



**CLEAN ENERGY MANUFACTURING INNOVATION
INSTITUTE FOR COMPOSITE MATERIALS AND
STRUCTURES**

FRCManufacturing@go.doe.gov

**FOA Webinar
DE-FOA-0000977**

3/06/14

Anticipated Schedule:

FOA Issue Date:	02/25/2014
FOA Informational Webinar:	03/06/2014
Submission Deadline for Concept Papers:	04/22/2014
Submission Deadline for Full Applications:	06/19/2014
Submission Deadline for Replies to Reviewer Comments:	07/24/2014
Expected Date for EERE Selection Notifications:	September 2014
Expected Timeframe for Award Negotiations:	90 Days

Notice

- All applicants are strongly encouraged to carefully read the Funding Opportunity Announcement DE-FOA-0000977 (**“FOA”**) and adhere to the stated submission requirements.
- This presentation summarizes the contents of FOA. If there are any inconsistencies between the FOA and this presentation or statements from DOE personnel, the FOA is the controlling document and applicants should rely on the FOA language and seek clarification from EERE.
- If you believe there is an inconsistency, please contact FRCManufacturing@go.doe.gov.
- There will not be a question and answer time during this presentation. All questions about the FOA are to be submitted to FRCManufacturing@go.doe.gov

Agenda

- 1) FOA Description
- 2) Technical Topic Area and FOA Goals
- 3) Award Information
- 4) Statement of Substantial Involvement
- 5) Cost Sharing
- 6) Concept Papers
- 7) Full Applications
- 8) Merit Review and Selection Process
- 9) Pre-Selection Interviews
- 10) Registration Requirements

FOA Description – Section I.A

- EERE, through the Advanced Manufacturing Office, seeks to establish a **Clean Energy Manufacturing Innovation Institute for Composite Materials and Structures**, to support U.S. prosperity and security; to further the mission of R&D in energy efficient and renewable technologies; and contribute to the creation of a national network of manufacturing institutes.
- The vision for these Institutes is to help revitalize American manufacturing and support domestic manufacturing competitiveness.

FOA Description - Section I.A

- The focus of the Institute resulting from this Funding Opportunity Announcement (FOA) will be low-cost, energy efficient manufacturing and recycling of fiber reinforced polymer composites.
- The Institute will target continuous or discontinuous, primarily carbon and glass fiber composite, with thermoset or thermoplastic resin materials due to their superior strength and stiffness to weight ratios relative to other materials, and subsequent applicability to clean energy and industrial applications with potential impact to national energy goals.



Photo Credit: ORNL

FOA Description – Section I.B

- Section I.B. provides the following Background Information:
 - Energy, Manufacturing and Innovation
 - National Network for Manufacturing Innovation
 - Institute Overview
 - Shared RD&D Infrastructure

Note: Additional Background information can be found in Section I.B of the FOA document.

Technical Topic Area and FOA Goals – Section I.C

Introduction

- The focus of this FOA is Fiber Reinforced Polymer Composites due to their superior strength and stiffness to weight ratios relative to other materials, as shown in Figure 2, and subsequent applicability to clean energy and industrial applications with energy impact.

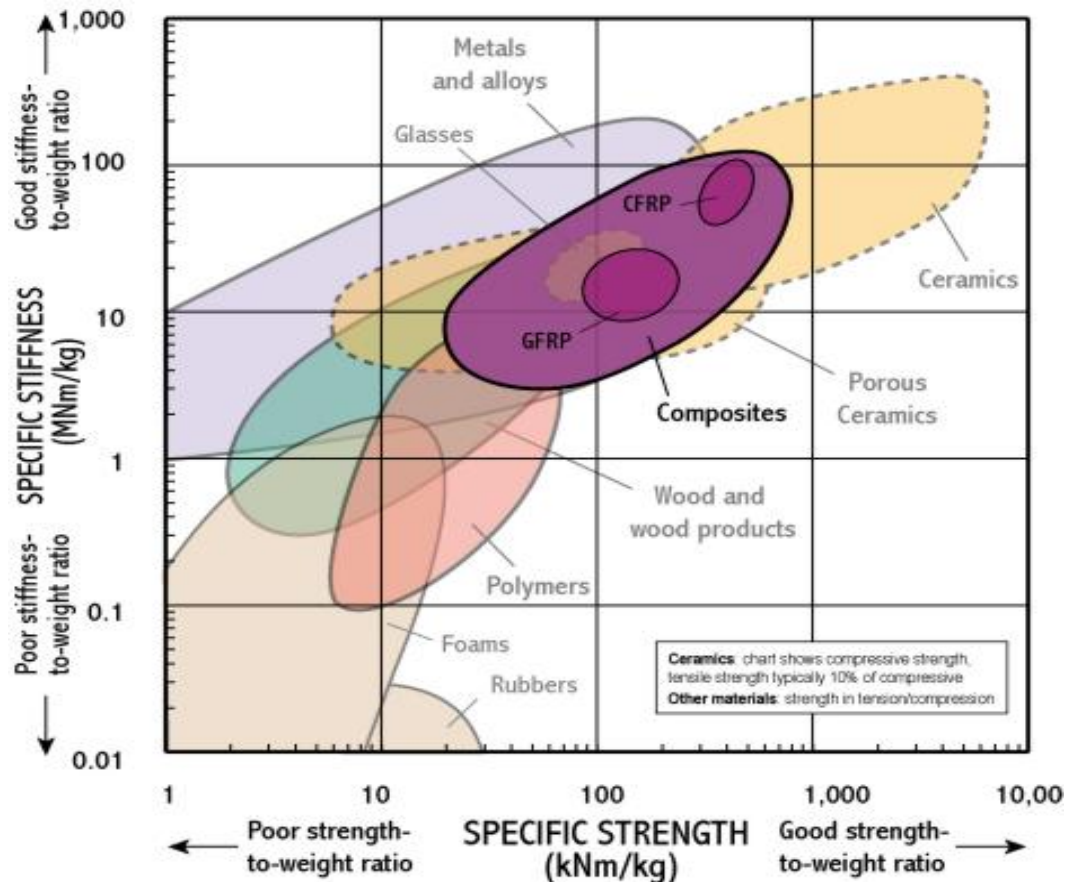


Figure 2. Specific stiffness and specific strength for various materials, the figure highlights Carbon Fiber Reinforced Polymer (CFRP) Composites and Glass Fiber Reinforced Polymer (GFRP) Composites.

