

Circularity for Secure and Sustainable Products and Materials: A Draft Strategic Framework Request for Information

DATE: Oct. 9, 2024
SUBJECT: Request for Information

Description

The U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE) has released *Circularity for Secure and Sustainable Products and Materials: A Draft Strategic Framework*. The focus of this document is addressing and overcoming the unique challenges related to recirculation of products and materials at the end-of-use (EOU) or end-of-life (EOL) back into the economy. It aims to describe EERE's economic and environmental impact goals related to increasing product and material circularity and to communicate EERE's work in advancing the approaches, strategies, and technologies that contribute to achieving those goals. The document identifies opportunities, challenges, and enablers for advancing circularity as well as providing an overview of current efforts across EERE. Finally, it provides a framework for prioritization of EERE funded research and development as well as a vision for future EERE activities related to product and material circularity.

Background

The Circularity for Secure and Sustainable Products and Materials: A Draft Strategic Framework can be accessed via this link:

<https://www.energy.gov/sites/default/files/2024-10/circularity-for-secure-sustainable-products-materials-report.pdf>.

Purpose

The purpose of this request for information (RFI) is to solicit feedback from industry, academia, research laboratories, government agencies, and other stakeholders on issues related to EERE's strategic framework to increase product and material circularity. This feedback will help to ensure EERE's investments in this space are optimally positioned to address opportunities and challenges related to increasing circularity.

EERE is specifically interested in information on:

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- Framework for prioritization of research and development as well as ways to maximize impact of the strategy.
- Significant opportunities, challenges, and enablers to increase product and material circularity.
- Technology advancement needed to achieve EERE objectives.
- Prioritization of future EERE investments, including data that supports this prioritization.

This is solely a request for information and not a funding opportunity announcement (FOA). EERE is not accepting applications.

Disclaimer and Important Notes

This RFI is not a FOA; therefore, EERE is not accepting applications at this time. EERE may issue a FOA in the future based on or related to the content and responses to this RFI; however, EERE may also elect not to issue a FOA. There is no guarantee that a FOA will be issued as a result of this RFI. Responding to this RFI does not provide any advantage or disadvantage to potential applicants if EERE chooses to issue a FOA regarding the subject matter. Final details, including the anticipated award size, quantity, and timing of EERE funded awards, will be subject to Congressional appropriations and direction.

Any information obtained as a result of this RFI is intended to be used by the Government on a non-attribution basis for planning and strategy development; this RFI does not constitute a formal solicitation for proposals or abstracts. Your response to this notice will be treated as information only. EERE will review and consider all responses in its formulation of program strategies for the identified materials of interest that are the subject of this request. EERE will not provide reimbursement for costs incurred in responding to this RFI. Respondents are advised that EERE is under no obligation to acknowledge receipt of the information received or provide feedback to respondents with respect to any information submitted under this RFI. Responses to this RFI do not bind EERE to any further actions related to this topic.

Confidential Business Information

Pursuant to 10 CFR 1004.11, any person submitting information that he or she believes to be confidential and exempt by law from public disclosure should submit via email, postal mail, or hand delivery two well-marked copies: one copy of the document, marked "confidential," including all the information believed to be confidential; and one copy of the document, marked "nonconfidential," with the information believed to be

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confidential deleted. Submit these documents via email or on a CD, if feasible. DOE will make its own determination about the confidential status of the information and treat it according to its determination.

Evaluation and Administration by Federal and Non-Federal Personnel

Federal employees are subject to the non-disclosure requirements of a criminal statute, the Trade Secrets Act, 18 USC 1905. The Government may seek the advice of qualified non-Federal personnel. The Government may also use non-Federal personnel to conduct routine, nondiscretionary administrative activities. The respondents, by submitting their response, consent to EERE providing their response to non-Federal parties. Non-Federal parties given access to responses must be subject to an appropriate obligation of confidentiality prior to being given the access. Submissions may be reviewed by support contractors and private consultants.

Request for Information Categories and Questions

You may answer as few or as many of the questions below as you would like, but please focus on the aspects that are most pertinent to you or your field. For each response, please identify which category you are responding to.

Category A: Strategy Framework and Impact

The strategic framework document lays out the EERE vision, mission, and objectives for advancing product and material circularity as well as a framework for prioritization of EERE investments. For reference, they are summarized below.

Vision

The United States is a leader in sustainable economic growth by ensuring materials and products remain in circulation for as long as possible to minimize environmental impacts and raw material consumption, simultaneously maximizing quality of life and environmental justice.

Mission

The mission of EERE's work in this area is to develop, demonstrate, and deploy technologies and approaches needed to increase product and material circularity at scale.

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Objectives

As described in Section 1.7, increasing circularity directly contributes to decarbonization, environmental justice, security of U.S. supply, job creation, and strength the U.S. manufacturing sector, which are all important aspects of EERE's mission.

