THE CASE FOR POLYSTYRENE CIRCULARITY

Not a Problem to Eliminate, but an Opportunity to Realize

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Polystyrene Recycling ALLIANCE

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Introduction

Polystyrene—in both its expanded polystyrene (EPS) foam transport packaging and rigid solid polystyrene packaging (High Impact Polystyrene/General Purpose Polystyrene) forms—is being collected, processed, and returned to the market at a meaningful scale across North America, through a combination of commercial, municipal, and drop-off channels, supported by multiple proven recycling technologies.

This document provides an overview of EPS transport packaging and rigid polystyrene recycling as of 2026. It discusses two material streams. The first covers EPS transport packaging, including protective containers for large appliances, pharmaceutical shipments, and cold-chain logistics. The second focuses on rigid polystyrene packaging, such as cups, trays, and clamshells used across the food and retail sectors.

The Polystyrene Recycling Alliance (PSRA) was established precisely to make that progress measurable and visible. Backed by rigorous third-party research from Resource Recycling Systems (RRS), active regional demonstration projects, and a growing network of industry partners, PSRA is translating the case for polystyrene circularity for both EPS transport packaging and rigid polystyrene into infrastructure, policy, and market action.

Polystyrene is not a problem to be eliminated. It is a circular opportunity to be realized—with the right infrastructure, the right policy signals, and the right industry partners already in place.

Recyclability: The Case for Both Streams

Recyclability is the foundational question for any material seeking a place in a circular economy. For polystyrene, the answer is unambiguous: both EPS transport packaging and rigid polystyrene packaging are being recycled today through infrastructure already in place, serving real end markets. What the evidence shows is not a theoretical capability but a functioning, and still-expanding, system

EPS Transport Packaging

EPS transport packaging has achieved a 31% recycling rate in North America, according to the EPS Industry Alliance.[i] That figure: 168.6 million pounds diverted from disposal in 2022 alone, places EPS on par with many materials the recycling sector considers mainstream. Two major global bodies have taken note:

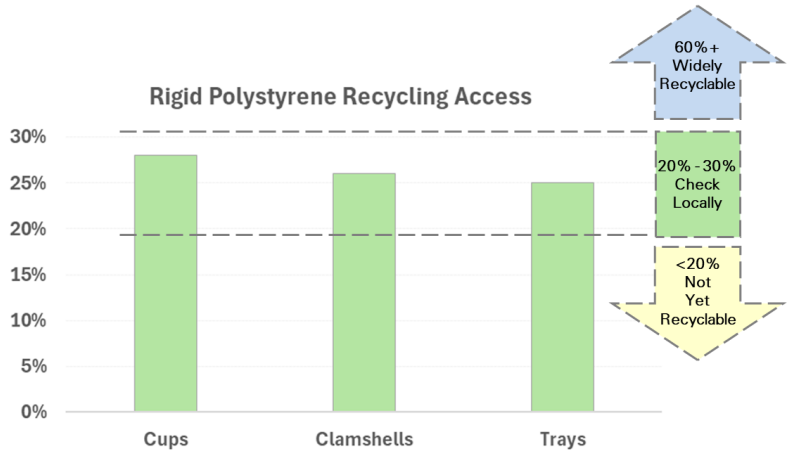
- **UNEP Recognition:** The United Nations Environment Programme's (UNEP) 2024 Plastic Pollution Science report, published ahead of global plastics treaty negotiations at INC-4, explicitly recognizes EPS transport packaging as "recycled in practice and at scale" in certain countries and regions. UNEP notes that only a handful of packaging formats have earned this designation. [ii]

- **Ellen MacArthur Foundation:** In a January 2024 correction letter to the EPS Industry Alliance, EMF confirmed that EPS transport packaging "will be deemed recyclable in practice and at scale," meeting its benchmark of recycling rates above 30% across regions representing more than 400 million people. [iii]

Most of the collection happens outside of the traditional curbside collection system. The recycling infrastructure supporting these figures is primarily business-to-business oriented, featuring nearly 700 drop-off sites nationwide,[iv] reverse logistics programs through major retailers, and a densification industry that addresses EPS's core economic challenge. Examples of this are collection of packaging materials for the appliance and furniture industry. Because EPS is 95–98% air,[v] transporting non-densified material is not cost-effective. Densification involves compressing EPS into high-density ingots and bricks that fill a 40,000-pound truckload, turning it into a valuable and tradeable commodity. This is a substantial market, not just a niche operation.

