Education & Workforce Development Roadmap

2022 - 2023

Preparing The U.S. Workforce for the Circular Economy



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Document Reference:

- 2020 REMADE EWD Roadmap (Copies Available Upon Request)
- Workforce Profile
- 2020 REMADE Technology Roadmap (Copies Available Upon Request).
- 2018 REMADE Technology Roadmap (Copies Available Upon Request).

Overview

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The REMADE Institute, a public-private partnership established by the U.S. Department of Energy (DOE) enables early-stage applied research and development of technologies to reduce embodied energy and carbon emissions associated with industrial-scale manufacturing. In addition to R&D activities, the Institute's parallel objective is to prepare U.S. workers for careers in the circular economy.



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REMADE's 2022-2023 Education and Workforce Development (EWD) Roadmap represents a continuation of REMADE's strategy to train the U.S workforce first detailed in the 2019 and 2020 EWD Roadmaps. Updates reflected in this roadmap include 1) content development progress in priority topics identified in the 2020 EWD Roadmap; 2) integration of REMADE R&D project outcomes into training material; 3) strengthened emphasis on diversity, equity, and inclusion; and 4) detailed next steps for the dissemination of training through 2023 and beyond.



Development Roadmap Update

The foundation for REMADE's EWD strategy detailed in the 2022-2023 EWD Roadmap was established through an initial national training gap analysis involving two studies. First, REMADE partnered with the Economic and Workforce Development Center at Monroe Community College in Rochester, New York to conduct a workforce profile study organizing and defining the REMADE-relevant workforce into two levels: engineers and technicians. This information was supplemented through REMADE's cataloging of ongoing workforce development programs offered by relevant trade organizations, certifying agencies, and university partners. These studies strengthened REMADE's understanding of where opportunities exist for new training development.

In 2019, REMADE conducted member interviews and formulated a strategy for increasing circular economy training in the U.S. This resulted in the release of REMADE's first EWD Roadmap outlining a multi-phased strategy that delivered incumbent workforce training through a three-tiered structure.

Throughout 2020, REMADE hosted training opportunities across each node primarily through online delivery. Based on the number of participants and follow-up surveys, REMADE validated gaps identified in the 2018 workforce analysis and 2019 EWD Roadmap. Training gaps of significance included a lack of understanding on the potential value of Re-X¹ practices within industry and for individuals seeking new career paths. REMADE also identified a lack of established certification programs in Re-X for employers to assess workers knowledge and skills. This led to the release of the 2020 EWD Roadmap highlighting REMADE's training delivery through outreach and tiered certificate pathways.

The 2020 EWD Roadmap refined the tiered certificate pathways program by assigning competency levels to each short course and certificate (awareness, practitioner, and expert). As noted in the 2020 EWD roadmap, the use of competency level enables the Institute to maximize engagement independent of an individual's expertise while communicating training expectations prior to enrolling. REMADE also listed short courses and certificate pathways that it plans to develop and deliver across all five REMADE nodes. Topics were compiled in coordination with the Technical Leadership Committee (TLC), Education and Training Steering Committee (ETSC), and internal REMADE subject matter experts.

¹ Re-X is shorthand for recovery, reuse, remanufacturing, and recycling.

REMADE's 2022-2023 EWD Roadmap represents a continuation of the 2020 EWD strategy with updated workforce development priorities and future dissemination activities. Content development progress since the release of the 2020 EWD Roadmap is reflected with REMADE's release of awareness level training across all five REMADE nodes. Completion of REMADE's first practitioner and expert level training is also noted in the area of advanced fibers recycling. Future priorities listed emphasize practitioner and expert level content development across each REMADE node.

This roadmap update was supported through insights gathered from the 2022 REMADE Request for Information, individual member interviews, and REMADE's ETSC and TLC. Training delivery consisting of outreach training, short courses, and tiered certificate pathways remain the primary mechanisms for training delivery.

To date, the Institute has engaged over 3,000 participants through both online and in-person opportunities. The Institute looks forward to continuing to provide flexible, on-demand training opportunities over the next year focusing on increasing training dissemination and new content development of priority topics.

Introduction

Background & Mission

Today, manufacturing accounts for 25 percent of U.S. energy consumption. With improvements in materials production and processing, the United States could significantly increase manufacturing energy efficiency, which could also yield substantial economic savings. To help realize these opportunities, the REMADE Institute—a \$140 million Manufacturing USA Institute co-funded by the U.S. Department of Energy—was launched in January 2017.

