Request for Proposals

Define and Enhance the Quality of Deconstructed Mattress Components

Issue Date: May 15, 2024

Open Call – No Specific Proposal Deadline

In this solicitation, MRC is specifically seeking to fund the development of innovative research proposals that demonstrate the potential to characterize recycled materials with respect to their composition, consistency, level, and nature of contamination. Additionally, concepts for separation or elimination/reduction of cross-contamination in the recycled component streams are being sought. The prospective project is envisioned to be at **TR level 1-3** and would typically be followed by further development to demonstrate techno-economic viability on a commercial scale.

Mattress Recycling Council

Attn: Karl Haider

khaider@mrc-us.org

www.mattressrecyclingcouncil.org

BACKGROUND

The Mattress Recycling Council (MRC) is a 501(c)(3) formed by the mattress industry to operate recycling programs (known as Bye Bye Mattress) in states which have enacted mattress recycling laws. MRC educates the mattress industry and consumers about these mattress recycling laws and works closely with local governments, waste management professionals, recyclers, and others to create an accessible and efficient mattress collection and recycling network.

MRC has recycled over 13 million mattresses since 2015 in its California, Connecticut and Rhode Island state programs. As part of its mission, MRC has established a Research program to increase the recyclability of discarded mattresses by developing new end uses for materials extracted from the deconstruction processes. To sustain future growth, it is vital that new economically viable markets and products for recovered materials be developed.

SOLICITATION DETAILS

There is significant variability in mattress materials and construction methods that are used commercially. Therefore, mattress deconstruction processes give rise to a variety of different components, including but not limited to outer covers, foam pads, quilted panels, end caps, barrier layers, springs, fasteners, and frames. These materials typically consist of polyurethane or latex foam, textiles based on polyester or polyester/cotton blends, mote cotton, shoddy felt, steel, wood, PVC, or cardboard. Information on these components and their current uses, along with summaries of active and completed MRC-funded research projects, can be found in the MRC 2022 Annual Report.

In many instances, dissimilar materials are glued or stitched together to form composite materials and separation is often incomplete. This results in cross-contamination of the recycled components. Mattress components may contain extractable or volatile components, including fire retardants, catalyst residues, or PFAs. Contamination from various substances, including mold, bodily fluids, food, or other household substances, is common.

Although specific composition and quality targets for recycled components are expected to vary depending on the targeted application and manufacturer, regardless of the recycled component or its targeted market, information on product composition, consistency, and contaminant levels of the recycled components are expected to be a pre-requisite to market development.

Therefore, methods to characterize and/or enhance the quality and consistency of these recycled components will be valuable to facilitate broader commercial use of recycled mattress components.

Specifically, the MRC is seeking proposals to develop concepts related to defining and enhancing product quality, including but not limited to:

- Determining details on the composition of mattress components, including but not limited to textiles, foams and plastics
- Quantifying product composition variability
- Qualitatively and quantitatively characterizing common contaminants in the recycled stream
- Identifying the presence of catalyst residues, fire retardants, PFAS, or other extractable or volatile materials in the recovered mattress components
- Sorting materials to produce recycled streams free of cross-contamination with other mattress components

Follow-up RFPs would delve deeper into specific markets and their requirements for product compositional information, product consistency and contamination levels.

ELIGIBLE APPLICANTS

- Public and private businesses - both U.S. based and international businesses are eligible to apply. However, they must be in good standing with all applicable U.S. federal, state and local agencies.
- Universities and research institutions
- Nonprofit entities in good standing with all federal, state and local agencies

PROJECT REQUIREMENTS

- The proposal should detail the steps necessary to develop a proof-of-principle solution.
- Proposals must identify at least one characterization or sorting technology and describe how the concept could be applied to recycled mattress components.
- The final report must contain information on scalability, capital equipment needs/cost and operating cost to justify further development.
- Technologies that employ analytical characterization and/or sorting methods that could be employed at a recycling facility are in scope.
- Only one proposal per eligible applicant per topic area will be accepted.
- Applicants are encouraged, but not required, to provide matching funds to the project.
- The research project must be completed within one year of the funding award.

AWARDS

MRC anticipates making multiple awards from this RFP with maximum award sizes of $125,000 per applicant. The objective is to evaluate the technical merit and feasibility of ideas that have potential to be scaled in support of MRC's objectives. Proposals should concentrate on research that will contribute to proving the technical feasibility of the approach or concept for the targeted use.

MAXIMUM FUNDING

- Maximum individual award: $125,000
- Cost share is encouraged but not required. It will be considered in final funding decisions.

PRE-APPLICATION SUBMISSION

MRC will use a two-stage process to identify projects for an award. First, interested parties will submit a non-confidential concept paper for internal review by MRC. The pre-application template is attached to this document. It can also be found on the MRC Research Program website.

Based on merit and alignment to our research strategy, the proposers of selected concept papers will be contacted for further discussion. Based on these discussions' outcomes, the applicant may be invited to submit a full proposal for review by MRC.

TIMELINE

This is an open-ended request for proposals. Therefore, prospective researchers are free to submit pre-proposal applications at any time. If the project is selected to move beyond the pre-proposal phase, research teams will be asked to submit a full proposal within 6 weeks after notification. All projects must be completed within one year of research contract execution.

FULL PROPOSAL GUIDELINES AND FEEDBACK

Proposers that are invited to submit a full proposal will provide:

1. Applicant(s) name
2. Applicant or Applicant's' contact information
3. A description of the applicants' industry/academic history and experience with similar projects
4. A project description that clearly outlines the impact on the program research objective and what steps the applicant will undertake to prove a technical and business case for the use of the proposed characterization or sorting concept in recycling facilities
5. A project work plan and milestone plan
6. A project budget, which includes any matching funds from the applicant, and a clear request for a specific amount of MRC funding
7. Acknowledgement of any potential conflicts of interest with MRC leadership or former employment in the mattress industry
8. Notification of any pending or outstanding judgments or enforcement actions against the applicant, the applicant's organization or its products and services

Pre-proposals should be submitted by email to Karl Haider khaider@mrc-us.org. If selected to submit a full proposal, it must be sent in PDF format and should not exceed 10 pages in length, including any attachments or letters of support. Proposals that do not follow application instructions may be considered non-responsive.

For approved projects, MRC will enter into a formal agreement with the innovator, which describes the project plan, deliverables, treatment of confidential information, intellectual property rights, and other terms. MRC is open to working with any organization that proposes a concept consistent with MRC's objectives.

MRC intends for the research program to be as transparent as possible, recognizing the need to protect confidential data. Confidential information must be clearly marked as such. MRC may use non-confidential research project documentation for California state annual reporting requirements and communication purposes.

Questions and comments about this RFP may be emailed to Karl Haider khaider@mrc-us.org. Additional information is posted on the MRC Research Program website.

Pre-Application Concept Paper Submission Form

(*Please submit Non-confidential Information only*)

Proposer name and title:	
Institution, street address:	
Phone:	
Email:	
Technical challenge being addressed:	
Proposed project title:	
Background/State of the art:	
Graphical abstract *(A figure or diagram illustrating the concept):*	
Project description *(Brief description of the concept and objectives of the proposal, including technical requirements, hypothesis, and novelty with respect to the state of the art in the field. ~500 words or less):*	
Proposer team, capabilities, and resources *(personnel, equipment, and demonstrated experience in the field including publications and intellectual property):*	
Technology Readiness Level (TRL) *(1-9, using TRL definition by DOE, http://en.wikipedia.org/wiki/Technology_readiness_level#Other_definitions_and_uses):*	
References cited:	