Technical Topic Area and FOA Goals – Section I.C

- A concentrated focus on innovative composite manufacturing approaches to meet cost and production targets that lower the energy consumption, greenhouse gas emissions and address end-of-life issues will accelerate the realization of life cycle energy efficiency.
- Target fiber reinforced polymer composite applications for this FOA are highlighted here.

Target Applications

Vehicles

- Lightweighting is an important end-use energy efficiency strategy in transportation, for example a 10% reduction in vehicle weight can improve fuel efficiency by 6%–8% for conventional internal combustion engines, or increase the range of a battery-electric vehicle by up to 10%.
- Composites can offer a range of mass reductions over steel ranging from 25–30% (glass fiber systems) up to 60–70% (carbon fiber systems).

Technical Topic Area and FOA Goals – Section I.C

Target Applications – cont.

Wind Turbines

- In wind energy, high strength and stiffness, fatigue-resistant lightweight materials like carbon fiber composites can support development of lighter, longer blades and increased power generation. In addition, “using lighter blades reduces the load-carrying requirements for the entire supporting structure and saves total costs far beyond the material savings of the blades alone.”

Compressed Gas Storage

- High pressure storage tanks are typically made with high strength (>700ksi tensile strength) carbon fiber filament in a polymer matrix wound over a metallic or polymeric liner. Carbon fiber composites can account for over 60% of the cost of these systems. FCTO has set ultimate cost targets of \$8/kWhr (\$267/kg H₂ stored). For Type IV storage tanks with 5.6kg of hydrogen storage at 700bar to meet these cost targets carbon fiber composite costs will need to drop to \$10--\$15/kg.

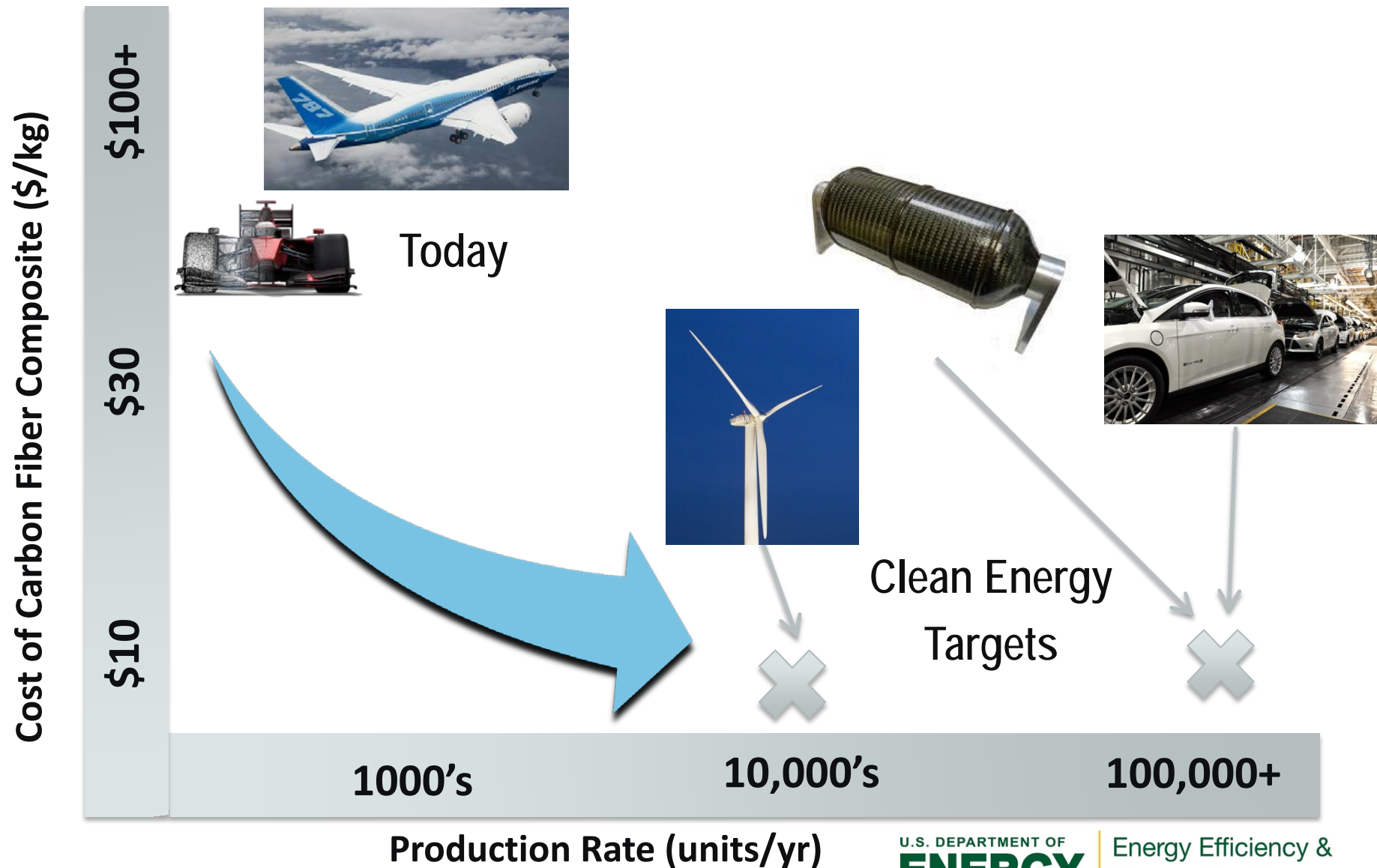
Technical Topic Area and FOA Goals – Section I.C

Target Applications – cont.

