

## Plastic Circularity Council Meeting: 01/16/2024

### Agenda

- Introductions & Welcome
- Review Council Priorities
- Discussion on council definitions
  - Define "Recycling"

### Member introductions and Ice breaker question

Ice breaker question: what is a plastic that you interact with daily that you're unsure of how to recycle

1. Adam Hill, Direct Polymers, Denver: Owns a plastics manufacturing facility handling post-industrial and post-consumer plastics processing in Colorado.
2. Alice Jin, Material Chemist and CTO of Rocky Tech: Works on R&D to improve the circular economy of plastics, focusing on upcycling HDPE and PP mixtures.
3. Liz Chapman, Executive Director of Recycle Colorado: Discussed forming a council devoted to the circularity of plastics.
4. Jennifer Freeman, Constellation Strategies: Discussed her challenges with recycling cosmetic packets and dog food bags.
5. Emily Freeman, Policy Holder: Talked about her difficulties with certain types of plastic packaging.
6. Reenee Casapulla, Foam Cycle: Mentioned the challenge of recycling vegetable net bags.
7. Brian Loma, Representative of Sullivan Plastics: Discussed the use of polyethylene plastics in asphalt roads.
8. Scott Hutching, Waste Management: Mentioned difficulty in recycling pouches for food items.
9. Alicia Archibald, Community Recycling Coordinator, Steamboat Springs: Discussed her interaction with plant containers.
10. Michelle Gazarik, Eco Cycle: Talked about the challenge of recycling foam polyethylene.
11. Ryan Call, Boulder-based Eco Cycle: Mentioned the need to update his knowledge on recyclable plastics in his new area.
12. Kevin Sullivan, National Renewable Energy Lab: Discussed the difficulty in recycling synthetic clothing.
13. Rob Writz, Board of Directors, Recycled Colorado: Mentioned challenges with bulky plastic toys and golf clubs.
14. Tim Daly, Waste Not Recycling: Discussed challenges with recycling certain types of plastic films and number 7 plastics.
15. Neil Noble, Republic Services: Liaison for the committee to the board of directors.
16. Chris Wacinski, CTO, Driven Plastics: Talked about the challenge with polypro super sacks and IBC containers.
17. Megan Wiebe, Boulder County Resource Conservation Division: Mentioned challenges with non-container plastics like old sunglasses and pens.

18. Eric Heyboer, Circular Colorado: Talked about his struggle with recycling plastic tea packets.
19. Alexa Rosenstein, Denver Airport: Discussed the issue with recycling black plastic mushroom containers.
20. Jeanette Hanna, BASF Biopolymers Division: Mentioned the challenge with recycling small bottles from contact lenses.
21. Pat White, Sustainability Association, Evergreen: Discussed confusion around recycling film plastics and clamshells.
22. Amelia Kovacs, Rocky Mountains: Mentioned the challenge with recycling skis.
23. Josh Taylor, Waste Management: Highlighted difficulties with various types of cannabis packaging.

### **Agenda 1: Discussion of Council Priorities**

Adam took the lead, stating the day's focus was to review the waste hierarchy sent by Rob and to define the circular economy and recycling.

- Waste Hierarchy Presentation by Rob: He discussed the importance of reduction and prevention in the context of recent plastic bag bans and industry efforts to reduce plastic in products. He referenced the Ellen MacArthur Foundation approach and a report from Clothing Partners on consumer reuse habits. Rob pointed out the hierarchy's top levels - Reduce, Reuse, and Recycle - and emphasized the group's intention to also discuss the definition of recycling.

### **Agenda 2: Defining Recycling:**

- Adam acknowledged Rob's presentation and agreed to start with the simple definitions of recycling as provided by Oxford and the EPA. He emphasized the need for the council to reach a consensus on specific examples and processes that qualify as recycling within their work.

The discussion moved towards defining what constitutes recycling, differentiating between mechanical recycling processes and technologies like pyrolysis.

Examples for discussion included:

- Recycling plastic beverage containers into new containers or textiles.
  - Transforming plastic film into extruded decking.
  - Using mixed plastics to create construction blocks.
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- There is consensus that defining recycling is complex and can vary widely by industry and process and a recycling hierarchy could be beneficial for prioritizing efforts and better managing the lifecycle of plastics.
  - Chemical recycling is debated, with a distinction made between processes that could be considered true recycling versus those that might fall under the category of recovery due to environmental and health impacts. The environmental impact, energy efficiency, and lifespan of recycled products are crucial considerations in defining recycling.

