REQUEST FOR INFORMATION
U.S. Department of Energy
Office of Energy Efficiency and Renewable Energy
Advanced Manufacturing Office

Request for Information (RFI): Clean Energy Manufacturing Topics Suitable for a Manufacturing Innovation Institute
DE-FOA-0001122

DATE: April 17, 2014

CLOSING DATE: May 20, 2014, 5:00 PM EDT

SUBJECT: Request for Information (RFI) on Clean Energy Manufacturing Topics Suitable for a Manufacturing Innovation Institute

DESCRIPTION: The Advanced Manufacturing Office (AMO) seeks information on mid-Technology Readiness Level (TRL)[1] research and development (R&D) needs, market challenges, supply chain challenges and shared facility needs in addressing advanced manufacturing development challenges impacting clean energy manufacturing. For the purposes of this RFI, clean energy manufacturing can be broadly considered the making of products and/or product based value-added services such that environmental impact is reduced in the making, use or disposal of the product made. For the purposes of this RFI, advanced manufacturing can broadly be considered the making of products and/or product based value–added services for which technology is either critically enabling or provides a relative competitive advantage relative to existing approaches. AMO is particularly interested in the challenges associated with advanced manufacturing pre-competitive technology which might be overcome by forming a Clean Energy Manufacturing Innovation Institute.

BACKGROUND: AMO partners with private and public stakeholders to improve U.S. competitiveness, save energy, create high-quality domestic manufacturing jobs and ensure global leadership in advanced manufacturing and clean energy technologies. AMO invests in cost-shared research, development and demonstration (RD&D) of innovative, next generation manufacturing processes and production technologies that will improve efficiency and reduce emissions, reduce industrial waste and reduce the life-cycle energy consumption of manufactured products. The results of this investment include having manufacturing energy efficiency harnessed as a competitive advantage, and cutting-edge clean energy products competitively manufactured in the United States.

[1] *National Network for Manufacturing Innovation: A Preliminary Design*. National Science and Technology Council. p8. January 2013. http://energy.gov/sites/prod/files/2013/11/f4/nstc_jan2013.pdf

This is a Request for Information (RFI) only. EERE will not pay for information provided under this RFI and no project will be supported as a result of this RFI. This RFI is not accepting applications for financial assistance or financial incentives. EERE may or may not issue a Funding Opportunity Announcement (FOA) based on consideration of the input received from this RFI.

AMO has been an early partner in the Administration's planned National Network of Manufacturing Innovation (NNMI).[2] AMO supports pre-competitive RD&D work in additive manufacturing / 3D printing topics through the interagency, Department of Defense led, pilot institute "America Makes" and the Manufacturing Demonstration Facility at Oak Ridge National Laboratory.[3,4] AMO also supports the Critical Materials Institute, a multi-year, multi-participant effort related the critical materials shortage.[5] AMO is leading a manufacturing innovation institute for wide bandgap semiconductor power electronics,[6] and currently has an open Funding Opportunity Announcement (FOA) for an advanced composites manufacturing innovation institute for clean energy applications.[7] This portfolio of technology development activities supports a broad range of advanced manufacturing issues with potential impact on domestically competitive clean energy manufacturing. However, there remains a need to engage the public and private sector to identify which (if any) advanced manufacturing technology areas might critically benefit from support in an organized manufacturing innovation institute and to assess the potential of such an institute on domestically competitive clean energy manufacturing.

PURPOSE: The purpose of this RFI is to solicit feedback from industry, academia, research laboratories, government agencies, and other stakeholders on general issues and topics to the establishment of potential Clean Energy Manufacturing Innovation Institutes. AMO seeks information through this RFI to understand cross-cutting as well as specific manufacturing challenges that if addressed could provide the underlying motivation for the formation of a manufacturing innovation institute, consistent with the mission of the Department of Energy, the Energy Efficiency and Renewable Energy Office (EERE) and AMO. 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 Funding Opportunity Announcement (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. Any FOA that EERE may issue is also subject to Congressional appropriations. 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.

