



Increasing the Reuse, Remanufacturing, Recovery & Recycling of Critical and Key Materials in U.S. Manufacturing



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REMADE[®] and Our Strategic Goals

In partnership with industry, academia, trade organizations, and national labs, REMADE[®] invests in and conducts research and development – including advanced design, manufacturing materials optimization, remanufacturing and materials recovery – to develop technologies that increase the supply of critical and key materials, enhance U.S. manufacturing competitiveness, strengthen domestic supply chain resilience, expand the American workforce, and grow the U.S. economy.

Strategic Goals: Develop transformational technologies that enable U.S. manufacturers to accelerate their transition toward the Circular Economy:



**Expand Reuse,
Remanufacturing,
Recycling & Recovery**



**Reduce the Use of
Raw or Virgin Materials**



**Increase the Supply and Use
of Recycled Materials**



**Decrease Energy
Consumption &
Lifecycle Impacts**



**Achieve Cost & Energy
Parity Between Virgin
& Recycled Materials**

About the REMADE Institute

NODES



Systems Analysis & Integration

Data collection, standardization, metrics, and tools for understanding material flow



Design for Re-X

Design tools to improve material utilization and reuse at End-of-Life (EOL)



Manufacturing Materials Optimization

Technologies to reduce in-process losses, reuse scrap materials, and utilize secondary feedstock in manufacturing



Remanufacturing & EOL Reuse

Efficient and cost-effective technologies for cleaning component restoration, condition assessment, and reverse logistics



Recycling & Recovery

Rapid gathering, identification, sorting, separation, contaminant removal, reprocessing and recycling

MATERIAL CLASSES



METALS



POLYMERS



E-SCRAP



FIBERS

Circular Economy



Our Goal – Reduce embodied energy and lifecycle impacts in U.S. Manufacturing

REMADE Consortium

150+ Members Strong

74
Industry

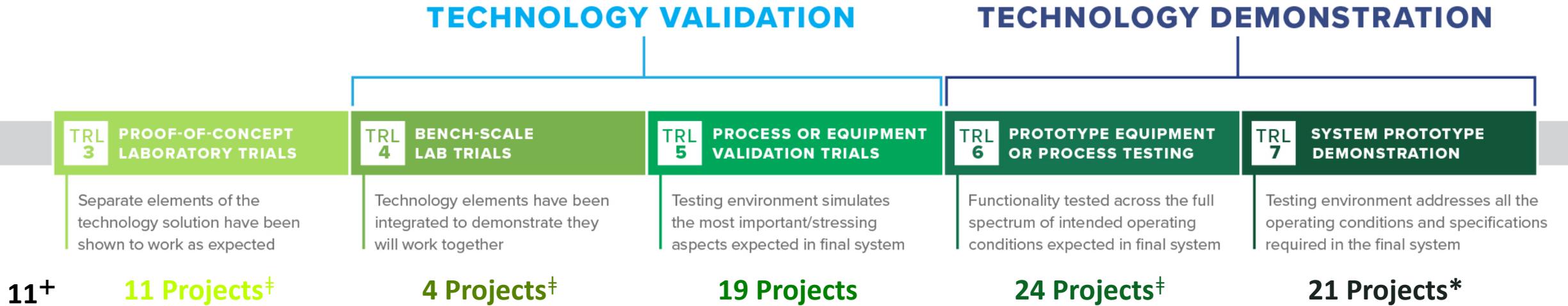
41
Academia

34
Trade orgs & Affiliates

8
National Labs



Leveraging REMADE's Public-Private Partnerships in Tech Demo Activities



Three technology licenses resulting from a REMADE Project issued this spring!