Other Applications

- Industrial equipment and components like heat exchangers, structural materials for buildings, fly-wheels for electricity grid stability, hydrokinetic power generation, support structures for solar systems, shipping containers and other systems can also benefit from lower cost, high strength and stiffness, corrosion resistant, and lightweight composite materials.
- Applicants may propose additional target application areas and economic and technical targets provided they can clearly demonstrate how effort in those areas will support the overall Institute objectives.

Advanced Composites for Clean Energy



Technical Topic Area and FOA Goals – Section I.C

Institute Technical Focus Areas

- AMO has identified three main focus areas for RD&D within the Institute: manufacturing throughput without degrading performance, energy use for composite materials and structures fabrication and recyclability for both in-process scrap and end-of-use.
- Additional enabling technologies and approaches to support improvements to composite manufacturing are discussed below.

Technical Topic Area and FOA Goals – Section I.C

Institute Technical Focus Areas – cont.

Speed

- Technical and non-technical limitations to manufacturing composites at high speed (throughput) contribute to the high cost of composite components which restricts their broader application.
- Improvements in automation, with high repeatability and further advancements of continuous processes such as tape and fiber placement systems, high speed resin transfer systems, pultrusion, high speed molding systems and new innovative processes with faster lay-up times and cure cycles to meet manufacturing rates and quality requirements are needed and will be an important RD&D focus area of the Institute.
- Use of innovative curing technologies (e.g. microwave, ultraviolet, electron beam, etc.) and integrated manufacturing approaches are also potential areas of R&D for the Institute.

Technical Topic Area and FOA Goals – Section I.C

Institute Technical Focus Areas – cont.

Energy

- One study estimates that carbon fiber composites are 3-5x more energy intensive than conventional steel on a weight basis. With the anticipated growth of carbon fiber composites over the next 10 years, it will be increasingly important to reduce the energy use in the manufacturing of carbon fiber composites for all applications.
- To achieve the energy targets identified in this FOA, the Institute will likely investigate a mix of strategies. One approach could be to reduce the energy used in the composite manufacturing process directly.
- A second approach could be through the use of alternative raw materials that require less energy to produce. The Bioenergy Technology Office's *Renewable, Low-Cost Carbon Fiber for Lightweight Vehicles: Summary Report* discusses potential alternative materials and technical challenges to drop in bio-based and unconventional fiber materials that may have lower embodied energy (and potentially cost) relative to existing PAN based technologies.

Technical Topic Area and FOA Goals – Section I.C

Institute Technical Focus Areas – cont.

Recycling

- The ability to reuse fibers and a strong recycling and reuse market can have a significant positive impact on the life-cycle energy and greenhouse gas footprint for composites, as well as cost.
- Innovative technologies are needed to continue to improve the recyclability of composites at a cost and performance competitive with virgin material with energy-efficient processes.
- Further improvements to recycling technologies, demonstration and qualification of high quality recycled fiber materials at lower cost, demonstration of thermoplastic materials have the potential to help expand this market further and reduce the life-cycle energy impact and cost of fiber reinforced composite materials.

Technical Topic Area and FOA Goals – Section I.C

Institute Technical Focus Areas – cont.

Enabling Technologies and Approaches

- To achieve the targets of the FOA and have widespread impact to adoption of composites in industry, additional enabling technology development and approaches may be incorporated into the Institute activities to support the main manufacturing focus.
- Enabling Technologies and Approaches discussed in more detail in Section I.C. of the FOA are:
 - *Innovative Design Concepts*
 - *Modeling and Simulation Tools*
 - *Effective Joining*
 - *Defect Detection*

Technical Topic Area and FOA Goals – Section I.C

FOA Goals

- The goal of this FOA is to establish a **Clean Energy Manufacturing Innovation Institute for Composite Materials and Structures** that will support U.S. prosperity and security; and contribute to the creation of the National Network for Manufacturing Innovation.
- The vision for the Institute is to help revitalize American manufacturing and support domestic manufacturing competitiveness.
- The technical topic area for this Institute is low-cost, high-speed, energy efficient manufacturing and recycling of fiber reinforced polymer composites.
- The Institute will target continuous or discontinuous, primarily carbon fiber or glass systems, with thermoset or thermoplastic resin materials.

Technical Topic Area and FOA Goals – Section I.C

FOA Goals – cont.

The overall objectives of the Institute over a ten year time frame are to:

- i. double the energy productivity of fiber reinforced polymer composite manufacturing;
 - ii. reduce life cycle energy use and associated greenhouse gas emissions for targeted application areas;
 - iii. increase domestic production capacity;
 - iv. increase jobs for American workers; and
 - v. support regional economic development.
- The Applicant must identify clear milestones (cycle time, energy intensity/embodied energy, repeatability, high volume cost estimate, performance targets, etc.) and how the Institute will demonstrate progress towards the defined targets for the award period at regular intervals and show a path to achieve the long term goals identified post award period.

Technical Topic Area and FOA Goals – Section I.C

FOA Goals – cont.

