



Request for Proposals



New Processes for Recycling Polymeric Mattress Components

Issue Date: May 15, 2024

Open Call – No Specific Proposal Deadline

MRC is seeking creative research proposals that demonstrate the potential to use hard-to-recycle mattress components in new applications and products as well as in reformulated products. In this solicitation, MRC is specifically seeking to fund the development of innovative ideas to modify, for the purpose of recycling, the various polymeric materials recovered from deconstructed mattresses at the end of their lifetime. 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

In this solicitation, MRC is seeking creative research proposals that demonstrate the potential to use hard-to-recycle mattress components in new applications and products as well as in reformulated products. The materials to be modified include quilt panels, textiles based on polyester or polyester/cotton blends, mote cotton, shoddy felt, polyurethane and/or latex foam. 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](#).

Modifications in the scope of this Request for Proposals (RFP) include, but are not limited to the following treatment of any of the recycled polymeric materials:

- Modification by chemical functionalization
- Thermal and/or thermocatalytic treatment
- Extrusion processing (e.g. reactive extrusion, vitrimerization)
- Complete or partial hydrolysis/chemolysis for the purpose of making raw materials that can be used in new products or processes.
- Purification
- Enzymatic or biotechnological modification or depolymerization

In each case, at least one potential secondary market for the modified materials must be identified. These markets may involve direct utilization of the modified material in a target application, or a description of how the modified material may serve as a raw material for use in mattress or other manufacturing operations. Concepts that produce fuel from polymeric mattress materials at the end of their lifetime are not in scope for this RFP.

In cases where the treatment or modification is expected to result in mixture of products, a scheme for separation into individual useful components, or a description of how the resulting product mixtures could be used in the targeted application, is required.

Please describe how and why the modified material is expected to have superior performance in the targeted application over the recovered material before any such modification.

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 modification of at least one target mattress polymeric component for use in at least one specific industrial/commercial scale application and/or manufacturing process.
- The final report must contain an economic analysis and a preliminary business case to justify further development and/or a potential field study with the selected modified component(s).
- Technologies that employ mechanical, chemical, biotechnological and/or thermal processing of the polymeric materials are in scope,
- Waste-to-energy, incineration, or concepts that produce fuel will not be considered.
- 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.
- Proposals that explore further development of existing products and applications without some modification of the polymeric component will not be considered.

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 commercial-scale application potential to support 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 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' outcome, 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 Applicants' 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 program research objectives and what steps the applicant will undertake to prove a technical and business case for the use of the modified material in the targeted application or manufacturing process
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 regarding 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 <i>(A figure or diagram illustrating the concept):</i>	
Project description <i>(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):</i>	
Proposer team, capabilities, and resources <i>(personnel, equipment, and demonstrated experience in the field including publications and intellectual property):</i>	
Technology Readiness Level (TRL) <i>(1-9, using TRL definition by DOE, http://en.wikipedia.org/wiki/Technology_readiness_level#Other_definitions_and_uses):</i>	
References cited:	