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[2] *National Network for Manufacturing Innovation: A Preliminary Design*. National Science and Technology Council. January 2013. http://energy.gov/sites/prod/files/2013/11/f4/nstc_jan2013.pdf
[3] https://www.americamakes.us/
[4] http://energy.gov/eere/amo/oak-ridge-manufacturing-demonstration-facility-mdf
[5] http://energy.gov/eere/amo/critical-materials-hub
[6] http://energy.gov/eere/amo/next-generation-power-electronics-national-manufacturing-innovation-institute
[7] http://energy.gov/eere/amo/articles/clean-energy-manufacturing-innovation-institute-composites-materials-and

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.

PROPRIETARY INFORMATION: Because information received in response to this RFI may be used to structure future programs and FOAs and/or otherwise be made available to the public, **respondents are strongly advised to NOT include any information in their responses that might be considered business sensitive, proprietary, or otherwise confidential.** If, however, a respondent chooses to submit business sensitive, proprietary, or otherwise confidential information, it must be clearly and conspicuously marked as such in the response.

Responses containing confidential, proprietary, or privileged information must be conspicuously marked as described below. Failure to comply with these marking requirements may result in the disclosure of the unmarked information under the Freedom of Information Act or otherwise. The U.S. Federal Government is not liable for the disclosure or use of unmarked information, and may use or disclose such information for any purpose.

If your response contains confidential, proprietary, or privileged information, you must include a cover sheet marked as follows identifying the specific pages containing confidential, proprietary, or privileged information:

> **Notice of Restriction on Disclosure and Use of Data:**
> Pages [list applicable pages] of this response may contain confidential, proprietary, or privileged information that is exempt from public disclosure. Such information shall be used or disclosed only for the purposes described in this RFI DE-FOA-0001122. The Government may use or disclose any information that is not appropriately marked or otherwise restricted, regardless of source.

In addition, (1) the header and footer of every page that contains confidential, proprietary, or privileged information must be marked as follows: “Contains Confidential, Proprietary, or Privileged Information Exempt from Public Disclosure” and (2) every line and paragraph containing proprietary, privileged, or trade secret information must be clearly marked with double brackets or highlighting.

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:

CATEGORY 1: Consideration of Topics Suitable for a Clean Energy Manufacturing Institute

1. **What do you think is a technical topic area suitable for organization and establishment of a Clean Energy Manufacturing Innovation Institute?** Describe the opportunity and mission of a potential institute in plain language (with minimal jargon).

2. AMO frames the formation of new programs around the consideration, analysis and assessment of five key issues: the consideration of Impact of the program if successful; the potential Additionality of investment in the program topic relative to existing public and private investment by others; the potential for Openness of a topic or technology community addressing a topic to new approaches, ideas or inputs; the need for investment in the topical area as a Proper Role of Government; and the potential for Enduring Economic Benefit of the topical area after a proposed program is complete.

   Please comment on the five key issues for each potential Clean Energy Manufacturing Innovation Institute topic identified in question 1. More detailed questions about each issue are provided below to frame your response:

   a. Impact: What is the advanced manufacturing development challenge to be solved? If solved, how would this development challenge affect clean energy technology? If solved, what organizations or groups will care in the public and/or private sectors? What would be the potential quantitative impacts on energy efficiency, life-cycle energy benefits, greenhouse gas reductions (GHG) and/or related environmental impacts in manufacturing or use?
   b. Additionality: Who supported the fundamental low-TRL research and development and why wouldn't they support mid-TRL advanced manufacturing development? Who else might co-fund this mid-TRL advanced manufacturing development? How might AMO support best catalyze co-funding of mid-TRL investment? What key knowledge or capability is missing, unknown or uncertain, which prevents private sector manufacturing of this technology today without further public sector investment?
   c. Openness: Can this mid-TRL advanced manufacturing development challenge be stated more broadly, without loss of potential impact? Is there a fertile low-TRL scientific base which is ready to address this advanced manufacturing

development challenge? What broad set of public and private sector stakeholders need to be engaged in addressing this advanced manufacturing development challenge and how would they be best engaged?