Framework for Prioritization of Research and Development

To prioritize where to focus finite research and development resources, the strategy proposes a framework for how EERE prioritizes investment to drive real world impacts.

This framework includes a three-step approach comprised of:

- Assessing the potential impacts of moving to a more circular material system.
- Identifying the transformation pathway and the barriers to deployment.
- Considering timeline for deployment and scaling.

Questions Related to Category A

- Regarding mission, vision, and objectives (section 2.1):
 - How appropriate are the mission, vision, and objectives for EERE investment in advancing product and material circularity?
 - What could make the document more effective at realizing the desired benefits (decarbonization, community benefits, U.S. security of supply, job creation and strengthening U.S. manufacturing) via increasing product and material circularity?
 - How should these benefits be assessed (either quantitatively or qualitatively) when EERE makes prioritization decisions?
 - Circular economy, material efficiency, and material circularity are distinct but related concepts. As we communicate across sectors about product and material circularity, what language or terminology resonates most with your industry? For example, would you define circularity differently than how it is presented in this framework?
- Regarding framework for prioritization (section 2.2):
 - What changes should be made to the considerations for prioritizing EERE work on product and material circularity?

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- Please include any data sources or other relevant references that would support quantification of increased circularity on desired impacts (energy, emissions, supply chain, and/or societal).
- Regarding impact:
 - How could the document improve focus on areas and technologies at each level of scientific and technological maturity from basic science to applied research and development (R&D) to maximize impact? How can it work together as a system across technology maturity levels?

Category B: Technical Aspects—Opportunities, Challenges, and Enablers (Section 3)

Section 3 of the strategic framework document highlights significant opportunities, challenges to overcome, and enablers for realizing the opportunities to increase product and material circularity.

Questions related to Category B

- Related to Re-X pathway specific opportunities, challenges and enablers (section 3.1):
 - What changes should be made to the opportunities, challenges, and enablers listed in the Re-X pathways?
- Related to cross-cutting R&D opportunities, challenges and enablers (section 3.2):
 - What changes should be made to the opportunities, challenges, and enablers in cross-cutting R&D?
- Related to nontechnical challenges and enablers (section 3.3):
 - What significant challenges and enablers are absent or underemphasized? What are overemphasized?
 - What additional details or information would be useful to include on these aspects (markets, business models, policy, etc.) to make the strategy more effective?
 - What role can EERE play to address the nontechnical challenges?
 - How can EERE effectively incorporate non-technical challenges such as market forces, business model innovation, and emerging policy to accelerate impact?

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Category C: Accelerating Scale Up and Diffusion of New Technologies or Practices

Section 3 of the strategy discusses the need not just for technical innovation but also for business model innovation as well as the impact of policy for increasing circularity. It is important that these innovations are both deployed and allowed to diffuse across applications to impact circularity as broadly as possible.

Questions Related to Category C

- What business model and supply chain innovations are most needed? How can EERE most effectively support this innovation?
- How does the policy landscape impact scaling and diffusion of technologies and innovations to create circular supply chains? How can EERE address related barriers and opportunities?
- What approaches would be most effective for accelerating scale up, validation, and diffusion of innovative technologies to unlock circularity (testbeds, pilot lines, or other approaches)?

Category D: Technical Aspects—Energy Efficiency and Renewable Energy Focus Areas (Section 4)

Section 4 identifies EERE focus areas for product and material circularity as well as discussing related challenges and technology advancement needed.

Questions Related to Category D

- What changes are needed to EERE's activities or focus areas to deliver the highest potential impact?
- Regarding specific product and material focus areas, please discuss any recommended changes to the challenges and needed technical advancements in any of the following material/product areas:
 - Critical materials (section 4.2.1)
 - Steel and aluminum (section 4.2.2)
 - Construction materials (cement & concrete, glass, and asphalt) (section 4.2.3)
 - Plastics (section 4.2.4)

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- Composites (section 4.2.5)
- Buildings and infrastructure (section 4.2.6)
- Batteries (section 4.2.7)
- Wind (section 4.2.8)
- Solar (section 4.2.9)
- Electrolyzers and fuel cells (section 4.2.10).
- To what extent should industrial scrap recycling/reuse and business to business material loss/waste factor into the strategy to increase circularity for each of these products and materials?
- For a given product or material, what factors should drive pathway prioritization (e.g. reuse vs. repurpose vs. recycle)?
- Regarding cross-cutting areas (section 4.2.11):
 - What changes are recommended to the challenges and technical advancements needed in cross-cutting areas?
 - How could the impact of cross-cutting technologies be increased?
- Regarding analysis, models, and data (section 4.2.12):
 - What recommended changes are needed to the challenges and technical advancements needed in analysis, models, and data?
 - What additional analysis or background data on energy use, emissions, or other relevant information should EERE consider when revising this strategy? What areas currently lack sufficient analysis or information to adequately inform research direction or prioritization?