Virginia Tech & Phinix LLC



OSU & Audubon Metals



Phinix LLC & Secondary AI Processor

Industry-funded Projects Will Also Provide Opportunities to Mature & Demonstrate Technology Developed under REMADE



**CRITICAL MINERALS
RECOVERY & RECYCLING**

20
PROJECTS

REMADE INSTITUTE **MAJOR INITIATIVES**

93
COMPLETED &
ONGOING PROJECTS

\$100 MILLION
TOTAL INVESTMENT



**CIRCULAR
DESIGN**

12
PROJECTS



AI INTEGRATION

21
PROJECTS



MRFNXTGEN®

13
PROJECTS



**ELECTRONICS
RECYCLING**

20
PROJECTS



**DIGITAL
REMANUFACTURING**

22
PROJECTS



**PLASTICS
RECYCLING**

30
PROJECTS



**TEXTILE
RECYCLING**

7
PROJECTS

Critical Minerals Recovery & Recycling

MAJOR INITIATIVE

Strengthening U.S. Supply Chain Resilience

GOALS

- **INCREASE** the recovery rate of critical materials* to support their domestic production and reduce the risk of supply chain disruptions
- **DEVELOP** collection strategies to maximize the recovery of critical materials from end-of-life products
- **DEVELOP** software tools that help designers identify ways to increase critical material recovery
- **LEVERAGE** artificial intelligence (AI) tools to improve sorting and recovery of critical materials

*Critical materials, as defined by the U.S. Department of Energy, include:

- Any nonfuel mineral, element, substance, or material that the DOE determines:
 - Has high risk for supply chain disruption; and
 - Serves an essential function in one or more energy technologies, including technologies that produce, transmit, store, and conserve energy; or
- A critical mineral [as designated by the U.S. Department of the Interior](USGS, 2025).