In partnership with industry, academia, trade associations, and national laboratories, REMADE will enable early-stage applied research and development of technologies that could dramatically reduce the embodied energy and carbon emissions associated with industrial-scale materials production and processing. The REMADE Institute is particularly focused on increasing the recovery, reuse, remanufacturing, and recycling (collectively referred to as Re-X) of metals, fibers, polymers, and electronic waste (e-waste).

Manufacturing Relevance

The work of the REMADE Institute is broadly focused on all material processing industries across the entire material value chain, including production, remanufacturing, and recycling. Because of this comprehensive scope, benefits realized from the Institute's efforts may be adopted throughout the entire U.S. manufacturing landscape, rather than within only certain technology concentrations.

Technical Focus Areas

The current state of materials manufacturing technologies, tools, methods, and processes presents challenges to achieving the level of Re-X envisioned as the future state of the manufacturing industry.

Current products are generally not designed with Re-X in mind, and manufacturing processes are not optimized for in-plant scrap reuse or the use of lower embodied-energy alternative feedstocks. At product end-of-life, there is a lack of reliable tools for assessing product condition and the potential for Re-X. Current methods for collecting, characterizing, sorting, separating, cleaning, and reprocessing materials can also make Re-X efforts too energy-intensive and cost-prohibitive. To achieve its mission and overcome these challenges, the REMADE Institute has organized its activities around five Nodes. Four Nodes align to the material lifecycle stages: Design for Re-X, Manufacturing Materials Optimization, Remanufacturing & End-of-life Reuse, and Recycling & Recovery; the fifth Node, Systems Analysis & Integration, addresses systems-level issues that are broader in scope than any one particular Node and have the potential to impact all the Nodes.

The Nodes will pursue research activities focused on overcoming challenges in the following areas:

What is Re-X?

Re-X is shorthand for recovery, reuse, remanufacturing, and recycling.

However, while not specifically called out in the above definition, sub-processes such as disassembly, sorting, inspection, cleaning, and collection should also be considered when considering Re-X within the manufacturing industry.



To support the transition to a more circular economy through design, recycling, reuse, remanufacturing, and systems improvements, industry needs a workforce educated and trained in the technologies, processes, and analysis methods critical to design, decision making, and implementation. However, current education and training materials and programs are geared for traditional manufacturing considerations and don't often provide for the needs and requirements of the circular economy.

Challenges in Training the U.S. Workforce

To educate the current and future Re-X workforce, REMADE-relevant industries must work to overcome the challenges and knowledge gaps summarized below. These challenges were identified through a series of new REMADE Member interviews conducted in 2022 with the goal of understanding how the Institute can best support our industry member's evolving training needs. These interview results further validated REMADE's multi-phased EWD strategy, including the launch of short courses and certificate pathways introduced in the 2019 and 2020 EWD Roadmaps. REMADE's 2022 Request for Information and industry member interviews suggested REMADE strengthen a focus on engineers.

Employers cannot easily assess engineer level skills pertaining to Re-X due to lack of established certification programs

• Employers increasingly rely upon on-the-job training for workers in Re-X and often lack resources to establish formal training programs that enable assessment of Re-X knowledge and skills. While considerable activity has taken place to launch national technician training, resources are still lacking for engineers in the emerging technology space.

Industry lacks flexible, on-demand access to training.

• Stackable, on-demand certificate-based training that accommodates a fast-paced industry environment is not readily available. Training requiring limited time-commitment for successful completion responds to this challenge. For engineers, stackable, module based online training supplements internal company proprietary training.

Limited understanding of Re-X business practices and the potential value of Re-X discourages industry from adopting the structural changes needed to fully incorporate circular economy approaches

- Information and case studies on the value of Re-X business practices are not widely available.
- Holistic product design cannot easily account for upstream and downstream factors along integrated supply chains due to lack of information.
- Cost-benefit analyses and design tradeoff analyses that account for end-of-life management and other circularity factors are limited by this lack of information, hindering consideration of Re-X into risk management decision-making.

Communication within the Re-X industry and the rest of the manufacturing industry is limited

- The emerging workforce is unaware of the opportunities and career possibilities in Re-X, leading to limited talent entering the industry.
- Because the Re-X industry is broad and fragmented, it is difficult for those working in it to connect, leverage knowledge, and build individual and collective skills.
- Links between researchers developing new Re-X relevant technologies and manufacturers who might benefit from those technologies to realize operational improvements are ad hoc or lacking today. As a result, industry misses opportunities and researchers risk pursuing research that is not addressing industry-relevant challenges.

