



## Plastics Recycling in Healthcare

# *“What is the Opportunity?”*

*Presented to:*

**Carolina Recycling Association**

**Healthcare Sustainability Workshop March 20, 2018**

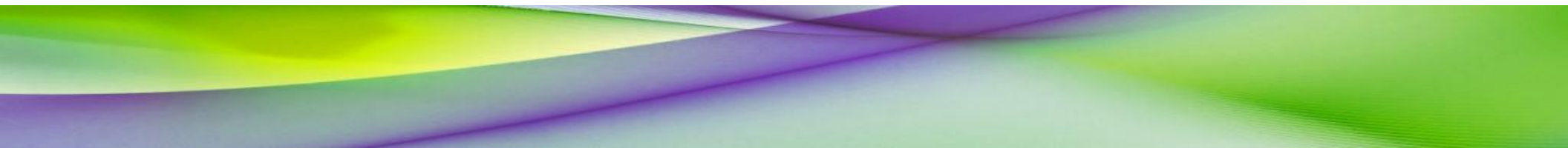
**Cherokee, NC**

# Agenda



- HPRC Overview
- The Opportunity in Healthcare Plastics
- Best practices: How to connect the MRF to the hospital
- Healthcare plastics as a commodity in the recycling market and the circular economy
- Questions?

*Recycler!*



# What is HPRC?



HPRC is a private, **technical coalition of industry peers** across healthcare, recycling and waste management industries **seeking to improve recyclability** of plastic products within healthcare.

## Vision

*All healthcare plastics are safely and effectively recycled and widely accepted as a valuable resource.*



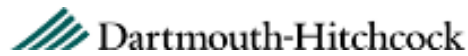
# Who We Are...



## Members



## Healthcare Facility Advisory Board



## Currently Engaged Stakeholders



## Coming Soon:

## Recycler Advisory Board



Visit [www.hprc.org](http://www.hprc.org)

# A Helping Hand for Hospitals



Work Product:  
HospiCycle

“How to” guide and collection of tools for establishing plastics recycling in patient care settings.

Looks at economic, regulatory, resourcing and infrastructure considerations

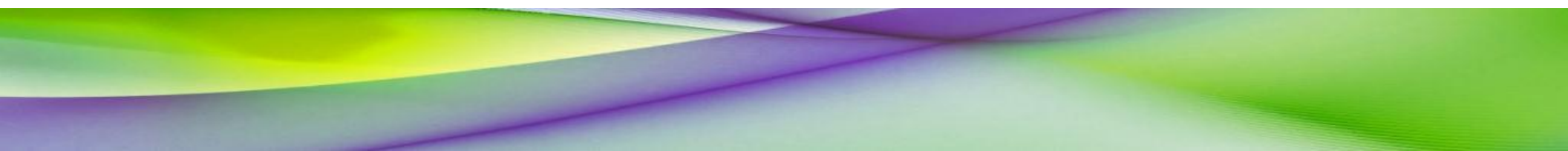
Experience the Interactive Prezi at:  
<http://bit.ly/HospiCycle>

# Healthcare Waste Situation



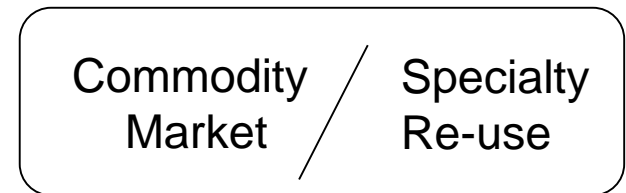
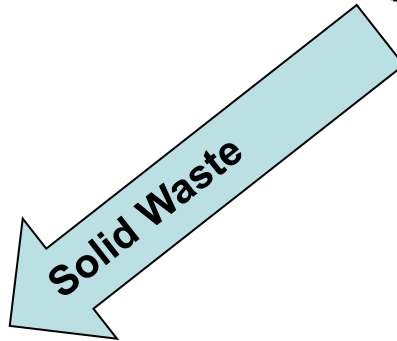
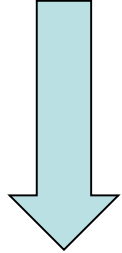
- 14,000 tons per day waste
- 20-25% plastics
- 85% noninfectious

The opportunity:  
**1,000,000 tons/year**





# What does the landscape look like today?

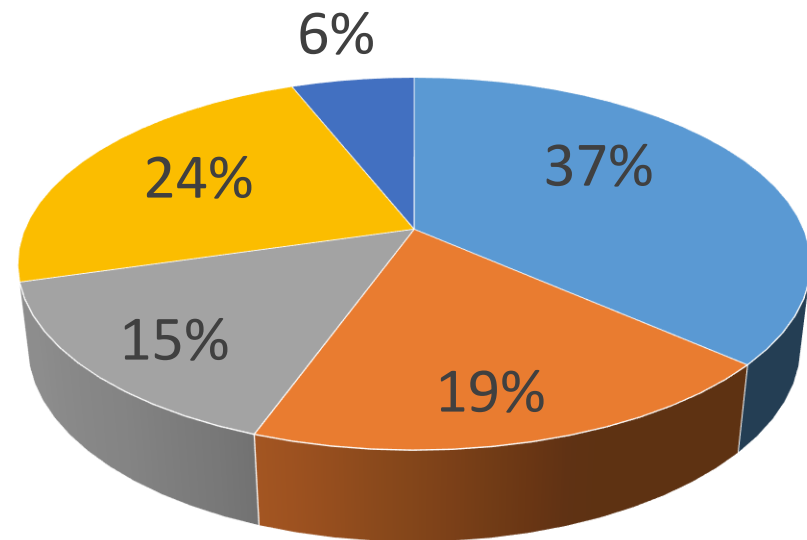


1. A variety of stakeholders with differing priorities!
2. Existing contractual arrangements that may limit flexibility.
3. A dynamic market for recyclable commodities.