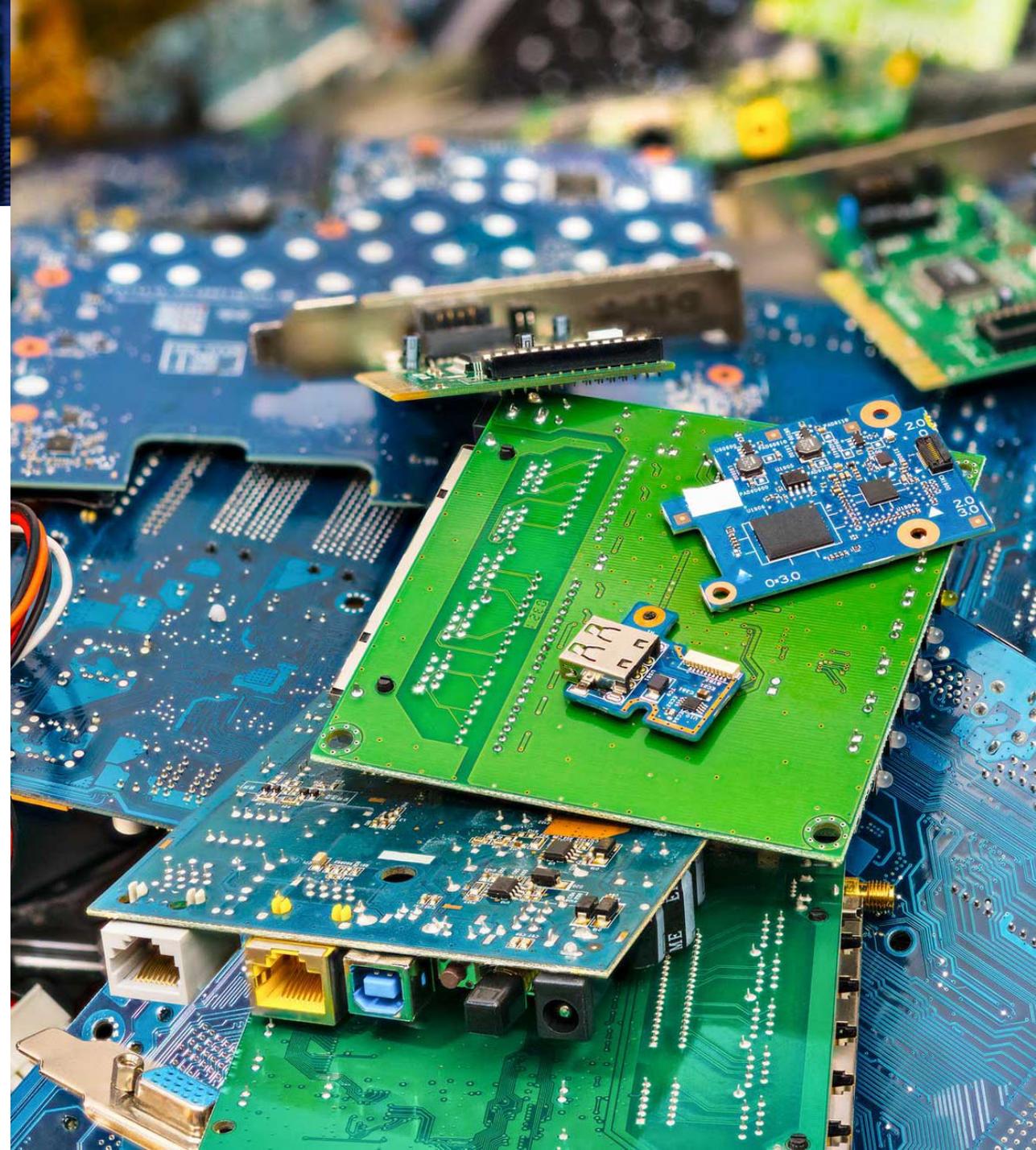
Electronics Recycling

MAJOR INITIATIVE

PIONEERING BREAKTHROUGH TECHNOLOGIES

Develop:

- Collection strategies to optimize recovery of end-of-life electronics
- Design tools to enable reuse, remanufacturing, and materials recovery of electronics
- Automated disassembly processes for high throughput and safe removal of batteries
- Right-sized technologies to recover precious metals and critical minerals from electronics
- Effective materials sorting, separation, recovery and recycling technologies
- Workforce training and development



Digital Remanufacturing

MAJOR INITIATIVE

REVOLUTIONIZING REMANUFACTURING THROUGH DIGITAL TECHNOLOGIES, A.I, ROBOTICS & AUTOMATION

GOALS

- **DEVELOP** new design for remanufacturing tools
- **INTEGRATE** A.I., robotics, and automation into processes and logistics
- **ADVANCE** reverse logistics and decision systems through A.I and machine learning
- **IMPROVE** inspection and disassembly to reduce costs
- **CREATE** new advanced condition assessment tools
- **DEVELOP** low-cost restoration technologies to increase capabilities
- **DRIVE** digital remanufacturing through the use of data and connectivity