Rigid Polystyrene (HIPS/GPPS)

Rigid polystyrene packaging, yogurt cups, deli trays, produce clamshells, and foodservice containers are further along their recycling journey than public perception suggests. An independent RRS analysis found that 25–28% of the U.S. population, roughly 90 million Americans, have access to recycle rigid polystyrene cups, clamshells, and trays. [vi] A follow-up analysis correcting survey inconsistencies places the true figure closer to 30%, or 100 million people. Under How2Recycle's labeling framework, that access level corresponds to "check locally" status—not yet "widely recyclable," but not accurately labeled "not recyclable" either.



Recycling Technologies

Three distinct technology pathways are commercially active for polystyrene in the United States. They are not competing alternatives; they are complementary tools, each suited to different feedstock qualities and collection contexts. Together, they eliminate the label of "unrecyclable" polystyrene.

Mechanical Recycling

Mechanical recycling remains the workhorse pathway for both EPS and rigid polystyrene transport packaging. For EPS transport packaging, the sequence runs from collection through densification to pelletizing, with a robust densification industry, including companies like Runi, GreenMax, Cobalt, REC, and Sebright, expanding capacity across North America. Densification compresses EPS—95–98% air—into high-density ingots and bricks, enabling a full 40,000-pound truckload and valuable, tradeable commodity. Foam Cycle's modular, turnkey densification solution is now operating in 30+ municipal locations, including the province of Quebec, and adding new installations each year. For rigid polystyrene packaging, mechanical recycling includes shredding, washing, and re-pelletizing into clean resin that can be returned to food-contact applications—polystyrene's low diffusion characteristics, similar to PET, make it particularly well-suited for closed-loop food-grade recovery. [vii]Unlike many materials being recycled, polystyrene retains its integrity and performance through multiple mechanical cycles with minimal degradation.

Dissolution or Physical Recycling

Dissolution, or physical recycling, has crossed from demonstration to commercial production. For EPS transport packaging, dissolution is particularly effective in compact urban or retail settings where densification equipment is impractical and can process contaminated EPS streams that mechanical recycling cannot absorb. Since 2013, one U.S. operator has used dissolution to produce FDA-approved rigid polystyrene for food contact. Since 2023, a second has operated at more than 8,000 metric tons per year with greater than 99% polymer recovery, producing pellets with 25% certified recycled content cleared for direct food contact in rigid polystyrene. Critically, dissolution removes fine inorganic residues at ppm levels. An ISO 14044-reviewed lifecycle analysis found that the process has a low-carbon profile, approximately 25% lower than virgin polystyrene.

Chemical Recycling

Chemical recycling extends the system's reach to contaminated and multi-material streams that neither mechanical nor dissolution processes can absorb. The Agilyx/Americas Styrenics Regenyx joint venture proved pyrolysis can convert post-use polystyrene back to styrene monomer or mixed hydrocarbon feedstocks, enabling repolymerization into virgin-equivalent polystyrene or use in other petrochemical applications. Today, FreePoint Ecosystems in Hebron, Ohio, and ExxonMobil in Baytown, Texas, process mixed plastic bales that include rigid polystyrene packaging — meaning rigid polystyrene packaging can enter the circular economy even when collected in a mixed stream with polyethylene and polypropylene. Chemical recycling capacity in the U.S. is forecast to triple by 2030 relative to 2025 levels, according to AMI (Applied Market Information, LLC) projections. The U.S. Plastics Pact has recognized that these technologies "offer solutions for specific hard-to-recycle formats," [viii] and PSRA-commissioned modeling estimates that by 2030, 50–66% of the U.S. population could have access to recycling EPS transport packaging and rigid polystyrene packaging as this capacity comes online. [ix]

End Markets: Scale, Scope & Demand Signal

End markets are the engine of any recycling system. Without reliable offtake demand, collection infrastructure stalls, commodity value erodes, and investment dries up. PSRA commissioned RRS to conduct the most comprehensive inventory of U.S. and Canadian polystyrene end markets to date. A vetted database built through rigorous web research and primary interviews with companies actively handling recovered polystyrene.

EPS End Markets

RRS identified 81 companies operating 119 facilities that receive, process, or reclaim recovered EPS transport packaging across 30 U.S. states and four Canadian provinces. Approximately 52% are manufacturing end markets using recycled EPS directly as a feedstock. [x]The range of end-use applications is broad: new EPS transport packaging, construction and architectural materials, wood composites, patio furniture, picture frames, interior moldings, textiles and fibers, paints and coatings, and adhesives. International demand adds another dimension—European and Asian manufacturers actively import densified EPS from North America for use in the fish industry, medical devices, and automotive and sports equipment components.