# Healthcare (Clinical) Recyclables



- Sterilization Wrap
- Paper
- Rigid Plastics
- Other Flexibles (Non-Woven and Film Plastics)
- Other Recyclables





# The Supply: Healthcare Plastics



**PP**



**PP, PET, PETG, PS, HDPE**



**PP, PET, HDPE**



**Tyvek® (HDPE)**



**Film and Laminated  
Packaging**



**Sterilization Wrap  
PP**



**PVC**

# Adjusting to Targeted Healthcare Plastics



**PP**



**PP, PET, PETG, PS**



**PP, PET, HDPE**



**Tyvek® (HDPE)**



**Sterilization Wrap (PP)**

# The Challenge: Sorting Unacceptable Materials



**PPE**



**Used Cleaning Materials**



**Sharps**



**Metal containing materials**



**Paper**



**Rubber items**



**PVC**



# Main OR Clinical Plastics Recycling

## RECYCLE the following items



**RIGID INSTRUMENT PACKAGING**

**CONTAINERS**  
Saline/irrigation bottles (caps not recyclable), empty sani-wipe containers, etc.

**TYVEK®**  
Sterile barrier packaging/rigid tray lids (separate completely from tray)  
*Note: Tyvek® looks like paper but does NOT tear!*

**BLUE WRAP & OVERWRAP**  
Clean blue sterilization wraps, gowns (note: back table covers are not recyclable)

**TRAYS, PITCHERS, BOWLS**

**PLACE ITEMS IN HAZY BAGS WITH GREEN PRINT**

## DO NOT RECYCLE the following items

Consult your leadership with any questions regarding disposal



**RMW & SHARPS**  
(red bag, sharps containers)

**METALLIC MATERIALS**  
Foil backed packaging, equipment with metal screws

**FLEXIBLE PACKAGING**  
Plastic film from sterile packs, supply sleeves, syringe & IV packaging

**PEEL PACK**

**CLEANING, PREP**  
Foam, paper towels, cotton materials, gowns, masks, foot & head covers

**USED MEDICAL SUPPLIES**  
Rubber items, hose, wire, paper, IV bags

**TIPS FOR SUCCESS**

- ☑ Clean, dry, clinical materials only.
- ☑ Separate rigid plastic peel-packs completely.
- ☑ Paper and cardboard can be recycled separately (different bag).
- ☑ **SAFETY FIRST:** Recycled materials will be sorted by people, not machines. **When in doubt, throw it out!**

Recycle OR  
Training  
Materials

# Logistics – MRF Pathway



OR set up



OR Collection



In-House Transport



Hospital Dock



MRF



Recycler





# MRF Pathway - Observations & Feedback



## Observations

- Lower volume received than expected
- High contamination rates

## Hospital Feedback

- OR sorting requirements are very complex
- Priority is patient care

## Hauler / MRF Feedback

- Hand sorting bags is not feasible at municipal MRF
- Hand sorting bags is time consuming

## Recycler Feedback

- High rates of unacceptable items
- Co-mingled plastics have low value
- Not enough volume



# Connecting Supply & Demand



## Supply

- Variety of plastics
  - Multi-layered/multi-material
  - Co-mingled flexible and rigid
- Limited resources
  - Small spaces
  - Limited personnel
  - Patient priority



## Demand

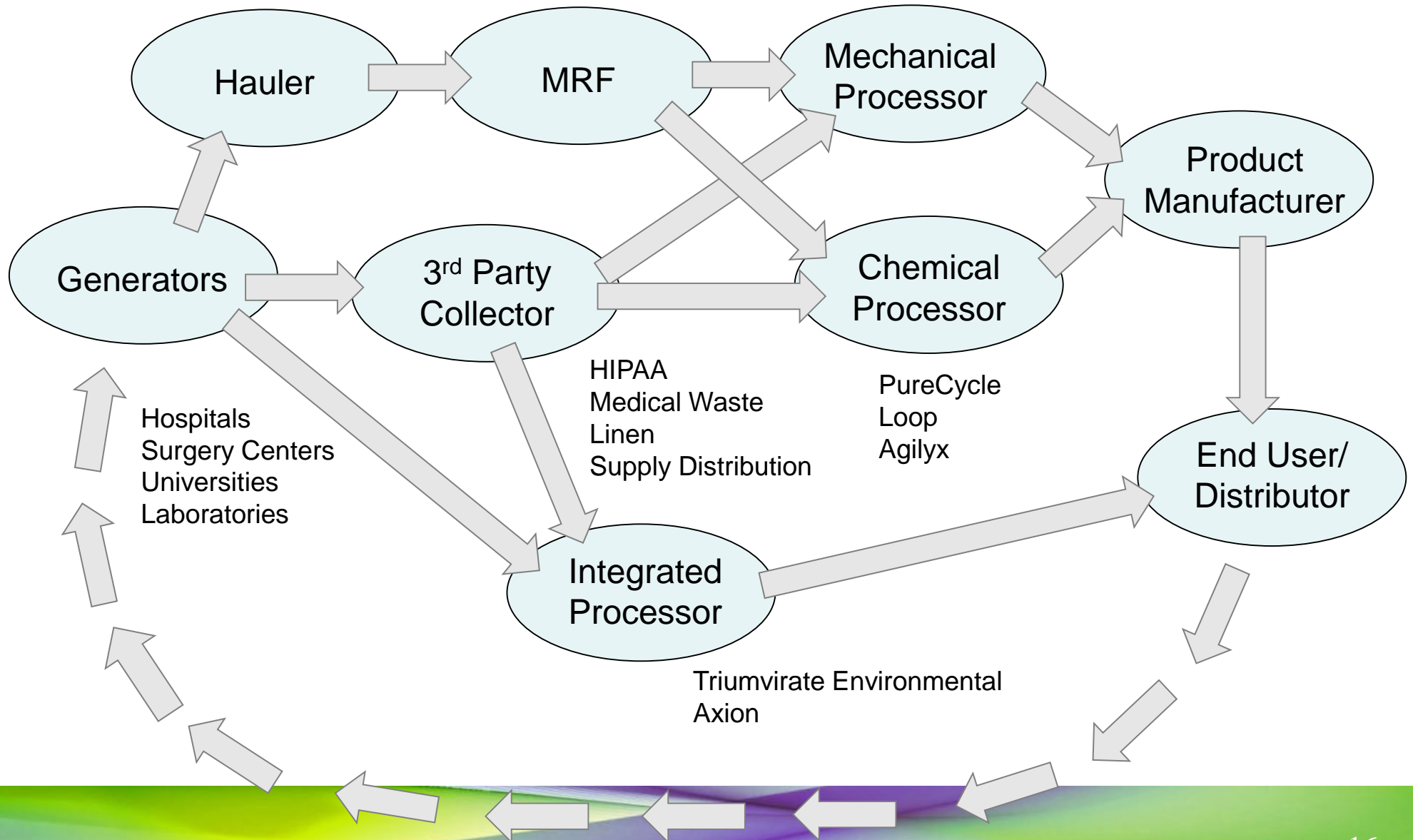
- Pre-sorted plastics
  - Co-mingling decreases value
- Economic viability
  - Market challenges
  - Sorting technology?
  - Time, capital, personnel