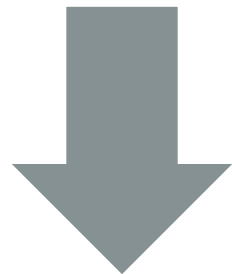
The quantitative technical objectives of the R&D work of the Institute are to:

- i. Reduce production cost of finished carbon fiber composites for targeted applications (vehicles, wind, high-pressure gas storage at a minimum) by >25% in five years, on a pathway to a reduction of cost >50% over ten years;
- ii. Demonstrate production of fiber reinforced polymer composites with cost and embodied energy parity to today's glass fiber technology and performance of today's carbon fiber composites for target application areas and relevant production speed in five years;
- iii. Demonstrate technologies, at sufficient scale, that reduce the embodied energy (and associated greenhouse gas emissions) of carbon fiber composites by 50% compared to today's technology on a pathway to 75% reduction in ten years; and
- iv. Demonstrate technologies, at sufficient scale, for >80% recyclability or reuse of fiber reinforced polymer composites in five years into useful components with projected cost and quality at commercial scale competitive with virgin materials on a pathway to >95% recyclability or reuse starting in ten years.

Composites Manufacturing Innovation Institute FOA Objectives

Develop and demonstrate innovative technologies
that will within 10 years...

...make advanced fiber reinforced
polymer composites at relevant
production speed and performance for
clean energy products at



**50% Lower
Cost
Using 75% Less
Energy**

**And Reuse or
Recycle >95%**

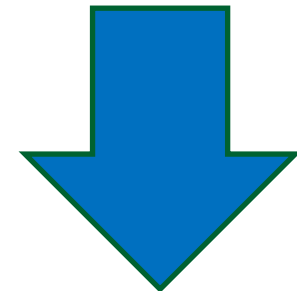


...and support U.S. Manufacturing
Competitiveness by increasing



**Energy Productivity
Regional Economic
Development and Jobs
Domestic Production**

**And Reducing
Energy Use**



Technical Topic Area and FOA Goals – Section I.C

FOA Goals – cont.

- At a minimum, the Applicant is expected to propose work to address the primary focus of the Institute within the three target application areas identified in the FOA.
- Applicants may propose to address additional applications and other fiber reinforcements (e.g. biobased, natural fibers, cellulosic materials, etc.) but must justify the benefit of this additional work along a pathway towards achieving the goals of this FOA.
- For any and all proposed application areas, it is strongly encouraged to have end users/OEMs from the relevant industries included in the Institute, demonstrating market pull and technical relevance for subsequent technology transfer and commercial adoption.

Technical Topic Area and FOA Goals – Section I.C

FOA Goals – cont.

Application	Estimated Current CFC Cost	Institute CFC Cost Reduction Target (2018) ⁸⁸	CFC Ultimate Cost Target (2024)	CFC Tensile Strength	CFC Stiffness	Production Volume Cycle Time
Vehicles (Body Structures)	\$26-33/kg	>35%	<\$11/kg by 2025 ⁸⁹ ~60%	0.85GPa (123ksi)	96GPa ⁹¹ (14Msi)	100,000 units/yr <3min cycle time (carbon) <5min cycle time (glass) ^{89,90}
Wind (Blades)	\$26/kg	>25% ⁹³	\$17/kg ~35%	1.903 GPa (276ksi)	134GPa (19.4Msi) ⁹⁴	10,000 units/yr (at >60m length blades) ⁹⁰
Compressed Gas Storage (700 bar – Type IV)	\$20-25/kg	>30% ⁹⁰	\$10-15/kg ~50% ⁹⁵	2.55 Gpa (370ksi)	135 Gpa (20Msi) ⁹⁶	500,000 units/yr (carbon fiber) ⁹⁵

Table 2. Institute cost targets for carbon fiber composites (CFC) for key application areas at relevant production targets and representative strength and stiffness values for 0-degree unidirectional laminates.

Technical Topic Area and FOA Goals – Section I.C

FOA Goals – cont.

To achieve these objectives and goals, consistent with the technical topic area as described and the Clean Energy Manufacturing Institute goals, the Institute created through this FOA will:

- a) become a financially self-sustaining, world-leading innovation hub, preferably managed by an independent, not-for profit entity, that brings together private and public entities to develop and accelerate adoption of innovative next generation manufacturing technologies;
- b) establish an Institute leadership team with the demonstrated experience and capability to execute and manage diverse technical and manufacturing RD&D teams, recruit and manage a complex industrial partnership to address pre-competitive manufacturing challenges, establish benchmarks and assessment tools for projects management and build a culture of team oriented collaborative execution and delivery of results;
- c) support a core set of shared RD&D infrastructure that provides a clear center of gravity for the Institute and enables affordable access to physical and virtual tools, as well as expertise, to reduce the cost and risk of commercialization, address technical challenges that may arise from scale-up and production at a manufacturing relevant scale and provide data to enable business case and value proposition development;

Technical Topic Area and FOA Goals – Section I.C

FOA Goals – cont.

- d) establish, execute and report a process for convening stakeholders and developing a multi-year industry roadmap for the manufacturing technology or make substantial contributions to an existing roadmap effort including periodic update to the roadmap (annual or bi-annual);
- e) establish, execute and assess an annually reviewed manufacturing RD&D technical strategic plan for the institute, reflective of addressing an industry roadmap, that enables applied projects (TRL/MRL 4-7) that support new processes, equipment, design tools, and capabilities for innovative production or materials technologies; accelerate certification and qualification of processes and products; maintain data and models and develop testing protocols and standard as appropriate for the technology area; and provide quantitative and measurable progress towards the quantitative goals of this FOA;
- f) define clear and transparent Institute by-laws, policies and strategies for participation of a wide range of stakeholders in the Institute, in particular, to engage Small and Medium Enterprises (SMEs) through outreach and intermediaries, including programs like the National Institute of Standards and Technology Manufacturing Extension Partnership (NIST MEP) network where appropriate, and provide sufficient financial and contractual mechanisms and a plan to engage stakeholders along the supply chain, including end-users, to benefit from the Institute resources and support a strong domestic integrated supply chain;

Technical Topic Area and FOA Goals – Section I.C

FOA Goals – cont.