Rigid Polystyrene End Markets

RRS identified 45 companies with approximately 50 facilities handling recovered rigid polystyrene packaging (HIPS and/or GPPS) across 22 U.S. states and four Canadian provinces. Roughly 13% are direct manufacturing end markets; the remainder are reclaimers, brokers, and tollers building the supply-side infrastructure. Medical plastics currently represent the dominant post-consumer rigid polystyrene packaging stream, supplemented by HIPS recovered through e-waste programs. [xi] End-use applications include food-grade containers (via dissolution and mechanical recycling), consumer goods, architectural moldings, and plastic sheet manufacturing, where recycled rigid polystyrene packaging substitutes for higher-cost virgin material and serves as a colorant to meet specifications without expensive inks.

Industry Investment in Polystyrene Circularity

The recycling infrastructure described above does not exist in a vacuum. It has been built, and continues to be expanded, through substantial capital commitments by EPS and PS manufacturers, recycling technology companies, and the partnerships they have forged across the value chain.

- **Nexkemia** has invested more than $20 million in EPS recycling and is producing raw materials with 30% recycled content.

- **Epsilyte** is expanding EPS collection, processing, and manufacturing raw materials with up to 50% post-consumer recycled content.

- **Styropek** already offers certified EPS with 25% post-consumer recycled content (PCR) via dissolution recycling and up to 100% certified recycled content via chemical recycling. Its new 25,000-ton mechanical recycling facility, which will be opening by Q3 2026, producing EPS with 30–50% PCR content.

- EPS molders are actively using recycled content resin to produce finished molded expanded polystyrene products with recycled content, including post-consumer recycled content.

- **Foam Cycle** deploys modular EPS recycling systems in municipalities and retail settings, with systems now operating in 30+ locations plus Quebec.

- **Foam Recycling Coalition (FRC)** has awarded over 46 grants over ten years that improved EPS recycling access for more than 17 million people.

These investments extend beyond densification into the full recycling value chain—end-market development, technology deployment, and consumer access. Each successful project, driven by the economic value of recycled polystyrene, improves public visibility and spurs additional private investment with a multiplier effect.

Recycling Projects in Action

PSRA's theory of change is grounded in demonstration. By investing in real projects—with real partners, real infrastructure, and real end markets—PSRA generates the proof points that shift stakeholder perception and inform policy. The following active collaborations span the United States, Canada, and Latin America.

Nashville, TN Foam Cycle + Nashville Dept. of Waste Services	• PSRA facilitated the installation of Foam Cycle's patented densification system at Nashville's East Convenience Center—launched Earth Day, April 22, 2026. [xii] • All EPS formats accepted: transport packaging, clean food service, and food packaging. Material densified on-site and shipped to an EPS manufacturing facility in La Vergne, TN. • A portable trailer system enables on-demand collection at universities, festivals, and seasonal events. Internal Metro Nashville EPS streams are also being captured. •
Colorado (Statewide)	• PSRA partnership with Circular Colorado deploys the Circular Transportation Network (CTN), designed to overcome barriers for rural

Circular Colorado + Brave Industries (Denver & Baltimore)	and small-scale EPS generators, including low volume, high transport cost, and absent hauling infrastructure. [xiii] • EPS is aggregated, densified, and shipped to Front Range end markets. Circular Colorado engages municipal and commercial partners, like Atlas Molded Products, while expanding outreach to additional communities. • Separate PSRA partnership with Brave Industries, a national consortium with plastics processing in eight states, launches in Denver and Baltimore, targeting all PS formats (EPS, XPS[xiv], HIPS, GPPS) with a path to national scale. [xv] • Both initiatives operate in EPR-implementation states, positioning them as policy-relevant demonstrations.
Mexico City R3vira + Mexican Plastics Pact (PPMX)	• PSRA investment enables R3vira to double its innovative 'peque-ruta' (micro-route) collection network from 12 to 24 active pathways citywide by 2026, spanning all 16 boroughs of North America's largest city. • Recovered HIPS and EPS processed through Resirene's FDA-compliant facility into certified recycled resin for closed-loop food packaging applications. [xvi] • Separate PSRA collaboration with PPMX brings Danone, Lala, and Yakult into a HIPS dairy-packaging recovery initiative spanning Mexico City, the State of Mexico, Querétaro, and Puebla, with Ecolana and Grupo Mexico Recicla as recovery partners. • Over a 14-month implementation, the initiative validates collection methodologies, processing economics, and brand commitments that can inform broader North American strategy. [xvii]

Across these projects, a consistent pattern emerges: when collection infrastructure, densification or processing capability, and contracted end markets are aligned, polystyrene recycling works at scale, economically, and with measurable landfill diversion. Each project is designed to be replicable. The Nashville model can be deployed in any city with a willing municipal partner and a regional EPS manufacturer. The Colorado CTN model addresses the rural collection gap that prevents many small generators from accessing recycling. The Mexico City model shows that community-based micro-route collection can recover both foam and rigid PS at city scale.