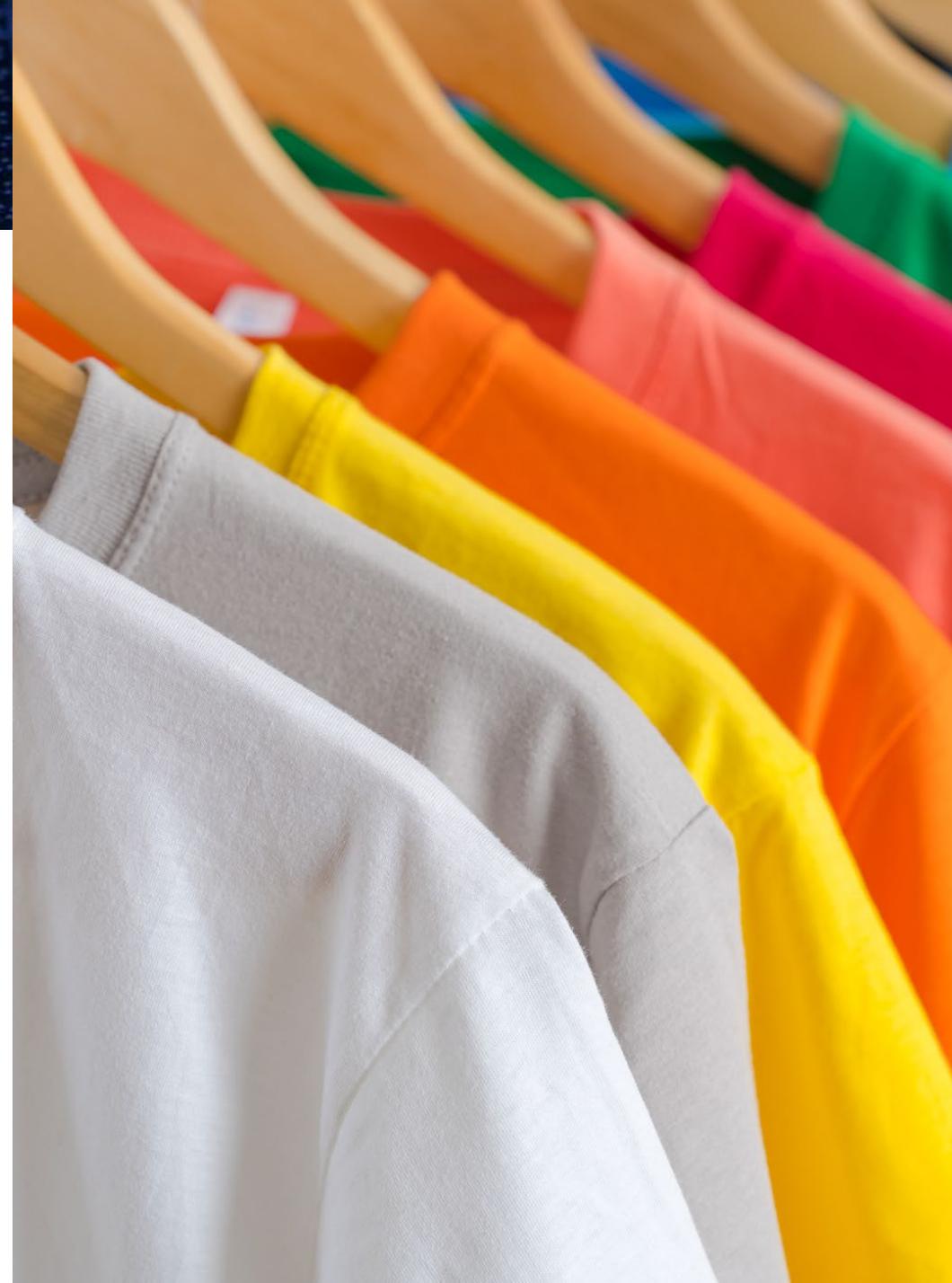
Fashion & Textiles

MAJOR INITIATIVE

*TRANSFORMING THE INDUSTRY
THROUGH BREAKTHROUGH RESOURCE
EFFICIENT TECHNOLOGY SOLUTIONS*

GOALS

- **MOBILIZE** stakeholders
- **DEVELOP** business and consumer models to promote circularity
- **INNOVATE** collection models
- **COLLECT DATA** and utilize to support policy driven pathways for resource efficiency
- **EXTEND** material lifecycles
- **DEVELOP & DEMONSTRATE** advanced sortation technologies
- **ADVANCE** materials recovery technology (mechanical & chemical recycling)
- **VALIDATE** end-markets for recovered materials



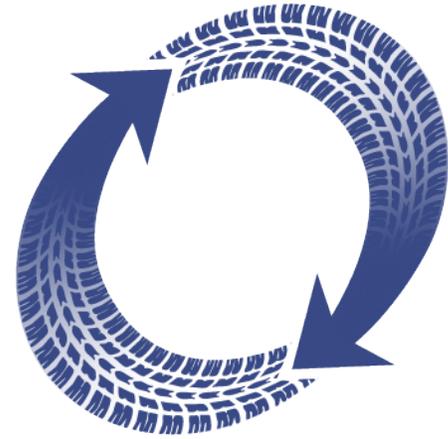
U.S. Department of War Textile Circularity Project

- Understand current departmental practices for disposition of end-of-life textiles
- Identify potential pathways, key technologies, and potential barriers for development of textile circularity
- Develop recommendations for future progress in circularity, with respect to economic feasibility and sustainability