Industry Feedback

One recommendation from the REMADE Workforce Profile was for the Institute to use a combination of surveys and groups to refine the specific skills and competencies that REMADE's EWD efforts should target.

In 2022, REMADE released a Request for Information (RFI) open to members and non-members of the Institute. The purpose of the RFI was to secure updated feedback on technology and training priorities. Furthermore, REMADE conducted in-depth interviews with individual industry members in 2022 to identify incumbent workforce development gaps and receive feedback on how REMADE can help industry address training challenges. The results of this feedback reenforced the value of REMADE's strategy first adopted in 2020 and also assisted with roadmap updates detailed in subsequent pages.

Technology Development

The technology REMADE and its members develop during their research projects represents new knowledge that can be disseminated when projects have ended. As research teams develop new tools, they can train REMADE members to leverage these capabilities in their own operations. The REMADE Member Portal and public website are tools for the sharing of technology project work products and intellectual property in a manner that is consistent with REMADE's Intellectual Property Management Plan (IPMP) and Data Management Plan (DMP). REMADE is facilitating the creation of new training from projects through multiple avenues:

1. Project Webinars (30 Minute Presentation/30 Minute Questions & Answers)

REMADE has hosted over 20 project webinars with more than 800 participants covering each REMADE focus area. The goal of project webinars is to provide participants an update on project progress and accomplishments to date. Webinars also strengthen participants understanding of broad industry challenges the project is working to solve. Participants are provided the opportunity to ask questions in real time with subject matter experts.

2. Short Courses

To date REMADE has released 34 short courses in the areas of remanufacturing, plastics recycling, fibers recycling, design for re-x, and systems analysis. In addition to project webinars, REMADE is also focused on integrating project results into short courses as part of REMADE's tiered certificate pathways. Mechanisms for integrating project results into short courses include:

A) REMADE technology project case study integration into short courses (For example, REMADE's short courses in advanced fibers recycling released in 2022 incorporated three relevant REMADE R&D project outcomes into the curriculum).

B) Recommendations from the ETSC and TLC to create short courses based on specific R&D projects. These recommendations are followed-up by REMADE facilitating introductions between R&D project leads and EWD project leads.

C) EWD project teaming with relevant R&D project leads for content development updating.

Short courses are available on-demand to members on the REMADE Member Portal. Non-member access is fee-based.

3. Dissemination of Project Results

REMADE is committed to providing the resources and communication platform for project teams to share project results through publications, course development, and conference presentations. While REMADE is continuously working to create cutting-edge training for the U.S. workforce, the Institute recognizes the importance of supporting a project team's efforts to disseminate new findings. This includes currently 24 REMADE project reports on the REMADE members portal with more reports expected to be added.

4. Student Project Involvement

REMADE considers student involvement in research projects as a critical avenue for training the next-generation workforce. For example, 28 undergraduates, 58 graduates, and 18 post-doc students are currently involved with REMADE projects Students are uniquely positioned to accompany the deployment of new REMADE technology to U.S. industry and serve as trainers for a new generation of incumbent workers.

Diversity, Equity, & Inclusion

REMADE workforce development initiatives will play a key role in advancing diversity, equity, and inclusion (DEI) within U.S. industry. Future REMADE activities that will contribute to this critical mission include:

1. Pursuing joint funding opportunities with workforce development organizations focused on preparing underserved communities for careers in Re-X.

2. Hosting targeted interviews and/or workshops with members focused on how REMADE workforce development activities can best support an individual organization's DEI goals.

3. Strengthening relationships with relevant universities, industry partners, and trade associations to assist REMADE with dissemination of training to increase DEI participation.

4. Coordination with Manufacturing USA Institutes on initiatives to advance DEI across U.S. manufacturing ecosystem.

REMADE EWD Content Development Approach

REMADE's 2022-2023 content develop efforts center on three major categories: outreach training, short courses, Tiered Certificate Pathways. This approach and categorization were first identified in the 2020 EWD roadmap and is summarized below:

Outreach Training

REMADE is actively providing training through project webinars, conference presentations, and thought leadership events. The goal of this training is to deliver brief overviews of REMADE relevant technology, industry, or best practices.

Short Courses

Short Courses cover a single or multiple concepts, technologies, and practices and are tailored for the incumbent workforce at three competency levels: Awareness, Practitioner, or Expert.

