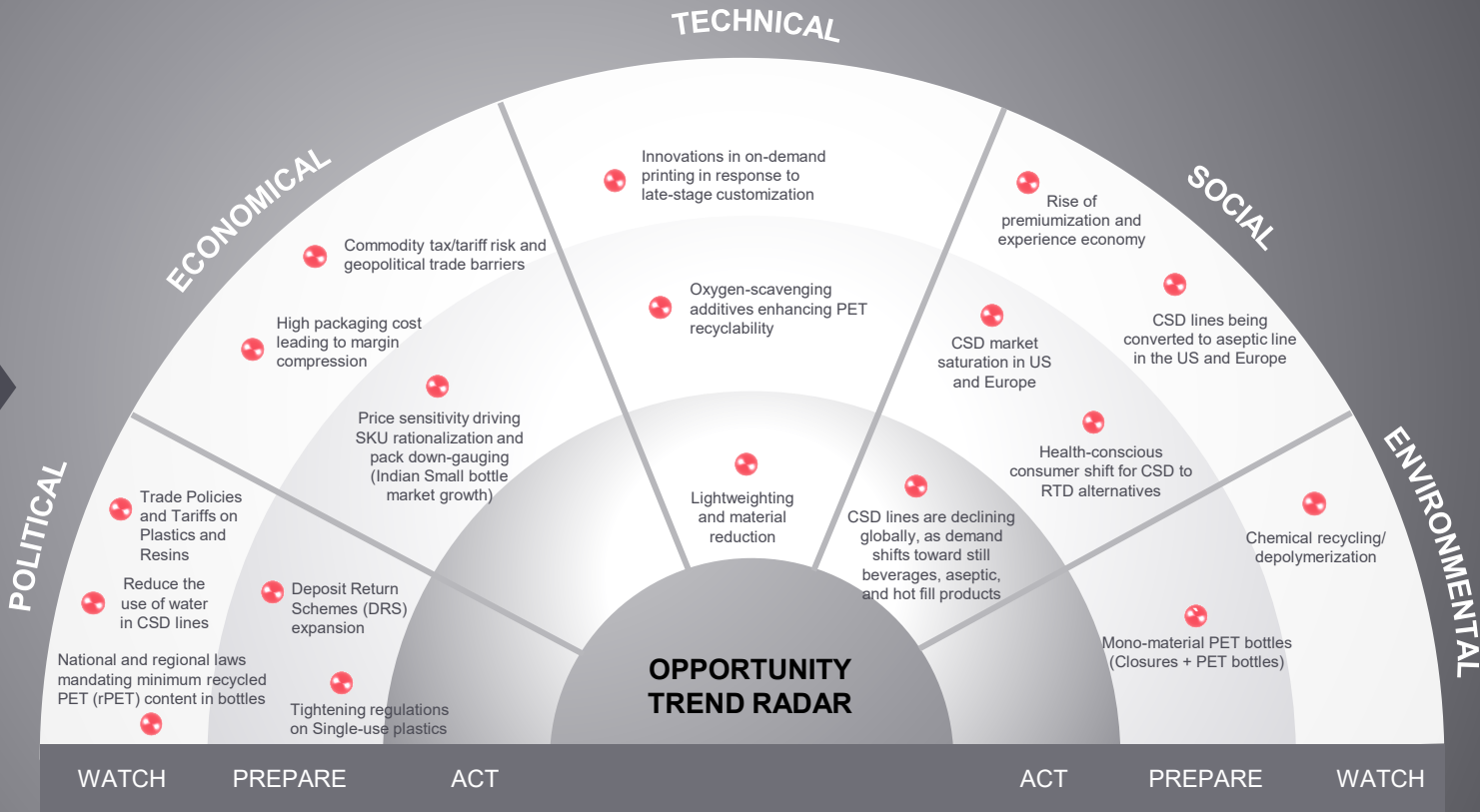


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Key Trends

MAJOR TRENDS/ DEVELOPMENTS INFLUENCING THE PACKAGING OPERATIONS

Highlighting the major trends from innovation in packaging design to consumer trends that are shaping the FandB packaging industry