# Value Chain Diagram



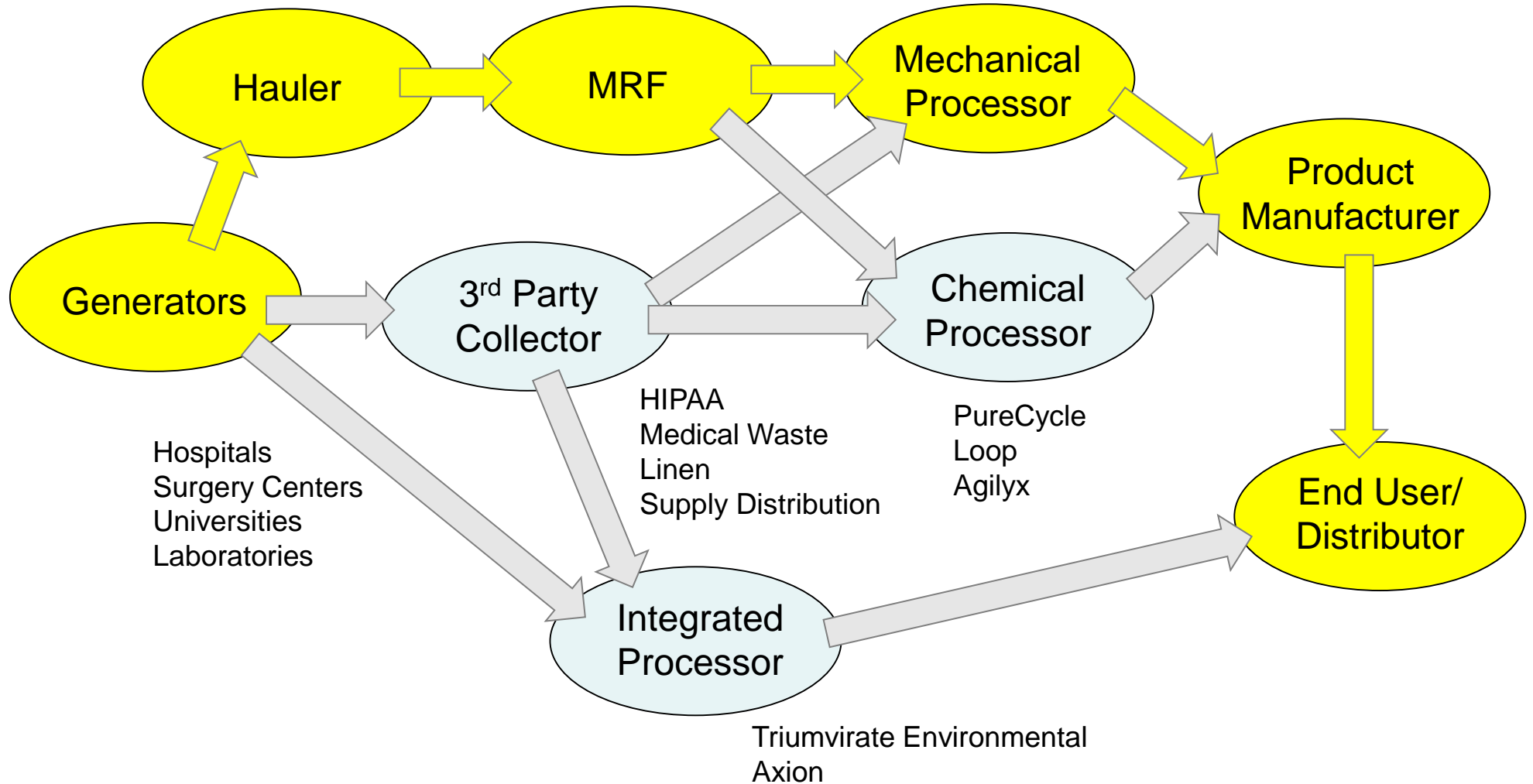
Film Processors  
Compounders  
PRF  
PI Recyclers



# Value Chain Diagram



Film Processors  
Compounders  
PRF  
PI Recyclers

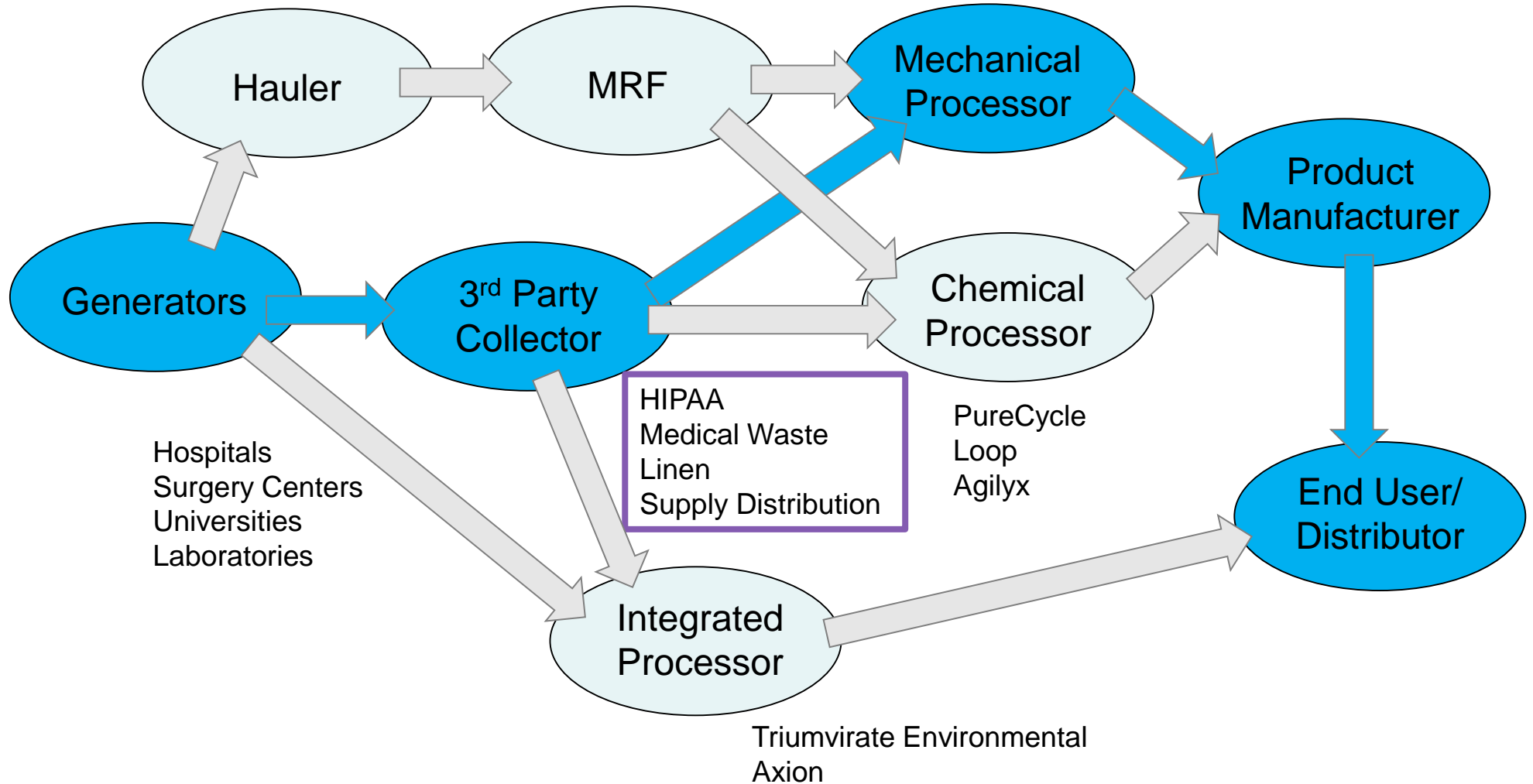




# So Consider Another Pathway:



Film Processors  
Compounders  
PRF  
PI Recyclers



# Targeted Recycling – The Potential





## What Hospitals Can Do:



- Build Your Own Healthcare Plastics Recycling Ecosystem
  - Form Partnerships with 3<sup>rd</sup> Party Collectors
  - Connect with Plastics Recyclers in your Region
- Implement Targeted Recycling Programs
  - Find high volume items that have value such as sterilization wrap and other PP materials
  - Handle them through a dedicated process
- Consider community partners for sorting comingled materials
  - Goodwill, others
- Review your supply chain
  - Narrow types of plastics purchased/used
  - Advocate for reformulation of products





## What Recyclers/ Collectors can do:



- Approach Your Hospital Clients to Discuss Healthcare Plastics Recycling
  - Start with Environmental or Sustainability Contacts
  - Connect with Plastic Processors in your Region
- Use Vehicles Already Making Pickups at Hospitals
- Implement Targeted Recycling Programs
  - Find high volume items that have value such as sterilization wrap and other PP materials
  - Handle them through a dedicated process
- Consider aligning with community partners to manage comingled materials
  - Goodwill, others



# Market Factors...



- China's bans on imported plastic waste
- Recycler's and logistics provider's capabilities (and priorities) can change rapidly with changes in their operations and market for their products.
- All stakeholders must understand the challenges (and costs) of extracting, sorting, and logistics – at present comingled materials have zero value