The Path to Circularity

Circularity for polystyrene is not a future aspiration; it is a trajectory with identifiable milestones. The RRS Recycling Roadmap, commissioned by PSRA, provides the analytical framework. Its central projection is by 2030, growth in chemical recycling capacity alone could enable 50–66% of the U.S. population to access recycling for at least one form of polystyrene. Combined with the expansion of mechanical and dissolution infrastructure already in place, the pathway to widespread polystyrene recyclability is measurable and near-term.

Supply-Side Priorities

Building a reliable supply of post-consumer polystyrene requires two coordinated moves. First, incentives to material recovery facilities (MRFs), plastic recovery facilities, and secondary sorters on a per-pound basis to cover the incremental cost of sorting polystyrene from single-stream bales. Second, targeted drop-off and retail take-back programs that generate clean, high-purity feedstock

from commercial generators. These mechanisms create the supply volumes that justify investment in reclamation capacity Much of this is already happening on a commercial scale in the appliance and furniture industries.

Demand-Side Priorities

Supply without demand stalls. Consistent, visible offtake through purchase commitments from manufacturers seeking PCR content, extended producer responsibility (EPR)-funded market development programs, or recycled content in procurement standards signals to the market that investment in polystyrene recovery has a buyer at the end.

Policy Alignment

Extended Producer Responsibility (EPR) legislation is taking shape across multiple U.S. states. The fee structures embedded in these frameworks should reflect the evidence base for polystyrene recyclability, not default to "problematic" classifications that impose disproportionate costs on a material with demonstrated circular pathways. Oregon, Colorado, and other early EPR states have an opportunity to calibrate their approaches using the latest data rather than outdated assumptions. Minimal investment in EPS and rigid polystyrene collection and recycling could occur through EPR revenue. This would avoid major capital expenditure for municipalities, while allowing them to take advantage of existing end markets. This model enables scalable participation in the polystyrene value chain with lower operational risk and faster implementation. This is already occurring in Oregon.

Conclusion

The state of EPS transport packaging and rigid polystyrene packaging recycling in 2026 is one of demonstrated capability and accelerating momentum. Three technologies are commercially active. End markets span 30 U.S. states and four Canadian provinces for EPS transport packaging, and 22 states for rigid polystyrene packaging. A 31% recycling rate for EPS transport packaging, verified by independent analysis, and recognized by UNEP and the Ellen MacArthur Foundation, anchors the evidence base. Rigid polystyrene packaging is accessible to roughly 100 million Americans.

The gap between where polystyrene recycling is today and where it needs to be is narrower than the public narrative suggests. It is a gap that targeted infrastructure investment, end-market development, policy alignment, and industry collaboration can close within this decade. The work PSRA and its partners are doing in Nashville, Colorado, Mexico City, and beyond is not symbolic—it is the replicable model for scaling polystyrene circularity across North America.

Polystyrene is evolving towards a circular economy. The evidence is in. The infrastructure is in place or being built. The question before policymakers, brands, and recycling system operators is whether they will support that transition or continue to treat a solvable challenge as a reason for elimination.

The facts are clear: polystyrene is not a problem to be eliminated. It is a circular opportunity already being realized, one investment and one partnership at a time.

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[i] Alternative Recycling Channels Drive EPS Packaging's 30% Recycling Rate in North America, Diverting 168 million Pounds from Landfills
[ii] UNEP, *Plastic Pollution Science*, 2024 (p. 61)
[iii] Ellen MacArthur Foundation Letter to the EPS-Industry Alliance, March 27, 2024
[iv] EPS Industry Alliance Sees Surge In Recycling Locations Across North America
[v] Green Building & Energy Efficiency — EPS Industry Alliance
[vi] Recycling Roadmap
[vii] https://www.diva-portal.org/smash/get/diva2%3A12173/FULLTEXT01.pdf
[viii] U.S. Plastics Pact | Physical and Chemical Recycling Position Paper
[ix] Recycling Roadmap
[x] New Study Reveals Robust Polystyrene Recycling Infrastructure Across North America
[xi] New Study Reveals Robust Polystyrene Recycling Infrastructure Across North America
[xii] Polystyrene Recycling Continues Improving with a Big Step Forward in Nashville, Tennessee
[xiii] PSRA and Circular Colorado Partner to Expand EPS Recycling
[xiv] Extruded Polystyrene
[xv] The Polystyrene Recycling Alliance Announces Groundbreaking Partnership with Brave Industries
[xvi] The Polystyrene Recycling Alliance and R3vira Announce Collaboration to Expand Polystyrene Recycling in Mexico City
[xvii] Polystyrene Recycling Alliance Partners with Mexican Plastics Pact to promote High-Impact Polystyrene Circularity