Key objectives of brands

Major beverage brands are aligning their objectives with broader industry trends such as sustainability, lightweighting, increased use of recycled content, digitalization of packaging processes, automation to reduce labor dependence, and late-stage customization to meet evolving consumer demands

- Reduce packaging waste / make packaging circular
- Raise percentage of recycled content in primary packaging
- Explore and scale reuse/refill and low-packaging business models
- Reduce material use / light-weighting and alternative materials
- Increase automation and digitalization across factories and packaging lines
- Enable mass / late-stage customization and personalization at scale
- Localize production and packaging closer to demand
- Improve supply-chain resilience and packaging flexibility
- Brand and marketing objectives tied to packaging design
- Operational sustainability: reduce carbon, energy and water impacts from packaging operations



Objectives of Major Brands

The sector is undergoing a broader shift toward sustainability, lightweighting, higher recycled content integration, digitalization of packaging operations, increased automation to minimize labor dependence, and late-stage customization to address rapidly evolving consumer preferences.

Need to improve recycling infrastructure



- Make 100% of packaging recyclable or reusable; reduce use of virgin plastics (ongoing target under Nestlé's packaging strategy).
- Scale collection, recycling and use of recycled content (rPET); support reuse pilots where relevant.

Scaling rPET in emerging markets



- Increase rPET share (used 15% rPET across key markets in 2024) and scale circular packaging under updated goals; strategy details in 2024 AR/ESG hub.
- Goal reset in 2025 (including reuse target changes) reflects material/market constraints and invites stakeholder questions.

Design 100% of packaging for recycling



- Decouple growth from virgin plastic; design 100% of packaging for recycling; increase recycled plastic use; develop reuse solutions
- Scaling rPET supply, collection system gaps, and roll-out of reuse models at consumer level

Green brand image



- Invest in lightweight PET bottles to cut material use.
- Expand use of eco-friendly packaging (including rPET and bioplastics in pilot projects).
- Rising consumer demand for premium-looking packaging (glass, functional aesthetics) creates trade-offs with lightweighting.

Weakened ambition vs earlier goals



- 35–40% recycled material in primary packaging by 2035 (incl. 30–35% rPET); collect 70–75% of equivalent bottles/cans by 2035.
- Insufficient collection infrastructure in many markets; limited, costly food-grade rPET; compliance with evolving policies (EPR/DRS, tethered caps, recycled-content mandates)