Category E: Future Work and Partnerships/Engagement (Section 5)

Section 5 of the strategic framework document discusses how EERE plans to advance product and material circularity in the future. Areas of focus for technology advancement are identified and include:

- Prioritization of investment in opportunities where circularity has the highest impact at the national scale on decarbonization, community benefits, security of U.S. supply, and job creation. This involves data collection and analysis, including understanding geographical hot spots, to inform the prioritization framework.

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- Developing more rapid and cost-effective product, component, and material identification, sortation, and separation technologies.
- Unlocking design for circularity. This includes design and material approaches to enable material circularity (Re-X pathways) and leveraging digital tools and approaches for system monitoring, assessment, and tracking.
- Developing data, analysis, and modeling tools to support whole life cycle analysis and support decision making, including at the product and business model design stage.
- Deploying clean energy technologies via increasing recovery and reuse of critical materials.

In addition to technology advancement, EERE also plans to actively coordinate and engage across DOE, the federal government, and with external stakeholders.

Questions Related to Category E

- Areas of focus for EERE future efforts: What changes should be made (added/removed, emphasized/deemphasized) to EERE's focus areas?
- Regarding engagement:
 - What activities by local, state, or other Federal government agencies could be leveraged to achieve the goals of this strategy? How could coordination of research efforts across DOE and with other entities and agencies improve EERE's approach to advance specific research directions and/or deployment of new technologies?
 - What strategic partnerships across industry and nongovernment organizations (NGOs) would help to realize the goals of the strategy? How could coordination with research and analysis efforts from industry and NGOs improve EERE's efficacy at advancing product and material circularity?
 - What mechanisms can be used to engage academia and federally funded research and development centers to help realize the goals of the strategy?
 - How should EERE engage internationally, if at all, to achieve the goals of the strategy?
 - How can EERE support companies or industries in working together to increase adoption of business models or technology? What stakeholder engagement mechanisms could be used to inform, engage, and incentivize companies and industries to collaborate?

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- Regarding data and analysis:
 - What additional analysis or background data on energy, emissions, or other relevant information should EERE consider when revising this strategy? What areas currently lack sufficient analysis or information to adequately inform research directions?
 - What data should EERE collect, synthesize, and analyze to inform prioritization of circularity activities for the highest potential impact on emissions, supply chain security, and/or community benefits on a national scale?
- Regarding future efforts:
 - How can EERE best support implementation of redesign for circularity and help to achieve the mission of the strategy?
 - How could the strategy improve focus on areas and technologies at each level of scientific and technological maturity from basic science to applied R&D?

Category F: Community Benefits Implications of Increased Product and Material Circularity

Understanding the impacts of increased circularity as it relates to communities is an emerging area of focus that EERE is starting to learn more about—and one that will inform the direction of future programs.

Questions Related to Category F

- What steps can be taken to ensure that the needs and perspectives of communities are considered and incorporated when expanding the use of end-of-life materials in U.S. manufacturing?
- Which communities will be most affected by a transition to a circular economy?
- Which human health, environmental or ecological factors do you consider when assessing technologies for a circular economy?
- Are there specific workforce development needs that could impact the transition to product/material circularity and opportunities that could result from it?
- What metrics are important for EERE to track with respect to the impact or potential impact of increased product and material circularity on communities? How should this information be collected and verified?

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Category G: Other Feedback

Questions Related to Category G

- Please provide feedback on any other aspect of the *Circularity for Secure and Sustainable Products and Materials: A Draft Strategic Framework*.

Request for Information Response Guidelines

Responses to this RFI must be submitted electronically to CircularEconomyRFI@ee.doe.gov no later than 5 p.m. ET on Dec. 16, 2024. Responses must be provided as attachments to an email, titled "Organization Name_Organization Type". It is recommended that attachments with file sizes exceeding 25 megabytes (MB) be compressed (i.e., zipped) to ensure message delivery. Responses must be provided as a Microsoft Word file (.docx) attachment to the email, and no more than 10 pages in length with 12-point font and 1-inch margins. Only electronic responses will be accepted.

Please identify your answers by responding to a specific question or topic if applicable. Respondents may answer as many or as few questions as they wish.

EERE will not respond to individual submissions or publish publicly a compendium of responses. A response to this RFI will not be viewed as a binding commitment to develop or pursue the project or ideas discussed.

Respondents are requested to provide the following information at the start of their response to this RFI:

- Company/institution name
- Company/institution contact
- Contact address, phone number, and email address
- Type of organization (e.g., academic, national laboratory, government, industry, nongovernment organization, other).

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