NYS Waste Tire Program

- An estimated 18-20 million used tires are generated in New York State every year
 - Around 29 million used tires are stockpiled across the Empire State
- NYS Waste Tire Program - administered by REMADE® - is developing and administering grant programs for technology development and technology demonstration, representing **\$8 million** in total anticipated investment
- RFP announced in September; awards expected to be announced in the next few weeks



NEW YORK STATE
WASTE TIRE
PROGRAM

Education & Workforce Development

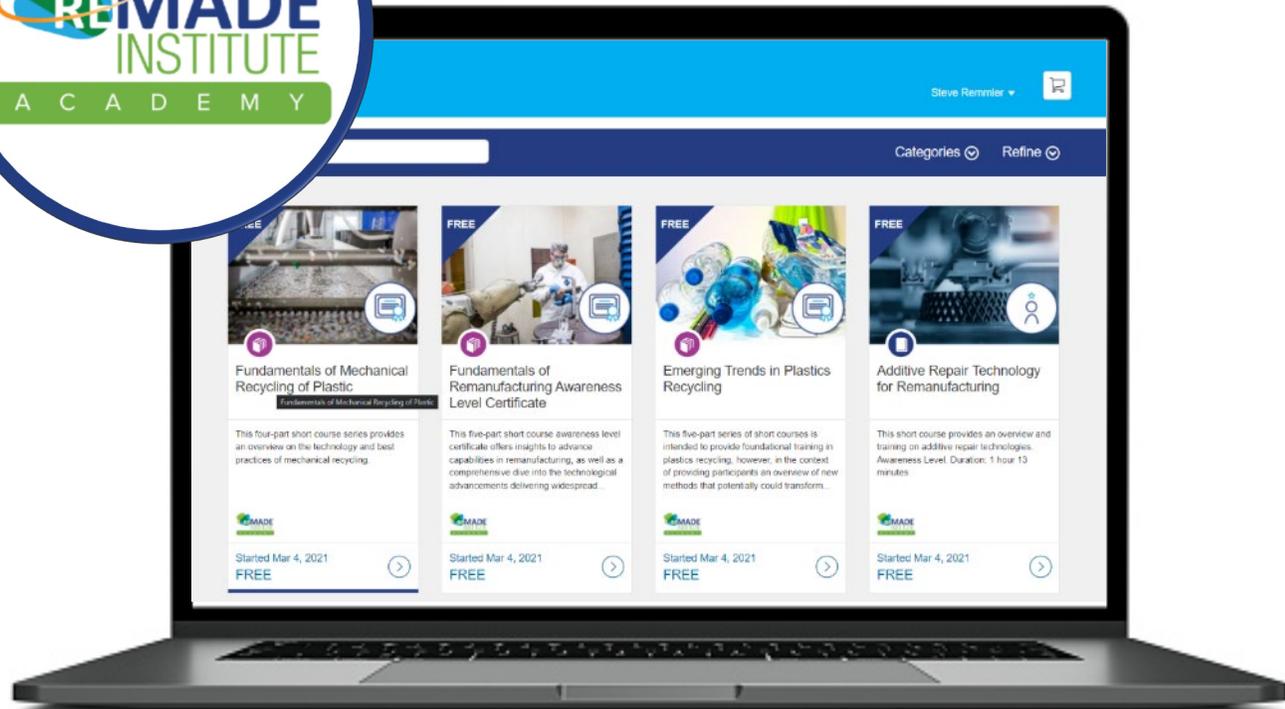


Unique short courses & certificate programs

Workshops, conferences, and bootcamps

Online / on demand learning platform

Customized for engineers and technicians



Course Catalog Examples



Remanufacturing Training

Introduction to Remanufacturing

Cleaning Technology

Condition Assessment Technology

Additive Repair Technology

Design for Remanufacturing

Exploring High-Speed Laser Cladding for Repair

Non-Destructive Evaluation of Fatigue Damage

Redefining Value-The Manufacturing Revolution

Systems Analysis & Integration Training

A Systems Analysis of Plastics in the Global Economy

Introduction to Circular Economy and Systems Analysis

Mapping the Materials Base

Materials Disruption Possibilities, Now and Into the Future

Recycling Training

Crash Course in Plastics Recycling

Chemical Recycling of Plastic Waste

End-of-Life and the Circular Economy

Flexible Plastic Packaging

Plastic Flows Through a MRF

E-Waste Challenges and Opportunities

Circular Economy Workforce Training for Remanufacturing and Electronics Recycling Industries