- g) provide capabilities for and collaboration on open, pre-competitive work, among multiple parties in an Intellectual Property (IP) protected environment, as well as proprietary activities as appropriate to engage stakeholders as relevant to the technology area;
- h) establish a technical education and workforce development plan to support technical and career education that will leverage relevant existing resources like the National Science Foundation Advanced Technology Education (NSF ATE) Centers and the Department of Labor Trade Adjustment Assistance Community College and Career Training (TAACCCT) Program, industry validated certifications and apprenticeship programs, etc. to develop the workforce needed to serve in our nation's high value, next generation manufacturing facilities, as appropriate to the technology area; and
- i) leverage relevant existing private and public sector resources and facilities such as NSF ATE Centers, NIST MEPs, national laboratories, university centers and other government investments.

Technical Topic Area and FOA Goals – Section I.C

FOA Goals – cont.

Institute Best Practices

- DOE has identified several best practices for management and operations that the proposed Institute applicants are expected to align with and plans to address these points are to be included in the project narrative. Deviations from these best practices shall be adequately justified by the applicant with a strong alternative plan.
- See Section I.C. for more information on these best practices.

Non-Responsive Applications – Section III.D

The following types of applications will be deemed nonresponsive and will not be reviewed or considered for any award:

- Applications that fall outside the technical parameters specified in Section I.C of the FOA, including but not limited to:
 - Manufacturing, joining or other techniques solely focused on well established markets such as aerospace applications or applications which have no justified impact to energy goals (i.e. sporting goods);
 - An Institute focused solely on carbon fiber precursor development or carbon fiber conversion technologies, the Institute should leverage and tie into existing R&D efforts for these areas; and
 - An Institute solely focused on polymer or glass chemistry development
 - An Institute that is solely focused on and duplicates large scale final product testing and end use validation that is broadly available such as crash testing, integration of components like a blade into test wind turbines, hydrostatic pressure vessel testing, etc. that already exists.
- Applications for proposed technologies that are not based on sound scientific principles (e.g., violates the law of thermodynamics).
- Applications which are not related to the Advanced Manufacturing of Composite Materials and Structures.

Award Information

Total Amount to be Awarded	Up to \$70,000,000*
Average Award Amount	EERE anticipates making one award between \$35,000,000 to \$70,000,000.
Type of Funding Agreement	Cooperative Agreements, Technology Investment Agreements, Work Authorizations, and Interagency Agreements
Period of Performance	Up to 60 months, divided into budget periods; budget periods will be for a 12 month (approximate) term.
Cost Share Requirement	50% of Total Project Cost (required minimum)

*Subject to the availability of appropriated funds

Statement of Substantial Involvement

EERE has substantial involvement in work performed under Awards made following this FOA. In addition to the administrative requirements of the Award, EERE has substantial involvement in the direction and redirection of the technical aspects of the project as a whole. Substantial involvement includes, but is not limited to, the following:

1. EERE shares responsibility with the Recipient for the management, control, direction, and performance of the Project.
2. EERE may intervene in the conduct or performance of work under this Award for programmatic reasons. Intervention includes the interruption or modification of the conduct or performance of project activities.
3. EERE may redirect or discontinue funding the Project based on the outcome of EERE's evaluation of the Project at a Go/No Go decision point.
4. EERE participates in major project decision-making processes.
5. EERE reviews and approves in a timely manner project plans, including project management, testing and technology transfer plans, and recommending alternate approaches, if the plans do not address the critical programmatic issues.
6. EERE participates in project management planning activities, including risk analysis, to ensure EERE Technology Office requirements or limitations are considered in performance of the work elements.
7. EERE promotes and facilitates technology transfer activities, including disseminating Technology Office results through presentations and publications.
8. EERE participates in any governance or management boards that may be established and may invite other U.S. Government officials for participation in advisory capacity.
9. To adequately monitor project progress and provide direction to the Institute, the Prime Recipient must provide EERE with an adequate level of insight into various Institute activities. Government Insight activities by EERE include attendance at Institute meetings, reviews and tests, and project management and monitoring activities which may result in co-location and physical accommodation of a Federal employee or Federal contractor onsite. The Prime Recipient must notify EERE of meetings, reviews, and tests in sufficient time to permit EERE participation and provide all appropriate documentation for EERE review. The Prime Recipient may be asked to provide a suitable physical location for a Federal employee or contractor for a specific time or as part of ongoing project management and monitoring by EERE.
10. EERE may choose to engage a private, independent engineering (IE) firm to assist in assessing the progress of the project and provide timely and accurate reports to EERE. The Prime Recipient will ensure that the IE has access to any and all relevant documentation sufficient to allow the IE to provide independent evaluations to EERE on the progress of the project. The Prime Recipient may require the IE to sign a non-disclosure agreement, and will negotiate the agreement in good faith and in a timely manner. EERE will evaluate the quality and completeness of information and documentation provided by the Prime Recipient to EERE and its consultants (i.e., IE) in order to allow EERE to provide technical direction to the Prime Recipient about how best to achieve the objectives of the Institute. Consultants to EERE may not provide technical direction to the Prime Recipient.

Cost Sharing Requirements

Applicants must contribute a minimum of **50%** of the total project costs for demonstration projects.