d. Proper Role of Government: Why specifically would addressing this advanced manufacturing development challenge through an institute be in the public sector national interest now? What are the potential market failures and why wouldn't the private sector address this manufacturing development challenge by itself in the absence of public sector investment? Is there a pathway for public sector and AMO support to end and what metrics would provide short-term indicators of success along this pathway? Are there supply chain issues where multiple organizations would need to simultaneously change technology approaches or practices for this clean energy technology to be manufactured? What non-technology development issues need to be addressed (workforce development, unique facility construction, user knowledge dissemination, etc.) for this clean energy technology to be adopted?

e. Enduring Economic Benefit: Is there large potential for follow-on funding and what are the potential stage-gate metrics to be achieved before that follow-on support could be harnessed? Is industry currently trying to address solution to this mid-TRL challenge and what achieve limitations have they met? Would this mid-TRL advanced manufacturing challenge impact more than one clean energy (or non-clean energy) application?

CATEGORY 2: Potential broad working groups for investigating and coordinating efforts related to Clean Energy Manufacturing Institute topics

1. Through a DOE-wide Clean Energy Manufacturing Initiative (CEMI), AMO has set up internal government working groups to explore possible synergies and opportunities to leverage knowledge and capabilities across the Department of Energy in the identification of potential clean energy manufacturing topics. Participation in these working groups includes individuals from Applied Offices (Energy Efficiency and Renewable Energy, Fossil Energy, Nuclear Energy); Early Stage Research Offices (Office of Science, Advanced Research Projects Agency – Energy) as well as other offices with relevant subject matter expertise (Loan Guarantee, NNSA, Energy Information Agency). The working groups are organized around themes of: a Cross-cutting Materials and Manufacturing Technologies; b) Energy Efficiency or Changing Resources in Manufacturing Processes; and c) Other Emergent Topics in Advanced Manufacturing. The working groups are further categorized as:

    a) Cross-cutting Materials and Manufacturing Technologies:
        i. Manufacturing scale-up of materials discovery, including scaling of materials from materials genome and nano-materials discoveries
        ii. Next generation electric machines

iii. Two-dimensional, surface-engineered and high value-add roll-to-roll manufacturing of materials and structures
iv. Manufacturing based on or enabled by biology or biomaterials

b) Energy Efficiency or Changing Resources in Manufacturing Processes:
   i. Information technology, sensors, big-data and high-performance computing for manufacturing processes (sometimes called: "radical manufacturing" or "smart manufacturing")
   ii. Scalable and modular process intensification
   iii. Intelligent and efficient grid integration of manufacturing (advanced combined heat and power, demand response, etc.)
   iv. Water and energy in advanced manufacturing
   v. Technologies to leverage changing fuels and feedstocks (natural gas, etc.) for the manufacturing sector

c) Other Emergent Topics in Advanced Manufacturing:
   i. Cross-cutting topics such as: metrology, low thermal budget processes, etc.

Please comment on these working group topical areas as they might apply to a potential Clean Energy Manufacturing Innovation Institute.

2. Through both AMO and/or in partnership with other federal agencies (Department of Defense, National Institute for Standards and Technologies, National Aeronautics and Space Administration, National Science Foundation, Department of Education), an initial set of Manufacturing Innovation Institutes or similar institute-like entities are being supported. In order to coordinate AMO efforts with the existing funded entities on an ongoing basis, internal government working groups have been established in the following topical areas:

   i. Advanced composites
   ii. Additive manufacturing / 3D printing
   iii. Wide bandgap semiconductor power electronics
   iv. Critical materials

   As a result, it would be considered less of a priority to establish additional new Clean Energy Manufacturing Innovation Institutes in these topical areas.

   Please comment what opportunities exist to further leverage AMO's existing support for RD&D in these working group topical areas.

REQUEST FOR INFORMATION RESPONSE GUIDELINES: Responses to this RFI must be submitted electronically to AMOGolden@go.doe.gov with a subject line "Response to RFI" no later than 5:00pm (EDT) on May 20, 2014. **Responses must be provided as a Microsoft Word document (.docx or .doc) of no more than 8 pages in length, 12 point font, 1 inch margins as an attachment to an email.** It is recommended that attachments with file sizes exceeding 25MB be compressed (i.e., zipped) to ensure message delivery. Only electronic responses will be accepted.

Please identify your answers by responding to a specific question or topic if possible. 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's address, phone number, and e-mail address.

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