- Awareness level short courses may last 1-2 hours
- Practitioner level short courses may last 4-8 hours
- Individual Expert level short courses may last 1-2 days

Tiered Certificate Pathways

REMADE's Tiered Certificate Pathways are developed by grouping similar short courses together to provide a deeper level of understanding of a broad topic. To achieve a formal certificate from the REMADE Institute, students need to complete each of the short courses for the associated Tiered Certificate Pathways.

REMADE will continue to leverage opportunities to incorporate R&D project results into all levels of EWD training.

Competency Levels

REMADE training is organized by the level of competency class participants will have achieved by the end of the short course and/or Tiered Certificate Pathways. As shown below, REMADE training covers three competency levels: Awareness training, Practitioner training, and Expert training.



Awareness Training

Awareness training is intended to provide participants a high-level introduction to the subject matter.

Practitioner Training

Practitioner level training is intended for incumbent workers that currently work with the technologies or in adjacent technology domains who wish to broaden their knowledge.

Expert Training

Expert level training is intended to provide in-depth coverage of advanced concepts or technology and is targeted toward engineers or scientists trying to expand their skill set.



The following table summarizes updated tiered certificate pathway priorities through 2025 for each node.

Priorities from the last EWD Roadmap no longer listed because of completion includes:

- U.S. labor market analysis identifying the occupations and competencies for engineers and technicians relevant to REMADE. Analysis is available on REMADE's website.
- Development of a curriculum catalog that describes existing training offered by universities, trade organizations, and certifying agencies to ensure there is no duplication of training already available.
- Launching of a Learning Management Platform to host REMADE online training. This platform was officially made available to members in early 2022.

In addition, content development goals listed in the prior roadmap that focused on awareness level pathways in remanufacturing, recycling and recovery, and systems analysis were accomplished. Updates related to awareness level topics shifted from content development goals to content dissemination goals.

The table below emphasizes new topics identified by the Technical Leadership Committee (TLC) and Education and Training Steering Committee (ETSC). The majority of content development is launching in 2023 and 2024.

Note: Short course development tables on subsequent pages reflect a specific breakdown of short course topics that support tiered certificate pathways.

Tiered Certificate Pathways	Competency Levels	Content Development Timeline	Dissemination Timeline
Advanced Fibers Recycling	Awareness, Practitioner, Expert	Completed *Advanced Fibers Recycling short courses listed on pg. 18.	2022 - 2025
Fundamentals of Remanufacturing	Awareness	Completed *Fundamentals of Remanufacturing short courses listed on pg. 20.	2022 - 2025
Fundamentals of Mechanical Recycling of Plastics	Awareness	Completed *Plastics Recycling short courses listed on pg. 19.	2022 - 2025
Emerging Trends in Plastics Recycling	Awareness	Completed *Plastics Recycling short courses listed on courses listed on pg. 19.	2022 - 2025

Tiered Certificate Pathways	Competency Levels	Content Development Timeline	Dissemination Timeline
Systems Analysis Tools and First Insights from REMADE Projects	Awareness	Completed *Systems Analysis short courses listed on pg. 20.	2022 - 2025
Systems Thinking in Material Management	Awareness, Practitioner, Expert	2022 Content Development Launch *Supporting Systems Analysis short courses listed on pg. 20.	2023 - 2025
Chemical Recycling of Plastics	Practitioner, Expert	2022 Content Development Launch *Supporting awareness level Chemical Recycling short course listed on pg. 19.	2024 - 2025
Advanced Materials Separation Technologies Awareness, Practitioner, Expert Supporting Plastics Recycling s listed on pg. 19. Also, releved Recycling short courses listed		2023 Content Development Launch *Supporting Plastics Recycling short courses listed on pg. 19. Also, relevant Metal Recycling short courses listed on pg. 20.	2024 - 2025
Design for Remanufacturing, Recycling, and/or Re-use Practitioner, Expert		2023 Content Development Launch *Supporting existing Reverse Engineering & Design for Remanufacturing awareness short courses listed on pg. 20. Supporting Design for Re-X short courses listed on pg. 19.	2024 - 2025
Condition Assessment for Remanufacturing	Practitioner, Expert	2023 Content Development Launch *Supporting awareness level Condition Assessment short courses listed on pg. 20.	2024 - 2025
Reverse Logistics for Remanufacturing	Awareness, Practitioner, Expert 2023 Content Development Launch *Supporting Remanufacturing short courses listed on pg. 20.		2024 - 2025
Simulation Techniques to Optimize Material Use in Manufacturing and Recycling	Awareness, Practitioner, Expert	2023 Content Development Launch *Represents REMADE's first coursework under the manufacturing materials optimization node.	2024 - 2025

