

Breakout Session Report Out

U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy



Breakout Session Name

Session Report "Volunteer"

Objective

- Identify the challenges and opportunities unique to manufacturing approaches for recycled and upcycled streams
- Consider closed-loop technologies or the use of recycled content in Additive Manufacturing/3D Printing applications

Major Challenges – Recycled and Upcycled Content

- The current ***Materials Space*** of the MRF stream and final applications must be mapped
- ***Technology solutions for Secondary MRFs*** which deal with highly mixed must be developed
- The lack of understanding of polymer decomposition from ***polymer to monomer in processing flows***
- There are a large amount of separation operations that can be enhanced or optimized

Opportunities – Recycled and Upcycled Content

- Each unit operation in a plant may have a unique value-proposition for improvement
- ***Technologies to handle contaminated streams*** including possibly mixed streams at secondary MRFs
- The development of models for development of secondary MRFs, possibly akin to biomass development

Major Challenges – Additive Manufacturing

- There is no current closed loop for Additive Manufacturing
- These products currently used for Additive Manufacturing are highly engineered

Opportunities – Additive Manufacturing

- There are limited opportunities in the space currently because it is a niche/small volume market that utilizes highly engineered thermoplastics currently
- There may be opportunities to use recycled composites (e.g. wind turbines) in this application

Most Important Takeaway Thought(s)

- There are *large opportunities for model and technology development for Secondary MRFs*
- There is a large opportunity to *understand the polymer processing that may enable the scale up of emergent technologies*
- Right now, opportunities for Additive Manufacturing seem limited