- Chris addressed the complexity of defining recycling, suggesting that any use of recycled plastic in place of virgin plastic should be considered a form of recycling, although it might not encompass the entire life cycle of the material. He mentioned that the definition might vary by industry, such as in asphalt, where recycled content can extend the life of the road for 20 years.
- Emily commented on the recyclability of paper and its fiber strength reduction after recycling.
- Brian proposed that "recycling" is an umbrella term that could include specific terms like "bottle to bottle recycling," "downcycling," and "upcycling," depending on the value change of the material. He also emphasized that waste to fuel or plastics to fuel should not be considered recycling.
- Alice spoke on chemical recycling, explaining that it breaks down polymers to monomers to create new plastics of the same quality as virgin materials. She thinks that chemical recycling should also be considered recycling, particularly for high-standard industries like medical and food packaging.
- Tim mentioned the challenge of recycling mixed plastics, especially in the medical field, and suggested that chemical recycling could be a solution for materials that cannot be mechanically separated.
- Adam proposed creating a recycling hierarchy to prioritize different types of recycling processes, with bottle-to-bottle recycling at the top.  
Hierarchy suggestion (from Chat):
  1. Fully circular mechanical reprocessing - I.e. bottle to bottle, crate to crate, sheet to pipe/sheet, etc
  2. "Dirtier" plastics that require blending, more technically advanced processed, washing, label removal, to go into cleaner feedstocks and be blended off
  3. Mixed plastics to single use products such as ByBlock, Terratico, or decking with additives (I.e fiberglass) and other single use applications to significantly extend the end of life timespan for those materials
  4. Plastics to fuel, plastics to energy, other similar processes
  5. Landfill
- Kevin agreed with Adam's idea of a hierarchy and highlighted the vast types of plastics that need categorizing for better management in Colorado.
- A participant added that the lifetime of recycled products, even if they can't be recycled again, should be considered when evaluating their environmental impact.
- Renee suggested categorizing recycling efforts by industry to add another layer to the hierarchy.
- Ranga raised concerns about the environmental and health impacts of chemical recycling processes like pyrolysis and gasification, referencing a report indicating potential issues with emissions of harmful chemicals.
- A participant suggested the consideration of industry-specific recycling maturity, using the example of PET bottles as a material with a well-established recycling market.

- General Discussion: Pyrolysis and gasification are recognized as only a part of the chemical recycling process. There are other chemical recycling methods that are both environmentally and economically viable.
- Joshua appreciates Adam's idea of a recycling hierarchy to help define the term and ensure alignment. He also supports Kevin's point about considering the durability of recycled materials.
- Michelle adds that environmental impact and economic costs should be key variables in defining the recycling process.
- Chris emphasizes the need for detailed definitions, including the value chain recognition. He suggests considering 'recovery' as a separate category from recycling and underlines the significance of the group's work in defining these terms for stakeholders like legislators and business developers.
- Kevin proposes collaborating with authors of a report from NREL to clarify findings in a future meeting.
- Alice offers to share a DOE report on the circularity of plastics, which is accepted by the group.

#### **Adam's Hierarchy Suggestion:**

**Tier 1:** Plastics that can undergo fully circular mechanical reprocessing (e.g., bottle-to-bottle recycling).

**Tier 2:** Plastics requiring advanced processing due to contamination but can still be recycled into high-quality materials.

**Tier 3:** Mixed plastics that can be turned into non-recyclable end products but extend the material's lifespan.

Adam discusses how the hierarchy could be applied to various types of plastics in the region to identify and prioritize materials for recycling. He talks about increasing the capacity to process post-consumer plastics and focusing on high-volume materials amenable to simpler mechanical reprocessing. Those involving waste-to-energy processes, may not fit the traditional definition of recycling.

This hierarchy is envisioned to guide the development of local end markets for recycled products, particularly in Colorado, where currently, valuable post-consumer and post-industrial grade HDPE materials are shipped out due to the lack of local processing infrastructure. Adam emphasized the potential for blending different grades and types of plastics to create new formulations for products like pipes, which could be an effective way to utilize materials that are otherwise difficult to recycle and have significant landfill footprints.

- The discussion also highlighted the predominant plastics collected in Colorado, including HDPE, PP, and PVC. Adam pointed out the flexibility in blending olefin plastics to create marketable end products and the opportunity to enhance value by combining various materials into specified formulations, meeting industry standards.

## **Concluding Remarks and Next Steps**

The meeting concluded with the suggestion to have a separate, dedicated session to delve deeper into developing end markets for recycled plastics and discuss specific examples of how to apply the proposed recycling hierarchy. The participants showed interest in continuing the conversation, particularly exploring the intersection of recycling, value creation, and environmental impact.

The next council meeting is tentatively scheduled for February 20, with the possibility of an additional meeting focused on the detailed application of the recycling hierarchy to local market development.

### **Next Steps:**

- Schedule and host a standalone meeting to explore Adam's detailed example of end-market development for recycling and its implications for recycling hierarchy.
- Incorporate findings from Emeril's report and the DOE report into the council's framework for defining recycling processes.
- Continue to refine the proposed recycling hierarchy and consider the economic and environmental impacts of various recycling processes.
- Next scheduled council meeting on February 20.