Contributions must be:

- Specified in the project budget
- Verifiable from the Prime Recipient's records
- Necessary and reasonable for proper and efficient accomplishment of the project

Every cost share contribution must be reviewed and approved in advance by the Contracting Officer and incorporated into the project budget before the expenditures are incurred

Allowable Cost Share

- Cost Share must be allowable and must be verifiable upon submission of the Full Application
- Refer to the following applicable Federal cost principles:

Entity	Cost Principles
Educational Institutions	2 CFR Part 220
State, Local, and Indian Tribal Governments	2 CFR Part 225
Non-profit Organizations	2 CFR Part 230
For-profit Organizations	FAR Part 31

Allowable Cost Share

- Cash Contributions
 - May be provided by the Prime Recipient, Subrecipients, or a Third Party
- In-Kind Contributions
 - Can include, but are not limited to: personnel costs, indirect costs, facilities and administrative costs, rental value of buildings or equipment, and the value of a service, other resource, or third party in-kind contribution

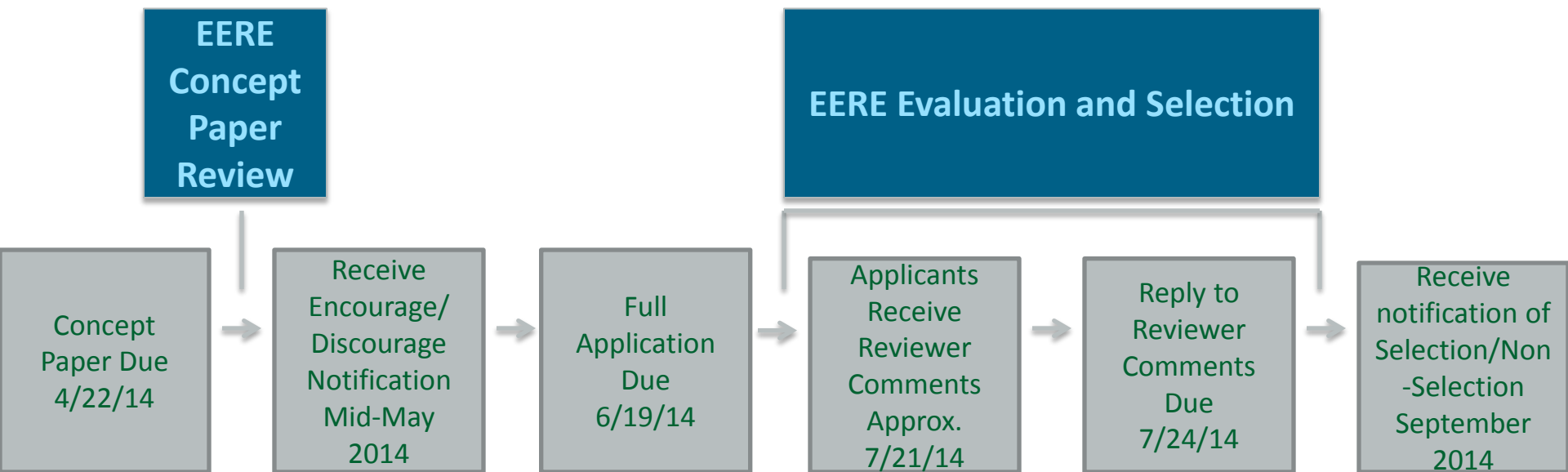
Unallowable Cost Share

- The Prime Recipient may not use the following sources to meet its cost share obligations including, but not limited to:
 - Revenues or royalties from the prospective operation of an activity beyond the project period
 - Proceeds from the prospective sale of an asset of an activity
 - Federal funding or property
 - Expenditures reimbursed under a separate Federal Technology Office
 - Independent research and development (IR&D) funds
 - The same cash or in-kind contributions for more than one project or program

Cost Share Payment

- Recipients must provide documentation of the cost share contribution, incrementally over the life of the award
- The cumulative cost share percentage provided on each invoice must reflect, at a minimum, the cost sharing percentage negotiated
- In limited circumstances, and where it is in the government's interest, the EERE Contracting Officer may approve a request by the Prime Recipient to meet its cost share requirements on a less frequent basis, such as monthly or quarterly. See Section III.B.6 of the FOA.

FOA Timeline



EERE anticipates making an award in early 2015

Concept Papers

- Applicants must submit a Concept Paper
 - Each Concept Paper must be limited to a single concept or technology
- The Concept Paper must include a technology description (See Section IV.C of the FOA)
 - The technology description is limited to 6 pages
 - The Operations and Management Approach description is limited to 4 pages
 - The Concept Paper can also include an Addendum which may include graphs, charts, or other data (limited to 10 pages)
- Concept Papers must be submitted by 4/22/2014, 5:00 PM ET through EERE Exchange, and must meet the content and form requirements (See Section IV.C of the FOA).
- EERE provides applicants with: (1) an “encouraged” or “discouraged” notification, and (2) the reviewer comments

Concept Paper Review

EERE evaluates the Concept Papers based on the following technical review criteria:

Criterion 1: Impact of the Proposed Institute (35%)

This criterion involves consideration of the following factors:

- Method used to identify current state of the art technology; and
- If technical success is achieved, the proposed Institute would significantly improve technical, non-technical and economic performance relative to the state of the art and support U.S. manufacturing competitiveness.

Criterion 2: Overall Scientific and Technical Merit (35%)

This criterion involves consideration of the following factors:

- The proposed Institute plan and facilities will support innovation
- The proposed Institute plans show potential to address technical challenges achieving to institute goals; and
- The proposed approach is without major technical flaws.

Criterion 3: Overall Management Approach (30%)

This criterion involves consideration of the following factors:

- The proposed Institute operations and management approach is without major flaws
- The proposed Institute management team and resources are adequate

Full Applications

- The Full Application includes:
 - **Technical Volume:** The key technical submission - info relating to the technical content, project team members, etc.
 - **SF-424 Application for Federal Assistance:** The formal application signed by the authorized representative of the applicant.
 - **SF-424A Budget & Budget Justification:** a detailed budget and spend plan for the project.
 - **Summary for Public Release**
 - **Summary Slide**
 - **Administrative Documents:** e.g., U.S. Manufacturing Plan, Draft IP Management Plan, Conflict of Interest Statement (if applicable), FFRDC Authorization (if applicable), Disclosure of Lobbying Activities, etc.