Short Course Development Priorities

With guidance from the Technical Leadership Committee (TLC) and Education and Training Steering Committee (ETSC), the Institute identified the following individual short courses as training priorities for the Institute. Short courses cover a single or multiple concepts, technologies, and practices tailored for the incumbent workforce at three competency levels: Awareness, Practitioner, or Expert. Short courses support Tiered Certificate Pathways as each pathway consists of grouping short courses together to form a certificate. Member feedback in 2022 reenforced that members continue to value the option REMADE provides to enroll in short courses as standalone opportunities or via a full certificate pathway consisting of multiple short courses.

The topics listed below represent the current inventory of the Institute's short courses as well as content development progress made since the 2020 EWD Roadmap release. The future packaging of short courses into Tiered Certificate Pathways will be dependent on Member input and guidance from the TLC and ETSC. These updates will be reflected in subsequent EWD Roadmaps where appropriate. Several individual short courses listed may also have multiple versions of the same competency level based on learning objectives and technology focus.

Short courses are available online through the REMADE Member Portal.

Future Content Development Priority 2022 - 2023 Development Priorit	y 🚺 In-Devel	opment Co	ntent Completed
Fibers Recycling	Awareness	Practitioner	Expert
Paper Recovery and Processing with a MRF System			
Manufacturing of Paper from Recycling Fibers – Process, Products, and Technologies			
Fiber Properties and Paper Physics			
Printing Inks and Deinking in the Paper Recycling Process			
Chemical Agents Used in paper Recycling to Improve Process Operation and Process Quality			
Stickies and Organic materials Characterization and Removal in the Paper Recycling Process			
New Technology Developments in Paper Recycling			
Recycled Paper Lab Research and Testing with TAPPI Standards			
Paper Recycling Pilot Plant and Industry Tours			

REMADE Institute Education & Workforce Development Roadmap 2022

Future Content Development Priority	2022 - 2023 Development Priority	In-Development	Content Completed
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Plastic Recycling	Awareness	Practitioner	Expert
Introduction to Polymers			
Polymer Production and Uses			
Plastic Recovery and the Circular Economy			
Recovering End-of-Life Plastics			
Recycling Recovery Limitations and Ways to Overcome Limitations			
Extruding and Compounding Plastics		\bigcirc	
Chemical Recycling			
PET Recycling			
Processing Plastics From E-Waste		\bigcirc	
Flexible Films and Multi-Layer Packaging			
Plastic Flows Through a MRF			
Product Design Considerations			
Advanced Materials Separation Technologies	0	\bigcirc	\bigcirc
Simulation Techniques to Optimize Material Use in Manufacturing & Recycling	0	\bigcirc	0

Design for Re-X	Awareness	Practitioner	Expert
Product Design Considerations for Plastics Recycling			
Introduction to Design for Re-X			
Design for Remanufacturing and Design Capture		\bigcirc	
Design for Assembly/Disassembly	\odot	\odot	
Design Choices to Enable Recycling vs Reman/Reuse	\odot	\odot	
Fundamentals of Sustainable Packaging Design	\odot		
Design for Circularity	\odot		
Design for Recycled Content	\odot	\bigcirc	
Design for Re-X Tradeoff Analysis	\odot	\bigcirc	
Lifecycle Assessment and Impact Analysis	\odot	\odot	
Economics of Design for Re-X	\odot	\odot	
Estimating OEM and EOL costs/rev streams	\odot	\odot	

💭 Future Content Development Priority 💫 2022 - 2023 Development Priority 🜓 In-Development 🔵 Content Completed

Expert

Remanufacturing	Awareness	Practitioner	Expert
Introduction to Remanufacturing		0	
Cleaning Technology for Remanufacturing		\bigcirc	
Condition Assessment Technology for Remanufacturing		\bigcirc	0
Additive Repair Technology for Remanufacturing		\bigcirc	
Reverse Engineering and Design for Remanufacturing		0	

Sustainable Manufacturing, Systems Analysis and the Circular Economy

Introduction to Circular Economy and Systems Analysis		
Systems Analysis Tools and First Insights from REMADE Projects		
Systems Thinking in Material Management		

