



MAJOR INITIATIVE

FASHION & TEXTILES

MAXIMIZING RESOURCE EFFICIENCY
WITH BREAKTHROUGH TECHNOLOGY



TRANSFORMING THE FASHION & TEXTILES INDUSTRY THROUGH BREAKTHROUGH RESOURCE-EFFICIENT TECHNOLOGY SOLUTIONS.

Textile waste is one of the largest and fastest-growing waste streams worldwide. Each year, an estimated 92 million tons of textile waste is generated globally — a number expected to rise without significant intervention from the fashion and textile industries. In the United States alone, textile waste has almost tripled from 1990 to 2018. Currently, only about 15% of textile waste is recycled, both globally and in the U.S. Of this small fraction, roughly half is reused in secondary markets as apparel, while the other half is downcycled into products like rags and shoddy. Less than 1% is recycled back into new textiles

To decrease the impacts of textile production and increase the levels of textile recycling, we need to change the design paradigm for fashion, create new approaches to collection, develop high throughput sortation technology (e.g. sortation of usable from non-usable apparel, sortation, and disassembly by materials class), develop and demonstrate advanced processing technologies for fiber-to-fiber recycling, and identify and validate viable end-markets for recycled textiles.



**GLOBALLY,
92 MILLION TONS
OF TEXTILE WASTE**
are generated each year



**TEXTILE
PRODUCTION
ACCOUNTS FOR APPROX.**

20% of clean water pollution and
9% of microplastic pollution in oceans



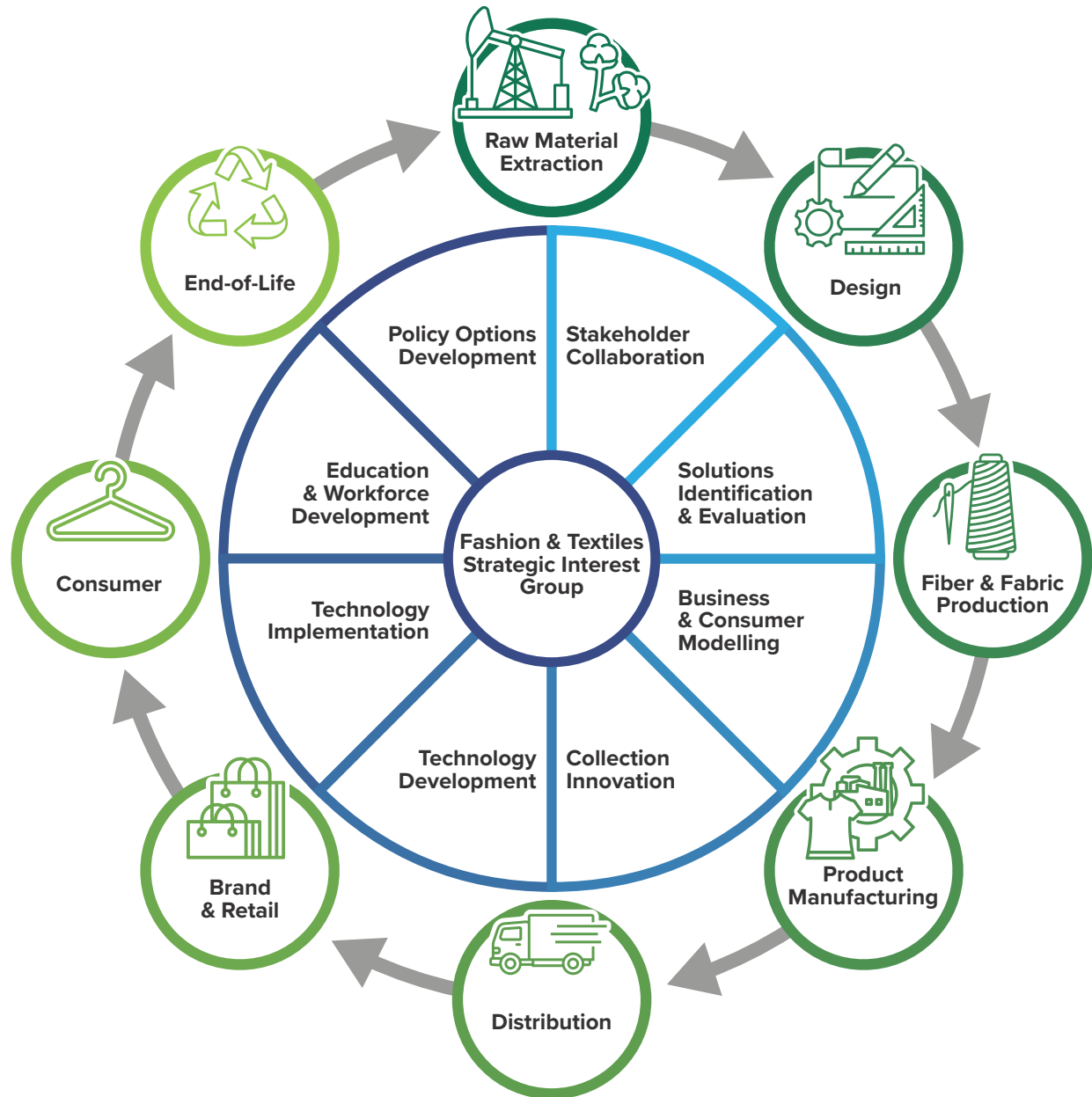
**THE TEXTILE
INDUSTRY
PRODUCES 2 to 8%**