Full Applications: Technical Volume Content

Technical Volume: the key technical component of the Full Application

Content of Technical Volume	Suggested % of Technical Volume
Cover Page	
Institute Overview	5%
Technical Description, Innovation and Impact	15%
Workplan	40%
Technical Qualifications and Resources	15%
Operations and Management Plan	15%
Summary of Intellectual Property (IP) Management Plan	5%
Transition Plan	5%

Full Application Eligibility Requirements

- Applicants must submit a Full Application by 6/19/2014 5PM ET
- Full Applications are eligible for review if:
 - The Applicant is an eligible entity Section III.A of FOA;
 - The Applicant submitted an eligible Concept Paper;
 - The Cost Share requirement is satisfied Section III.B of FOA;
 - The Full Application is compliant Section III.C of FOA; and
 - The proposed project is responsive to the FOA Section III.D of FOA
 - Applicants may only submit one Concept Paper and one Full Application for consideration under this FOA as the Prime Applicant.
 - The Full Application meets any other eligibility requirements listed in Section III of the FOA.

Who's Eligible to Apply?

Eligible applicants for this FOA include:

1. Individuals
2. Domestic Entities
3. Foreign Entities
4. Incorporated Consortia
5. Unincorporated Consortia

For more detail about each eligible applicant, please see Section III.A of the FOA for eligibility requirements

Multiple Applications

Applicants may only submit one Concept Paper and one Full Application for consideration under this FOA

If an applicant submits more than one Concept Paper or Full Application, EERE will only consider the last timely submission for evaluation

- Any other submissions received listing the same applicant will be considered non-compliant and not eligible for further consideration
- This limitation does not prohibit an applicant from collaborating on other applications (e.g., as a potential Subrecipient or partner) so long as the entity is only listed as the Prime Applicant on one Concept Paper and Full Application submitted under this FOA

Merit Review and Selection Process (Full Applications)

- The Merit Review process consists of multiple phases that each include an initial eligibility review and a thorough technical review
- Rigorous technical reviews are conducted by reviewers that are experts in the subject matter of the FOA
- Ultimately, the Selection Official considers the recommendations of the reviewers, along with other considerations such as program policy factors, to make the selection decisions

Technical Merit Review Criteria

Criterion 1: Technical Merit, Innovation, and Impact (25%)

Technical Merit and Innovation

- Quality of the overall approach for the proposed Institute to the develop and deploy innovative next generation manufacturing technologies that meet national needs and the goals of this FOA;
- Extent to which the proposed technology developments are innovative and have the potential to advance the state of the art;
- Degree to which the current state of the technology and the proposed advancement are clearly described;
- Extent to which the application specifically and convincingly explains how the applicant will move the state of the art to the proposed advancements demonstrating a deep technical understanding and industry needs by the Applicant;
- Degree to which the applicant adequately addressed the three focus areas identified in Section I of this FOA and adequately justifies additional focus areas to achieve the goals of the FOA;
- Quality of the technical education and workforce development plan to support technical education and career training and level of integration into the Institute technical activities;

Technical Merit Review Criteria

Criterion 1: Technical Merit, Innovation, and Impact (25%) - Continued

Technical Merit and Innovation - Continued

- Extent to which the Institute will leverage existing educational resources and support dissemination of curriculum materials; and
- Sufficiency of technical detail in the application to assess whether the proposed work is scientifically meritorious and revolutionary, including relevant data, calculations and discussion of prior work in the literature with analyses that support the viability of the proposed work.

Impact of the Institute

- How the Institute supports the FOA goals, topic area objectives and target specifications and metrics;
- The potential impact of the Institute on advancing the state of the art;
- Extent to which the applicant demonstrates the potential impact of the Institute for aggregate cumulative energy savings (TBTU) and reduction in GHG (tons of CO2 equivalent) on a life-cycle basis over ten years relative to existing available technologies;
- Degree of commitment to support U.S. manufacturing as demonstrated in the U.S. Manufacturing Plan;

Technical Merit Review Criteria

Criterion 1: Technical Merit, Innovation, and Impact (25%) - Continued

Impact of the Institute - Continued

- Extent to which the applicant demonstrates the potential impact of the Institute to support U.S manufacturing competitiveness, in particular to increase energy productivity, domestic production capacity, impact domestic job creation, trade balance and/or GDP, as well as regional economic development as a result of successful technology deployment and commercialization from Institute related activities over ten years;
- If the application includes participation of foreign-based entities, the adequacy of the justification for their participation and the estimated domestic production benefits; and
- The adequacy and reasonableness of assumption in estimating the potential impact of the Institute.

Technical Merit Review Criteria - Continued

Criterion 2: Institute Workplan and Commercialization Plan (25%)

Approach and Workplan

- Degree to which the approach and critical paths have been clearly described and thoughtfully considered;
- Degree to which the Applicant has identified and clearly described the goals for the overall Institute and major Institute elements, at a minimum, operations and management; shared RD&D facilities; R&D projects; stakeholder engagement and road-mapping; technical education and workforce development; and commercialization; and
- Degree to which the task descriptions are clear, detailed, timely, and reasonable, resulting in a high likelihood that the proposed Workplan will succeed in meeting the Institute goals.

Identification of Risks

- Discussion and demonstrated understanding of the key technical risk areas involved in the proposed work and the quality of the mitigation strategies to address them.

Technical Merit Review Criteria - Continued

Criterion 2: Institute Workplan and Commercialization Plan (25%) - Continued

Baseline, Metrics, and Deliverables

- The level of clarity in the definition of the baseline, metrics, and milestones; and
- Relative to a clearly defined experimental baseline, the strength of the quantifiable metrics, milestones, and a mid-point deliverables defined in the application, such that meaningful interim progress will be made.