# ...about the Materials: Readily Combinable Healthcare Plastics



**PP**



**PP, PET, PETG, PS**



**PP, PET, HDPE**



**Tyvek® (HDPE)**



**Sterilization Wrap (PP)**



# Recovered Polypropylene



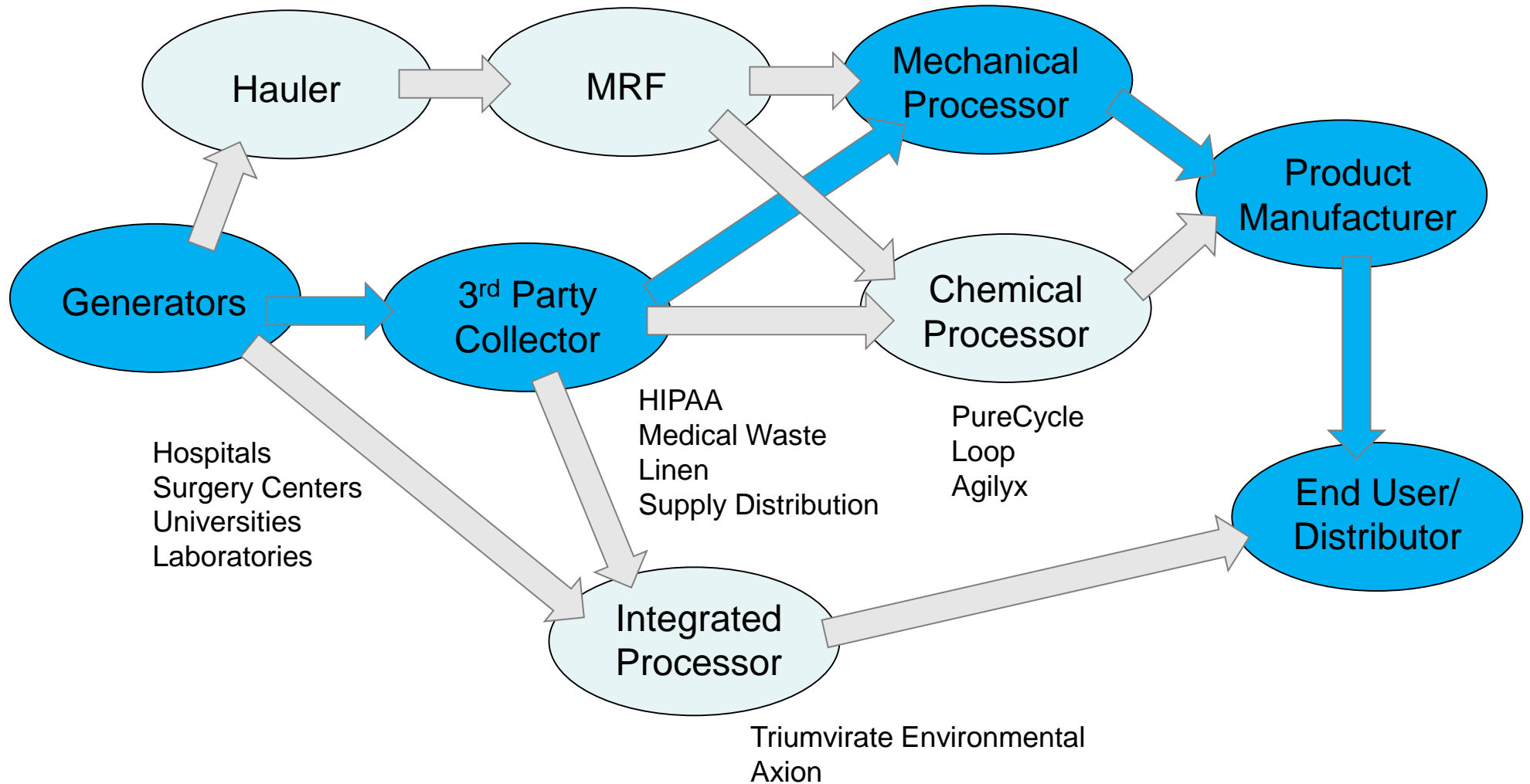
# Other Rigid



# Value Chain Diagram – Mechanical Recycling



Film Processors  
Compounders  
PRF  
PI Recyclers





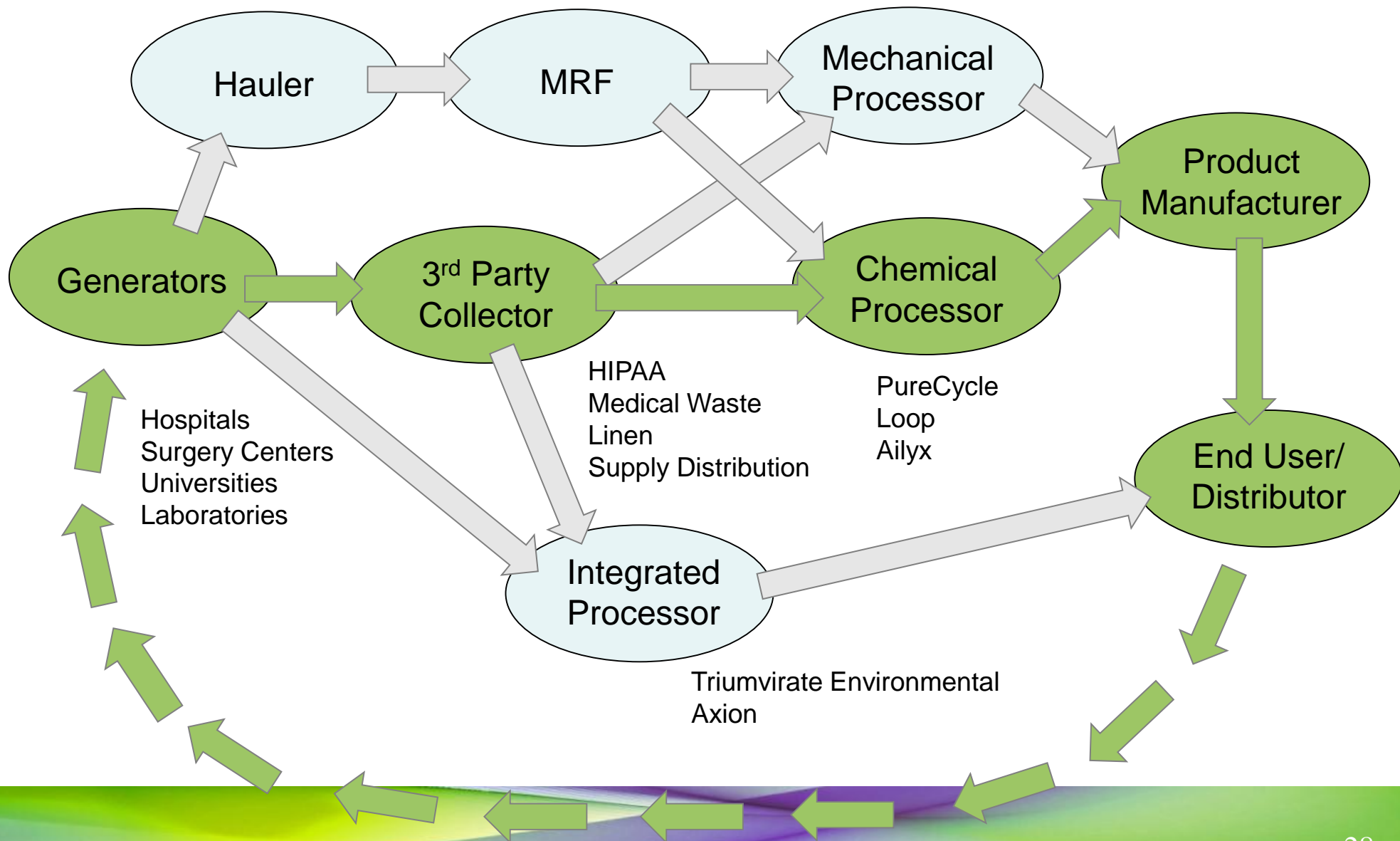
# Targeted Recycling – The Potential



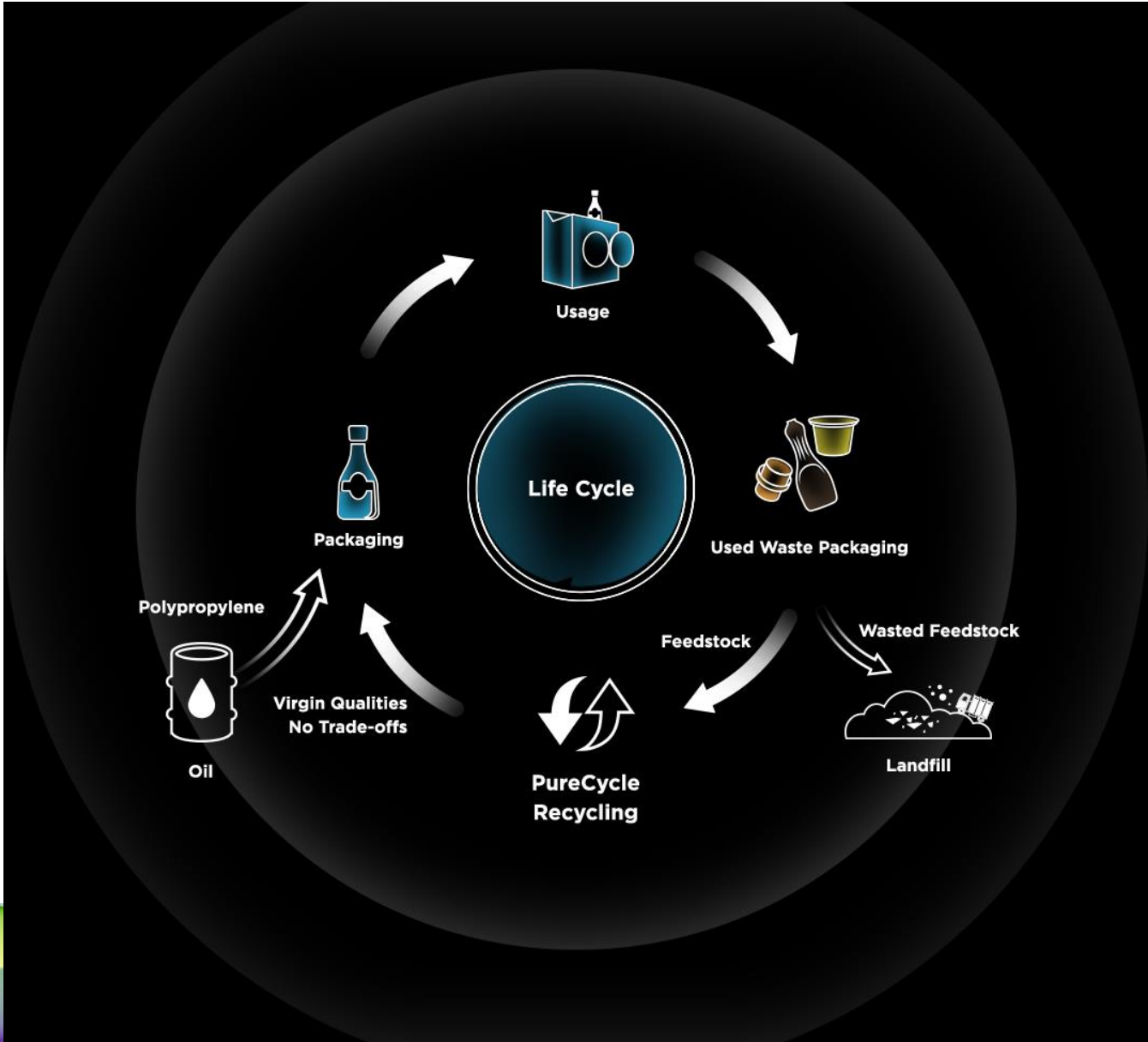
# Value Chain Diagram – Chemical Recycling



Film Processors  
Compounders  
PRF  
PI Recyclers



# Example Market: Non-Mechanical Polymer Recovery Technologies

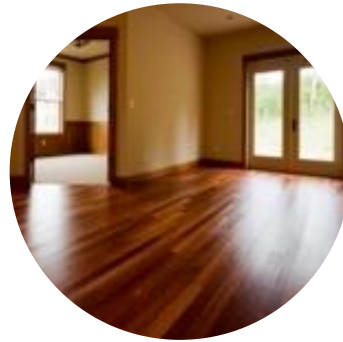




# Example Market



Inks



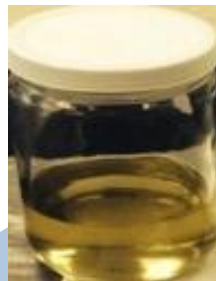
Coatings



Elastomers



Adhesives & Sealants



Resinate<sup>®</sup> Polyols



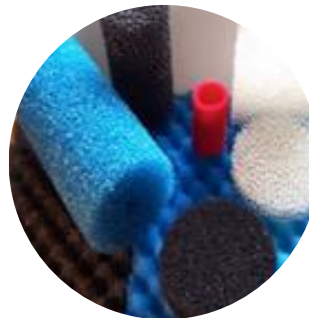
Flexible Foam



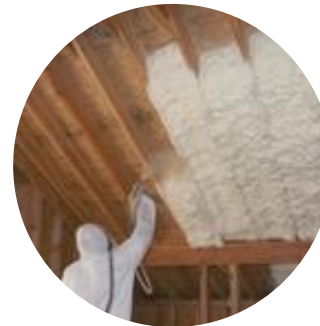
Recovered PET/PETG



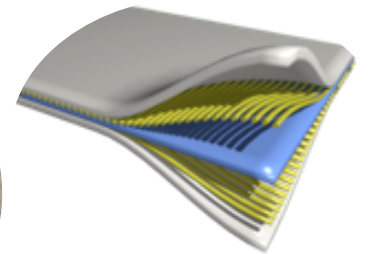
Plasticizers



Specialty Foams



Rigid Foam

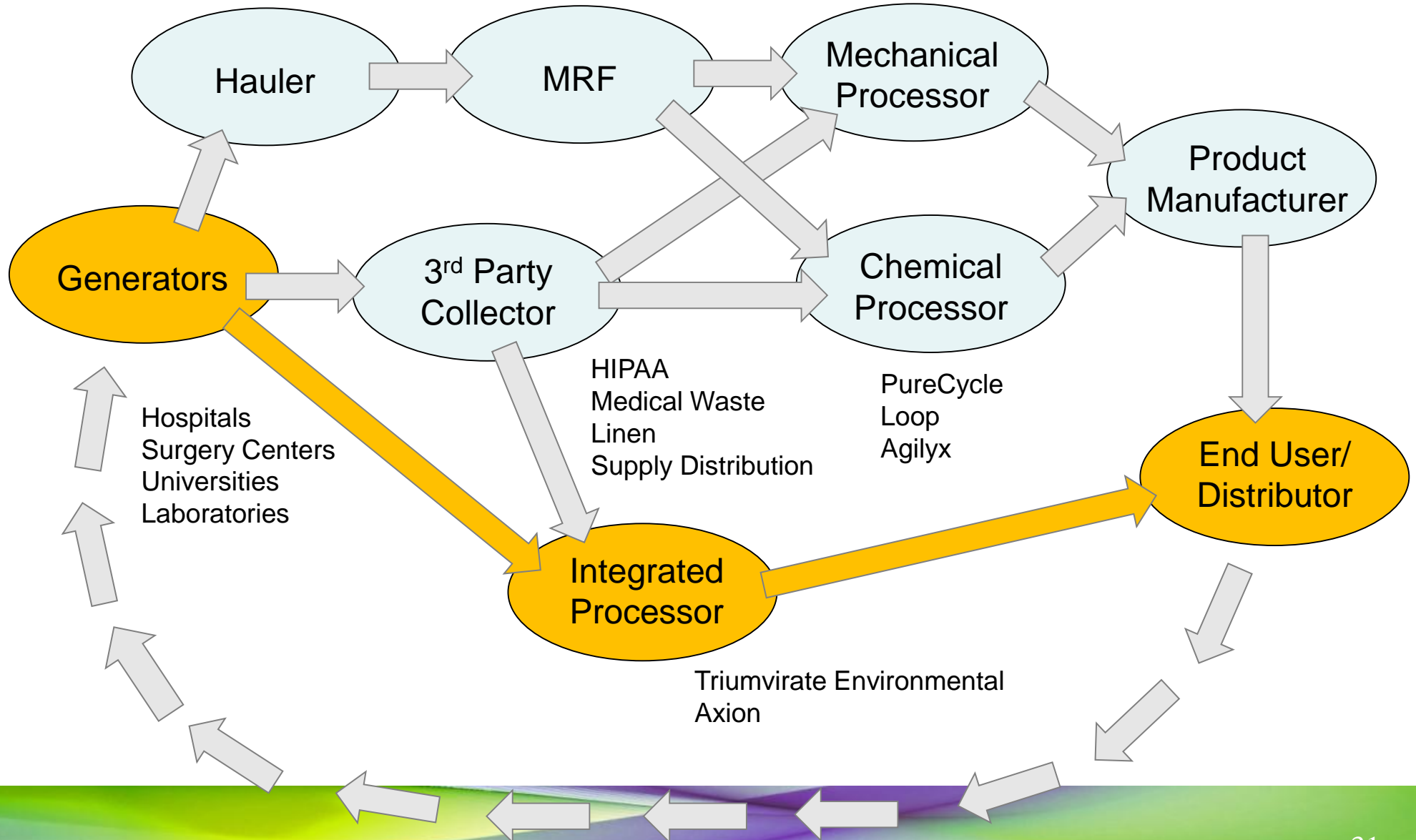