of annual GHG emissions

OUR GOALS

- Mobilize stakeholders across the value chain from fashion designers to consumers to drive change in the industry (see 'Framework for A Resource-Efficient...' diagram)
- Develop business and consumer models to evaluate options for alternate consumption (e.g. increase lease and rental of apparel)
- Develop and demonstrate innovative collection models (e.g. hub and spoke, regional clusters, retail take-back)
- Develop data-driven policy options to support pathways to increase resource efficiency
- Extend material lifecycles (e.g. improve material functionality through design, improve repairability, enable apparel repurposing)
- Develop and demonstrate advanced sortation technologies (e.g. NIR Spectroscopy, XRD, robotic disassembly, machine learning, artificial intelligence)
- Develop and demonstrate advanced materials recovery technology (e.g. mechanical, thermomechanical, solvent extraction, chemical, enzymatic)
- Validate viable markets for apparel and recovered materials (e.g. apparel reuse and rental, fiber-to-fiber)

FRAMEWORK FOR A RESOURCE-EFFICIENT FASHION & TEXTILES INDUSTRY



FASHION & TEXTILES RECYCLING R&D PORTFOLIO



Department of War Textile Circularity Market Research
Identifying and developing cost-savings opportunities in the Department of War textiles supply chains.



Mapping the Materials Base for REMADE
Establishing database and framework to evaluate material impacts across the REMADE technology R& D portfolio.



Development of an Automated Method for Disassembly & Separation of Apparel for Recycling
Advancing robotic, sensors and machine learning to rapidly characterize, dismantle, and separate mixed textile waste streams.



Dynamic Crosslinking to Enable EVA Recycling for Footwear
Conversion of crosslinked EVA scrap to viable input material in shoe manufacturing.



Reinforced Recycled Polymer Composites
Developing functional composite material from carpet scrap and PET bottles for acoustic and pallet applications.



Reprocessing & Upcycling of Mixed Polyurethane Waste Streams
Development of catalytic processes to enable reprocessing of thermoset polyurethanes found in automotive and mattress foam.

SCOPE OF INITIATIVE

- ▶ Natural & Manmade Fibers & Yarns
- ▶ Woven & Nonwoven Fabrics
- ▶ Apparel
- ▶ Footwear
- ▶ Outerwear
- ▶ Residential & Institutional Linens / Sheets / Pillowcases / Tablecloths / Napkins
- ▶ Furniture Upholstry
- ▶ Sleep Products / Mattresses
- ▶ Floor Coverings
- ▶ Window Treatments / Draperies / Curtains
- ▶ Tents / Tarps / Canopies
- ▶ Automotive Appearance Fabric / Seatbelts / Sound Insulation
- ▶ Personal Protective Equipment / Aprons / Gloves / Medical Gowns / Fire Resistant Outerwear

A VIBRANT ECOSYSTEM FOR INDUSTRY COLLABORATION

As a consortium of more than 150 manufacturers, universities, national labs, and trade associations, REMADE and its members develop innovative technologies to enhance U.S. manufacturing competitiveness, increase the resiliency of the U.S. supply chain, and accelerate the nation's transition to a Circular Economy. Together, we have the power to accomplish what no one organization could on its own.

MORE THAN THE POWER OF ONE



JOIN OUR FASHION & TEXTILES STRATEGIC INTEREST GROUP

■ COLLABORATE WITH INDUSTRY LEADERS:

Engage with top experts from across the fashion and textile industry, academia, national laboratories, and federal agencies to identify and solve critical challenges in sustainable fashion and textile recycling.

■ BUILD STRATEGIC RELATIONSHIPS:

Strengthen connections with key organizations and stakeholders tackling similar sustainability and business challenges.

■ ACCESS DIVERSE FUNDING OPPORTUNITIES:

Leverage resources from public, private, and philanthropic sectors to support innovation, reduce risk, and accelerate the deployment of transformative technologies.

■ SHAPE R&D PRIORITIES:

Influence and prioritize research and development initiatives endorsed by the group to ensure alignment with industry needs and sustainability goals.

■ DRIVE INNOVATION THROUGH COLLABORATION:

Work alongside partners to reduce barriers, share risk, and support the advancement and implementation of emerging technologies.

■ SUPPORT PROPOSAL DEVELOPMENT:

Participate in coordinated efforts to develop strong proposals for funding research, development, and demonstration projects that target key sustainability challenges in the fashion and textile ecosystem.

TO JOIN, CONTACT: JOHN KRECKEL

Director of Membership & Workforce Development

jkreckel@remadeinstitute.org