Summary:

- Developing online workforce training for roles in the remanufacturing and electronics recycling industries that do not require four-year degrees.
- Supporting these industries with training for individuals without four-year degrees to help businesses on-board new employees, retain talent, and increase economic impact.
- Marketing initiatives will be deployed to help industry and workforce investment boards recruit new employees.





2026 REMADE CIRCULAR ECONOMY TECH SUMMIT & CONFERENCE

IN PARTNERSHIP WITH:



Venue:
**NATIONAL
ACADEMY
OF SCIENCES
BUILDING**

2101 Constitution Ave. NW
Washington, D.C.



When:

**MARCH
11-12,
2026**



BREAKTHROUGH
INNOVATIONS
FOR SUSTAINABLE
MANUFACTURING.







Thank You

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PLASTICS RECYCLING



Increasing the Use of Recycled Tire Rubber in Commercial Tires



Converting Mixed Polyolefins (m-POs) to Feedstocks for Automotive & Building Applications



Dynamic Systems Analysis of PET and Olefin Polymers in a Circular Economy



Remaking of Recyclable Multilayer Barrier Films



FULL EV RECYCLING & REMANUFACTURING



Fast Diagnostics to Enable EV Battery Reuse



Automation for Remanufacturing Battery Modules



Machine Learning for Hybrid & Electric Vehicle Battery Prognostics



Enhanced Processing of Aluminum Scrap at End-of-life via Artificial Intelligence & Smart Sensing



Commercial Removal of Fe & Mn from Molten Aluminum Scrap Melts



Achieving 100% Recycled Aluminum in Die Casting Applications



DIGITAL REMANUFACTURING



Condition Assessment of Used Electronics



Implementation of Low-Heat Repair CMT for Cast Iron



Rapid Damage Identification to Reduce Remanufacturing Costs



Sorting & Recycling Mixed Flexible Packaging & Plastic Wrap in MRFs



MRFNXTGEN



Thermal Barcode System for Plastic Sorting



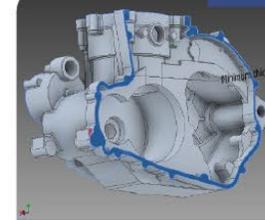
Autonomous Waste Sorting System for Recovering Waste



MAJOR INITIATIVES

PROJECT HIGHLIGHTS

CIRCULAR DESIGN



Development of a Novel Design for Remanufacturing Software Plug-in for CAD



Material & Vehicle Design for High-Value Recycling of Aluminum & Steel Sheet



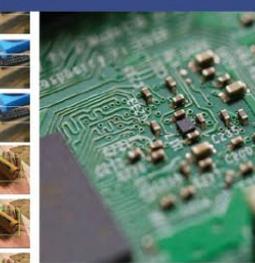
Design for RE-SOLAR



RECOVERY & RECYCLING OF ELECTRONICS



AI-Enabled Identification of Mixed Plastics & Electronics



Precious Metals Recovery from Printed Circuit Boards



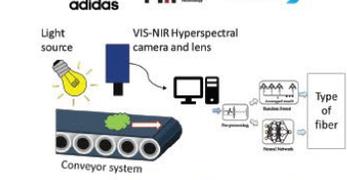
Automatic Disassembly of Consumer Electronics



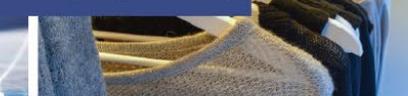
TEXTILE RECYCLING



Dynamic Crosslinking to Produce Secondary Feedstock from Recycled EVA as a Sustainable Solution for Footwear



Advancing the Sorting of Textiles for Recycling



Development of an Automated Method for Disassembly & Separation of Apparel for Recycling



Removal of Water Based Inks & Stickies from Spent Paper Fibers