Awareness

Metals Recycling	Awareness	Practitioner	Expert
Metal Recycling of Ferrous Metals	\odot		
Metal Recycling of Non-Ferrous Metals ⁴	\odot		
Limitations of Steel Recycling	\odot		
Limitations of Non-Ferrous Recycling	\odot		
Improving Quality of Ferrous Metals	\odot		
Improving Quality of Non-Ferrous Metals	\odot		
Future of Metal Recycling: Cross-Industry Secondary Feedstocks		\odot	
Future of Metal Recycling: Real Time Process Sensing & Control		\odot	0
Future of Metal Recycling: Solidification Modeling to ID New Processing Routes and Increase Recycling	\odot	\odot	\odot
Future of Metal Recycling: Materials Informatics and Machine Learning	\bigcirc	\bigcirc	\bigcirc
Metal Recovery Facilities	\odot	\odot	
Automotive and Aerospace Recycling	\bigcirc		
Simulation Techniques to Optimize Material Use in Manufacturing and Recycling	0	0	\bigcirc
Advanced Materials Separation Technologies	0	\bigcirc	\bigcirc
Recovery of Metals from E-Waste & Scrap with Low Metal Concentrations	\odot		

Next Steps for Training Dissemination

Since the 2020 EWD Roadmap release, REMADE expanded training offerings to include REMADE project outreach webinars, online short courses, and tiered certificate pathways in topics highlighted in the preceding pages. Training dissemination is now a key element for the future success of REMADE's EWD program.

The following information represents next steps for REMADE's EWD program over the next 12 months.

Online Content Expansion

With REMADE member Western Michigan University's completion of course development in advance fibers recycling, this resulted in the addition of 18 new online short courses consisting of awareness, practitioner, and expert level tiered certificate pathways. In addition, REMADE plans to add new tiered certificate pathways in systems analysis and chemical recycling of plastics in 2023. These new training opportunities will represent a significant expansion of training content for members.

In addition, REMADE will expand training availability to non-members for a fee adding to the 25 existing short courses available to non-members. Revenue generated from non-member participation will contribute toward the Institute's overall sustainment goals. Non-member training content is available on REMADE's public website.

Increase Industry Participation

REMADE's annual increase in industry membership presents an opportunity for the Institute to disseminate training to the incumbent workforce. The Institute's online training also enables industry members to participate in REMADE's EWD program without dedicating resources for travel. As REMADE's training content expands, the Institute will conduct targeted marketing efforts for industry to increase training awareness.

Industry member feedback indicated that for both small-medium sized enterprises and large OEMs, REMADE training opportunities play an important role in educating company leadership and preparing the workforce for the circular economy:

- Small-medium sized (SME) enterprises make-up over 60% of REMADE's industry Membership. REMADE's EWD program enables access to the same training as larger enterprises who often have greater internal training resources to leverage. REMADE looks forward to assisting SME's by growing awareness in 2023 of REMADE's training platform through individual outreach and integration of awareness level training into new employee onboarding.
- For larger enterprises. REMADE's training is positioned to effectively supplement existing internal training resources. Member feedback indicated that this is especially the case for practitioner and expert level training. With the anticipated release of new practitioner and expert level training in 2023, this represents an opportunity for REMADE to undertake targeted outreach geared toward OEM members who have expressed interest in advanced training.

Launch In-Person Training

While the Covid-19 crisis created an unprecedented demand for online training, REMADE looks forward to facilitating future in-person training opportunities at on-site member locations. Future on-site opportunities REMADE is targeting include:

- REMADE visiting member locations to provide company-wide awareness level overviews on the circular economy. The goal is to update members on emerging technologies in the circular economy and also emphasize the benefits of incorporating circular economy practices into operations.
- Leveraging REMADE training content with support from EWD Project PI's to host training on academic campuses in-coordination with regional industry and economic development organizations

Engage Affiliate Organizations

Professional affiliate organizations provide key outlets for REMADE training dissemination. REMADE will pursue opportunities to engage new stakeholders at trade and affiliate organization events to market training. Examples include:

- Institute of Scrap Recycling Industries Annual Convention
- Circularity Conference 2023
- 2023 Circular Economy Tech Summit & Conference
- Ellen MacArthur Foundation sponsored events

Manufacturing USA Cross-Institute Collaboration

REMADE will continue to collaborate with other Manufacturing USA Institutes on workforce development opportunities to engage our collective broad audiences across the U.S. Examples include:

- Organizing joint speaking opportunities with other Manufacturing USA Institutes such as the "Careers in Clean Energy Innovation" webinar series.
- Pursuing joint funding opportunities focused on strengthening diversity, equity, and inclusion in the workforce.