Market Transformation Plan

- For initial proposed project and technical work, the identification of target markets, competitors, and distribution channels for proposed technology developments along with known or perceived barriers to market penetration, including mitigation plan; and
- For initial proposed project and technical work, comprehensiveness of commercialization plan including but not limited to product development and/or service plan, commercialization timeline, financing, product marketing, legal/regulatory considerations including intellectual property, infrastructure requirements, data dissemination, U.S. manufacturing plan etc., and product distribution.

Technical Merit Review Criteria - Continued

Criterion 3: Team and Resources (20%)

Institute Team and Participants

- The capability of the Institute Director(s), lead organization and the proposed team to address all aspects of the proposed work with a good chance of success;
- Qualifications, relevant expertise, experience of the proposed Institute Director/Executive and key management staff in successfully managing a collaborative and/or multi-user facility;
- Level of time commitment to Institute management by the proposed Institute Director/Executive (expected full time role) and other key management staff (>75% time commitment);
- Degree to which the proposed consortia/team demonstrates the ability to facilitate and expedite further development and commercial deployment of the proposed technologies;
- Quality of the Institute participants and their level of commitment to support U.S. manufacturing competitiveness as defined in the U.S. Manufacturing Plan; and
- Level of participation by project participants as evidenced by letter(s) of commitment and how well they are integrated into the Workplan.

Technical Merit Review Criteria - Continued

Criterion 3: Team and Resources (20%) - Continued

Facilities

- The sufficiency of the existing and proposed facilities and capabilities to support the work;
- Degree of clarity in the differentiation between existing and new facilities and resources;
- Adequacy of the plan to update facilities and incorporate R&D developments into the shared facilities; and
- Degree to which the Institute will appropriately leverage existing resources and facilities including but not limited to NIST MEP Centers, NSF ATE Centers, national laboratories, and other government investments.

Budget and Spend Plan

- Reasonableness of budget and spend plan for proposed project and objectives;
- Accuracy of the representation of the value of in-kind contributions; and
- Adequacy of funding availability to encourage openness and new participants as the Institute goes forward and to accommodate changes in strategic direction that may occur once the Institute is formalized and aligned with strategic roadmaps.

Technical Merit Review Criteria - Continued

Criterion 4: Operations and Management Plan (15%)

Management and Governance Approach

- Reasonableness and effectiveness of management approach and structure to enable strategic decision-making;
- Adequacy of the inclusion of federal government (DOE and other Federal government participants identified by DOE) on decision making bodies (boards/committees) at both a strategic and technical level within the Institute;
- Degree to which the Institute can operate as an independent, neutral, non-biased coordinating and convening body for a diverse set of stakeholders;
- Quality of the proposed organization structure to support the Institute objectives, incentivize private sector participation and encourage SMEs participation in the Institute; and
- Adequacy of the plan to communicate and coordinate with, share and establish best practices, and participate in meetings with other institutes for manufacturing innovation established by DOE and other Federal Agencies and support the creation of a national network for manufacturing innovation.

Technical Merit Review Criteria - Continued

Criterion 4: Operations and Management Plan (15%) - Continued

Operations

- The adequacy and quality of the annual strategic planning process, including the plan for industry roadmap activities, periodic update of the industry roadmap (annual or bi-annual) and incorporation of the industry roadmap to Institute strategic planning;
- The adequacy and quality of the planned periodic (annual) review processes for Institute and project performance;
- Adequacy of the proposed Institute performance metrics and how metrics will be tracked to gauge success of the Institute and impact in the technology area
- Strength of methodology for selecting and prioritizing R&D work, and tracking performance for work;
- Adequacy of the plan to handle participation of foreign-based entities and ensure domestic production benefits;
- Quality of the stakeholder engagement plan, in particular with SMEs and ability to engage stakeholders along the supply chain including end-users and degree to which the annual planning process encourages new ideas and participants;

Technical Merit Review Criteria - Continued

Criterion 4: Operations and Management Plan (15%) - Continued

Operations - Continued

- Degree to which the Institute elements will be integrated and will provide value that is more than the sum of the individual activities and achieve the objectives of the FOA, in particular how will improvements developed through R&D projects be incorporated into shared RD&D facilities over time;
- Degree to which the Institute will provide capabilities for and collaboration in open, pre-competitive work, among multiple parties in an Intellectual Property (IP) protected environment, as well as proprietary activities as appropriate to engage stakeholders as relevant to the Institute objectives and goals of the FOA; and
- Degree to which the management and operations plan will enable the Institute to adapt to changing industry conditions and needs that may arise due to road-mapping efforts, as well as enable partnerships with external entities, such as other Federal government agencies.

Identification of Operational Risks

- Adequacy of the discussion of the economic and operational key risk areas involved in the operations and management plan, and the quality of the mitigation strategies to address them, specifically with respect to Intellectual Property management and securing U.S. manufacturing competitiveness.

Technical Merit Review Criteria - Continued

Criterion 5: Intellectual Property Management Plan (10%)

- Adequacy of the IP management plan for supporting the needs of the Institute, its participants, and the broader U.S. manufacturing sector;
- Extent to which the IP management plan will incentivize private sector involvement;
- Quality of the IP Management plan and any other IP agreements (attached as an Appendix of the Narrative) demonstrating that the IP issues inherent with collaborations and/or multi-user facilities are addressed; and
- Extent to which the applicant demonstrates an understanding of and adequate plan to address export control (ITAR and any other) regulations, address classified work as needed and conflicts of interest;

Criterion 6: Transition Plan (5%)

- Likelihood that the Institute can achieve financial self-sufficiency from dedicated federal funding within five years;
- The adequacy of the description of the funding/revenue model which will support Institute operations beyond the award period;
- