

# Facilitating a Circular Economy for Textiles

## Introductory Remarks

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# Mission – *America's Innovation Agency*

NIST

To promote **U.S. innovation** and **industrial competitiveness** by advancing **measurement science**, **standards**, and **technology** in ways that enhance economic security and improve our quality of life.



World-Leading Scientific and Engineering Research

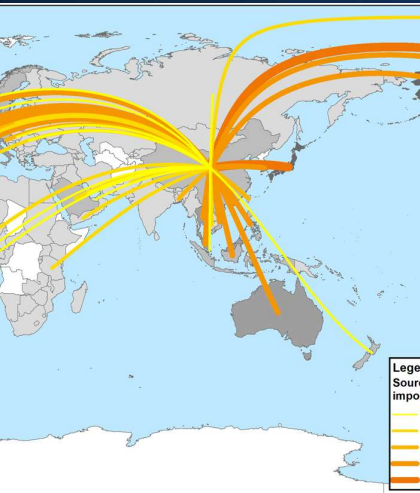


Advanced Manufacturing National Programs



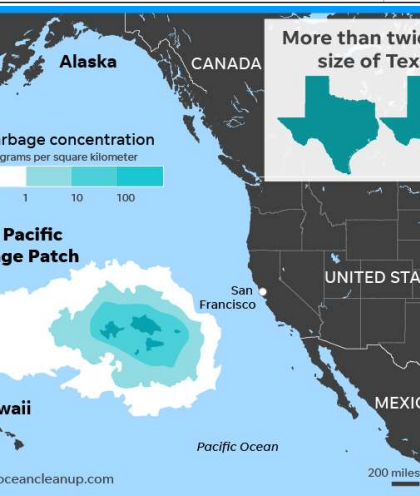
Technology Transfer and Innovation

# Two Converging Issues with Plastic Waste



- Global trade disruption in plastic waste
- Markets increasingly limited for traditional methods of collection and sortation
- Opportunities for new mechanical pathways and new technologies (e.g. chemical processes)

*Science Advances*, **2018**, DOI: 10.1126/sciadv.aat0131

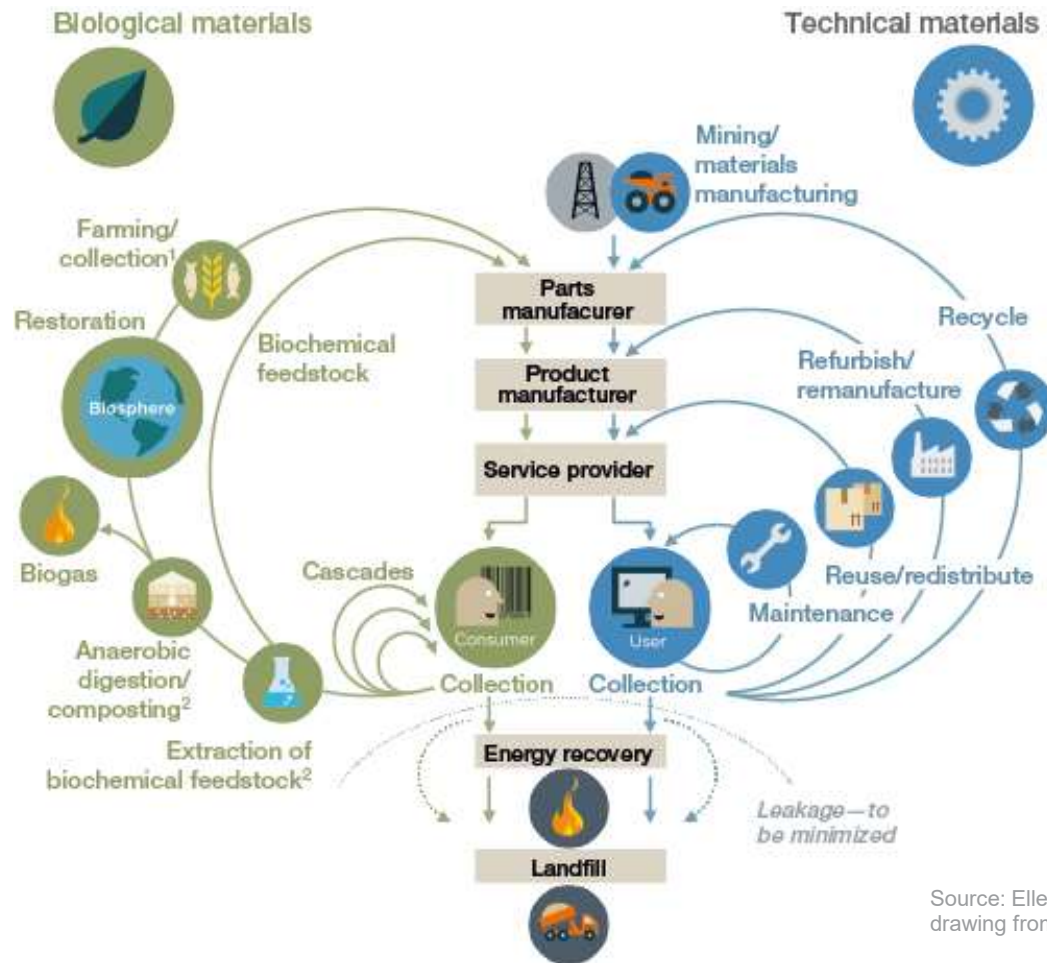


- Increasing awareness of environmental impacts of plastic debris, from macro- to micro-scale
- Quantification challenges and data scarcity problems



World Economic Forum, Ellen MacArthur Foundation and McKinsey & Company,  
*The New Plastics Economy – Rethinking the future of plastics* (2016)

# What is the Circular Economy?



The Circular Economy transforms our throwaway economy into one where waste is eliminated, resources are circulated, and nature is regenerated

Source: Ellen MacArthur Foundation circular economy team  
drawing from Braungart & McDonough and Cradle to Cradle (C2C)

# Circular Economy @ NIST



## Definition for NIST:

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Keeping atoms and molecules inside the economy, producing value, and out of unwanted sinks such as the environment (air, water, soil, etc)

**SOS 2.0:** system of economic activities that is restorative to the environment, enables resources to maintain their highest values and aims for the elimination of waste through superior design



## Organization

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We are structured roughly around materials classes:

- Polymers and Plastics
- 'High tech' waste (e-waste, solar, battery, critical mineral)
- Concrete/Built Environment
- Biomass
- **TEXTILES?**



# FY21 Workshops

NIST



**January 2021**

## **Circular Economy in the High-Tech World:**

- eWaste
- Solar waste
- Battery waste

Kelsea Schumacher  
and Marty Green



**May 2021**

## **Assessment of Mass Balance Accounting Methods for Polymers:**

- Basis of congressional report mandated by SOS 2.0

Kelsea Schumacher, Kate Beers, Kalman Migler, KC Morris and Josh Kneifel



**September 2021**

## **Facilitating a Circular Economy for Textiles:**

- Technical challenges
- Environmental impacts
- Government viewpoints

Kelsea Schumacher  
and Amanda Forster

# A couple of suggestions:

- **NIST works best with measurable/quantifiable needs and challenges.**
- Be specific about both the needs and potential impacts of solutions
- Don't hesitate to suggest multiple issues and/or solutions – capturing different points of view is very valuable



- **'Pre-competitive' barriers are also high value**
- What can enable the whole supply chain?
- What does 'everyone' acknowledge is needed to make circularity possible?
- Scientific/Technological focus is a NIST strength
- NIST is non-regulatory (not anti-regulatory)