Composites

# Integrated Processor Value Chain Diagram

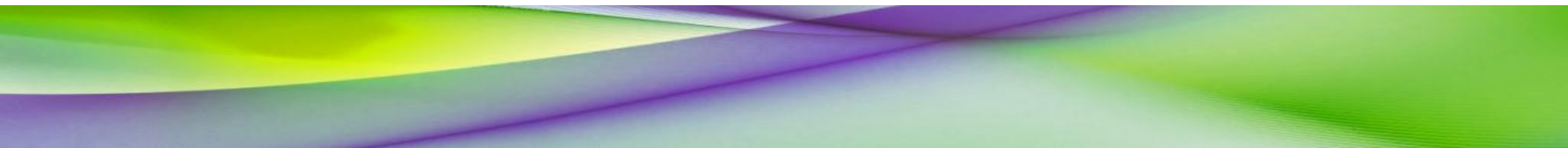


Film Processors  
Compounders  
PRF  
PI Recyclers



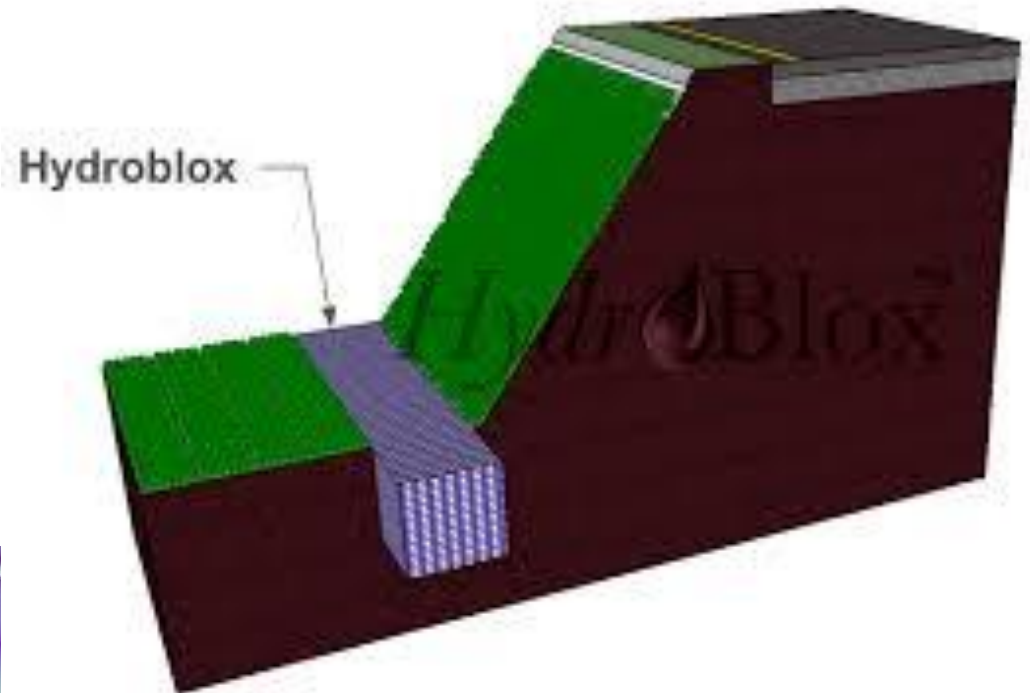


# Example Market: Integrated Processor

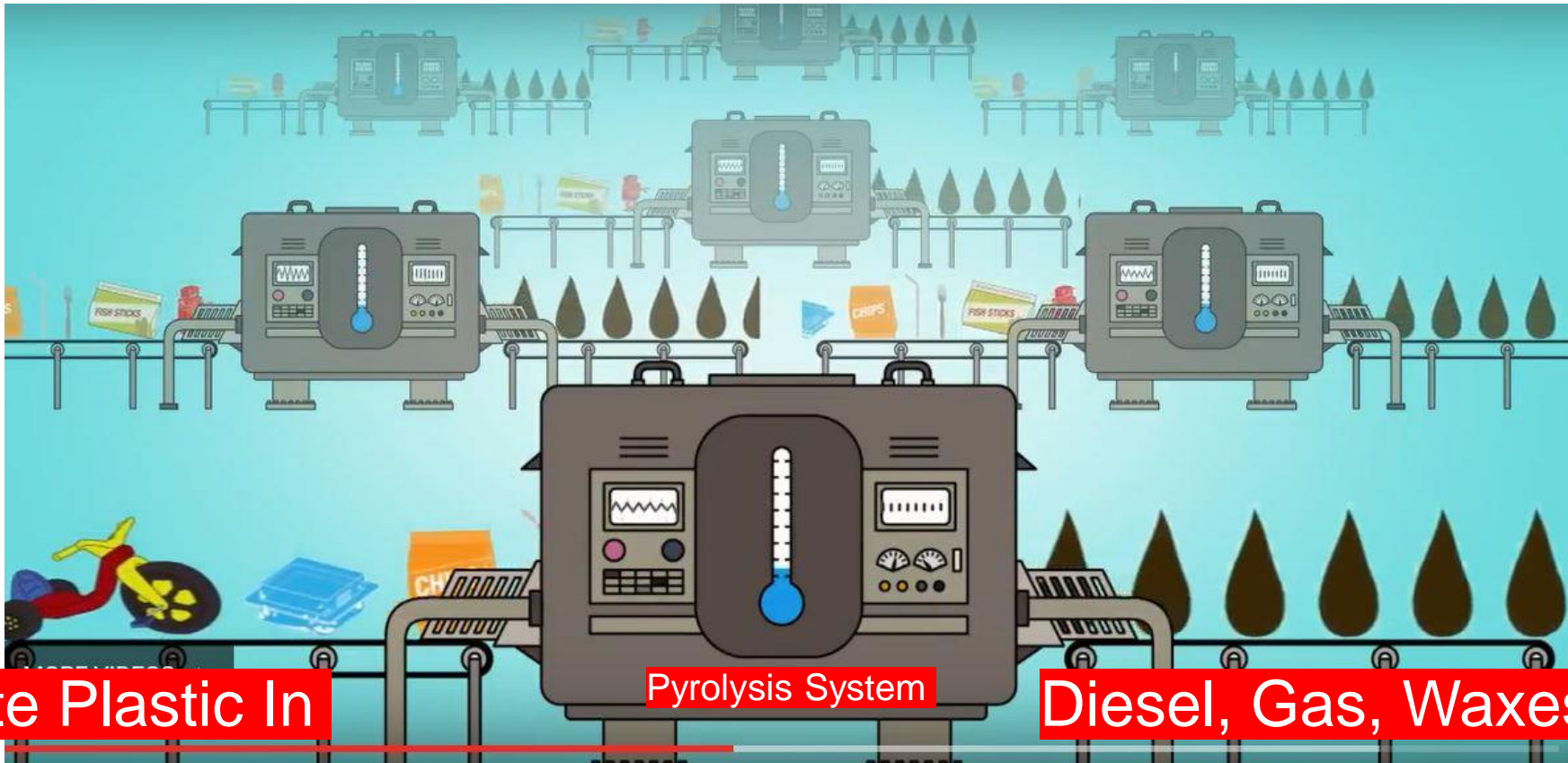




# Example Market: Innovative Drainage Product



# Example Market: Pyrolysis/Energy Recovery



Waste Plastic In

Pyrolysis System

Diesel, Gas, Waxes Out



# THANK YOU!!!



## For more information:

Visit [www.hprc.org](http://www.hprc.org)