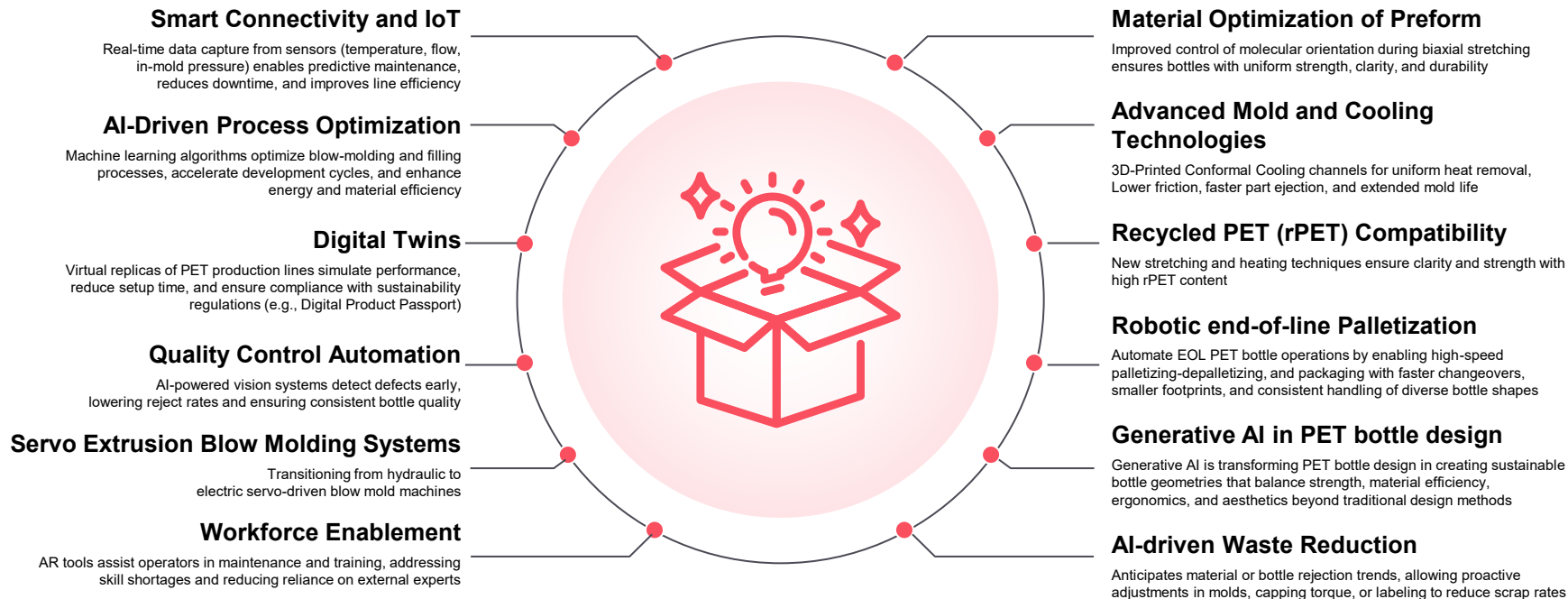
Predictive maintenance, planning



- Focus on lightweight PET.
- Increase vertical integration into rPET sourcing.
- Support retailers with sustainability claims.
- Strong cost-down pressure from retail clients.
- Volatile rPET prices.

Technology Innovation Packaging Lines

The beverage industry is under global pressure to innovate, driven by tougher competition, stricter environmental regulations, and growing demands for circularity



How manufacturers are looking to reduce Operational Costs in Beverage bottle production

Several strategies focus on optimizing blow molding operations through energy efficiency, waste reduction and process improvements to boost productivity and lower costs.

Streamlining changeovers and reducing downtime



- Quick-change mold systems that reduce setup times from hours to minutes
- Automated recipe management for different bottle designs
- Tool-less adjustments that minimize reliance on specialized technicians

Optimizing material handling and inventory management



- Minimize overstocking and associated carrying costs
- Reduce material shortages that can halt production
- Track raw material usage for accurate cost allocation

Equipment integrated with Predictive Maintenance



- Modern systems track key performance indicators such as vibration, temperature, and cycle counts
- Schedule interventions before breakdowns occur, reducing the likelihood of unplanned downtime and extending the lifespan of your blow molding equipment

Versatile blow molding equipment



- Evolving consumer demands push manufacturers to offer diverse bottle shapes, sizes, and materials
- Agile Blow molding equipment with quick-change molds, programmable controls, and recipe storage enables efficient short runs and frequent product changes

Focusing on energy-efficient blow molding equipment



- Adopting Servo-driven systems, optimized heating and cooling
- Automated shut-off and standby modes
- Energy recovery systems and incentives for green manufacturing

Waste reduction and Quality control



- Real-time monitoring and vision inspection systems
- Recycling scrap resin into production lines
- Improved mold design and preventive maintenance

Equipment and technology upgrade



- Upgrade to high-efficiency blow molding machines (faster cycles, lower maintenance)
- Quick-change molds and automated defect detection to cut downtime
- Smart technology (IoT, predictive maintenance, digital dashboards).

Process optimization in PET Lines



- Reduce resin usage via lightweighting and optimized preform design
- Advance process control to maintain consistent product quality and reduce the risk of defects by automating parameters such as temperature, pressure, and cycle timing

This is only the start.

Behind these insights sits deeper analysis, tailored strategies, and clear roadmaps.

Part 2 of this report will share our foresight on what will define the next standards in circularity, competitive benchmarks across OEMs, and pragmatic plays to turn packaging into a profit lever.

Connect with us to translate these perspectives into measurable impact for your business.

Connect with our experts now



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HEALTHY ENVIRONMENT

REUSE



REDUCE



CIRCULAR CHANGE

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Forethought

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