Leveraging a Cohesive Supply Chain to Close the Loop on EPS Packaging

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The Focus

- Block “Styrofoam”/Expanded Polystyrene (EPS) Packaging
- Specifically, EPS coolers from Biotech suppliers (for controlled temperature shipping)

- NOT
  - Packing Peanuts
  - Clamshell Food Containers
  - Polyurethane Foam
  - Plates, Cups, etc.
The Problem with Expanded Polystyrene (EPS)

- Petroleum-based (non-sustainable source)
- Bulky and lightweight
- Takes over 500 years to break down
- Styrofoam accounts for 30% of landfill volume annually
The Big Idea

Pieces of the Supply Chain

Supplier Relationship

Distribution

Customer Choice

Purchasing Activity
<table>
<thead>
<tr>
<th>Suppliers Using EPS Packaging</th>
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</thead>
<tbody>
<tr>
<td>Life Technologies</td>
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<tr>
<td>New England Biolabs</td>
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<tr>
<td>EMD Millipore</td>
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<td>Teknova</td>
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<tr>
<td>Thermo Fisher</td>
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<tr>
<td>Sigma-Aldrich</td>
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<td>Affymetrix</td>
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<td>Agilent</td>
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<td>Bio-Rad</td>
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<tr>
<td>Clontech</td>
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<tr>
<td>Genesee Scientific</td>
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<td>GlobalStem</td>
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<td>Hyclone</td>
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<td>Bioline</td>
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<tr>
<td>Fermentas</td>
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<td>Finnzymes</td>
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<td>Gemini</td>
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<td>Lamda Biotech</td>
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<tr>
<td>Corning</td>
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<tr>
<td>Omega Scientific</td>
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<tr>
<td>VWR International</td>
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<tr>
<td>Pierce</td>
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<tr>
<td>Denville Scientific</td>
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<tr>
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<td>ProSci</td>
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<td>Allele Biotechnology</td>
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<td>I.D.T.</td>
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<td>Genewiz</td>
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<td>Retrogen</td>
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<tr>
<td>Promega</td>
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<tr>
<td>BioLegend</td>
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<tr>
<td>Roche</td>
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</tbody>
</table>

UCSD receives thousands of EPS coolers a year. Over 5,000 from Life Technologies alone!
What’s happening to the EPS packaging once on campus?

- Reusing for Liquid Nitrogen, Water baths, shipping/transferring samples
- Recycling
- Leaving them in the halls/bays for Janitorial Services to clean up
- Landfill
Obstacles on Campus

- Outdated/Poor Communication
- Not sure if EPS is recyclable on campus
  - Unaware of proper prepping procedures
- Little campus support on recycling EPS
  - Not a Priority for customers
- Lack of awareness of Supplier Reuse programs
Outdated/Poor Communication

No mention of recycling EPS

No differentiation from block EPS
Reeducate Campus

Styrofoam Coolers **DO NOT** belong in the trash

**Better Solutions**

**Reuse**
Send coolers back to suppliers for reuse
- **SIGMA-ALDRICH**: Mail back coolers
- **Life Technologies**: Drop off coolers at COR Bio Services

**Recycle**
For **CLEAN, EMPTY** coolers that cannot be mailed back, place them in the Blue Recycle Bins

UC San Diego Procurement & Contracts
COR Bio Services
Questions? E-mail greenprocurement@ucsd.edu
Reeducate campus customers on the following EPS solutions.

**GOOD - Waste Stream Diversion: Recycle EPS**

**BETTER - Mitigation: Supplier Take-back/Reuse Program**

**BEST - Prevention: Encourage purchasing through stockrooms on campus, such as CORE Bio Services, to consolidate EPS packaging.**
GOOD: Recycle EPS
BETTER: Mitigation

- Mail Back/ Take-Back Programs
- In-House Reuse/Repurpose

Everyone deserves a second chance!
Mail-Back Programs

DROP-OFF SITE

Styrofoam® Cooler Reuse Program

1. Remove the Sigma-Aldrich product(s) and ice you received from the polystyrene (Styrofoam®) cooler.

2. Place the empty Sigma-Aldrich polystyrene cooler back in the box it came in.

3. Switch the flaps of the shipping box inside out, tape, fill out your shipping information and send. The inside flaps contain pre-paid shipping and address information.
Drop off Sites

Worked with Mail Services to establish 7 Drop off sites
Why Mail-back?