# SUPPLEMENTAL SLIDES

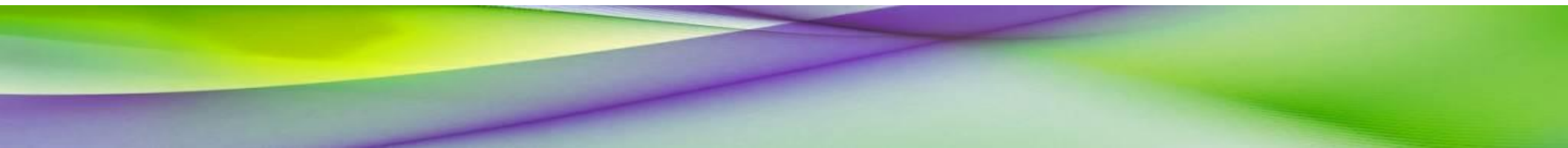


FIGURE 1: OUTLINE OF A CIRCULAR ECONOMY

PRINCIPLE

1

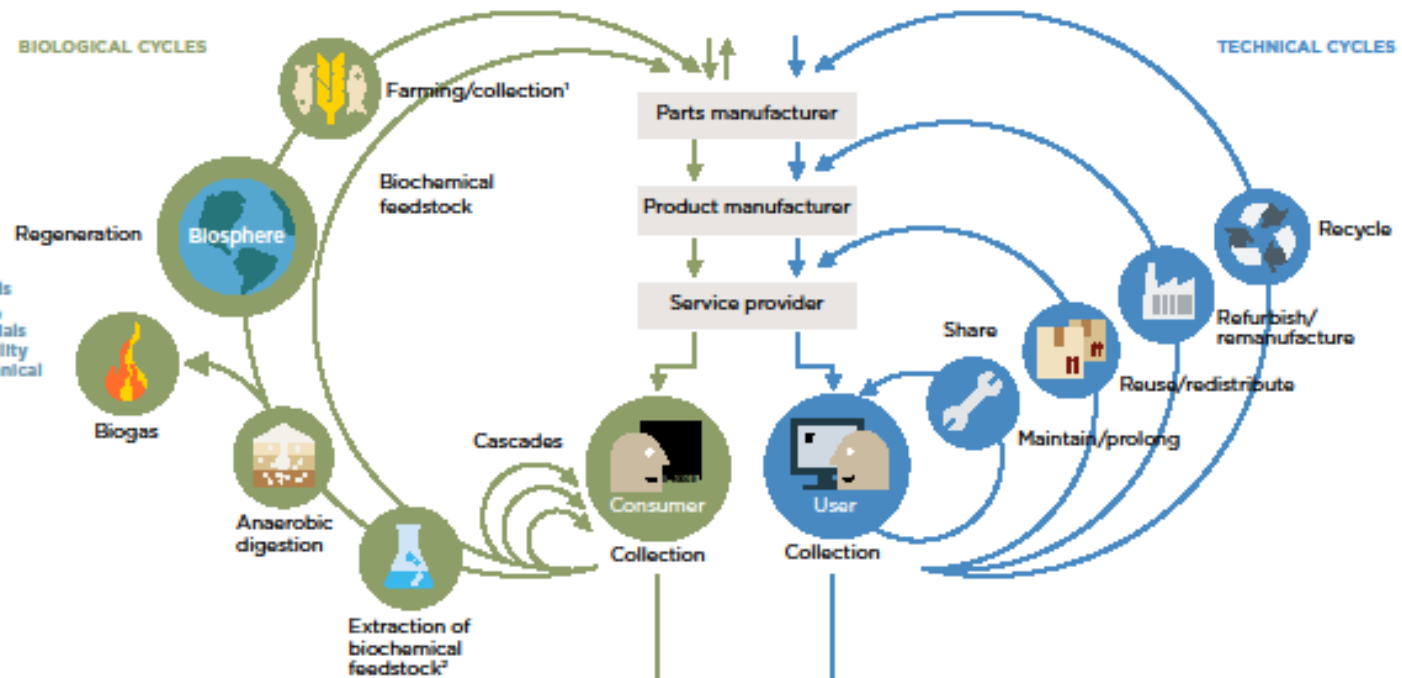
Preserve and enhance natural capital by controlling finite stocks and balancing renewable resource flows



PRINCIPLE

2

Optimise resource yields by circulating products, components and materials in use at the highest utility at all times in both technical and biological cycles



PRINCIPLE

3

Foster system effectiveness by revealing and designing out negative externalities

Minimise systematic leakage and negative externalities

1. Hunting and fishing  
2. Can take both post-harvest and post-consumer waste as an input

Source: Ellen MacArthur Foundation and McKinsey Center for Business and Environment; Adapted from Braungart & McDonough, Cradle to Cradle (C2C).



**“The development and introduction of new packaging materials and formats across global supply and distribution chains is happening far faster than and is largely disconnected from the development and deployment of corresponding after-use systems and infrastructure.”<sup>1</sup>**

*<sup>1</sup>The New Plastics Economy: Rethinking the Future of Plastics; Ellen MacArthur Foundation, 2016*



# Hospicycle Modules



## **Before You Begin:**

- [Common Recyclable Healthcare Plastics](#)
- [Typical Waste Characterization](#)
- [Checklist to Assess Hospital Readiness](#)
- [Guide to Developing a Plastics Recycling Business Case](#)
- [Economic Pro Forma Dock Space Guidelines](#)
- [Recycling Equipment Guidelines](#)

## **Getting Started:**

- [Plastics Mapping Tool](#)
- [Regulatory Compliance Guidelines](#)
- [Finding a Recycling Partner](#)
- [Questions to Ask Your Recycler](#)
- [Selecting a Recycling Strategy](#)

## Hospicycle Modules (cont'd)



### Running the Program:

- [Material Flow and Logistics](#)
- [Staff Training Resources](#)
- [Metrics Collection](#)
- [Economic Pro Forma](#)

### Improving the Program:

- [Targets and Goal Setting](#)
- [Communication Plan](#)
- [Auditing Your Program](#)



**To be Completely Updated for 2019 !**



# Lessons Learned

- Champions are critical; set up takes time and effort
- All involved must be aligned and committed – must account for conflicting priorities
- Understand the challenges of extracting, sorting, and logistics
- Understand the economics
- True “circular solutions” require participation from all stakeholders in the value chain