Manufacturing New: 3.73 lb CO2

Take-Back: 0.59 lb CO2 (Truck Cargo)

Recycling: 0.37+\(x\) lb CO2 (Ship Cargo to China)

\[x=\text{CO2 emissions from recycling methods in China}\]

Question: Does \(x\) exceed 0.22 lb CO2?

Conversion Rate Sources: Life Technologies, Carbonfund, USGS World Petroleum Assessment 2000, EPA Carbon Conversion Guide
Steel containers result in lower emissions per L after 4 uses.

Mail-back Carbon Footprint Results

<table>
<thead>
<tr>
<th>Container Type</th>
<th>Raw Materials &amp; Preprocessing</th>
<th>Manufacturing</th>
<th>Filling</th>
<th>Packaging</th>
<th>Distribution</th>
<th>Collection</th>
<th>Cleaning</th>
<th>Disposal</th>
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</thead>
<tbody>
<tr>
<td>2.5L Amber Glass</td>
<td>1.09</td>
<td></td>
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<tr>
<td>7L Returnable Stainless Steel</td>
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<tr>
<td>7L Returnable Stainless Steel-4 Uses</td>
<td>0.97</td>
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</tbody>
</table>
BEST: Prevention

• Encouraging **consolidation** with best procurement practices.

• Utilizing Stockrooms as a **consolidation** point for product distribution.

• Working with suppliers to develop EPS alternatives.
EPS Cooler Alternatives

- Cell Signaling Technologies
  - Rock and slag wool
- Mushroom Insulation
  - Mycelium
- Green Cell Foam (Biodegradable)
  - Sugar or corn based
  - Milk and clay based
- American Aerogel
Rock and Slag Wool

- Shipping Coolers Consist Of Cardboard Made Up Of 100% Post-Consumer Recycled Waste
- With Insulation made from Mineral Rock Slag Fiber Wrapped In A Biodegradable Plastic Film
- The Whole Box Is Biodegradable
Mushrooms

- Ecovative Designs
  - Mycelium based replacement

Agricultural Waste + Fungal Mycelium = Mushroom® Materials

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Green Cell Foam

- Insulation made of corn starch or sugarcane

- How do we dispose of this?
Aerogel

thermal packaging systems designed to provide cost savings while delivering ultimate performance, learn what products are right for you.
Future Considerations

- Reusing with local small businesses
- Internal Reuse program
- Repurposing (i.e. Waste to Waves, etc.)
- Investigate local recycling options
Reuse with a Local Small Business

- A win-win situation: Waste management for cost savings
- Identify a local business who is willing to perform pickups and/or pay for shipping
  - Preferably: An agreement supplier with a good relationship and high visibility content
Local Buyer of Recycled EPS

- Loose Fill and EPS Packaging Drop-off sites across the US
- Grind up and re-mold recycled EPS into new EPS packaging on-site

- Sonoco Products (Tijuana)
- Foam Fabricators (Compton, CA)
- Lifoam Industries (Vernon, CA)
- Aptco, LLC (McFarland, CA)
- Styrotek (Delano, CA)
- Sonoco Products (Hayward, CA)
- Foam Fabricators (Modesto, CA)

Find this map at epspackaging.org
In Summary

- EPS Packaging is a problem
- Check to see what’s being done at your campus
- There are several alternatives to EPS
- Reach out to your suppliers and let them know your EPS concerns.

Together we can achieve change quicker.
Special Thanks To

- Fred Gomez – UCSD
- Alonzo Noble – UCSD
- George Dalrymple – UCSD
- Gayle Ta - UCSD
- Bob Hill – Director of Recycling & Marketing (EDCO)
- Carlos Jaime – Community Relations Manager (Republic Waste)
- Heidi Brunell – Account Manager (Life Technologies)
- Rachael Relph – Sustainability Manager (Life Technologies)
- Allison Paradise – Sustainability Consultant (My Green Labs)
- Allen Doyle – UC Davis
- Patrick VanDyke – UC Davis
- Jazmin Pedroarena-Leal – Account Manager (Sigma)
- Jeffrey Whitford – Global Citizenship Manager (Sigma)
- Seth Levin – Sustainability Coordinator (Cell Signaling)
- Samantha O’Neill – Account Manager (Promega)
- Natalie Relyea – (Ecovative)
- Nicole Cruz – Sustainability Consultant (United Health Group)
Questions?

Contact Us!

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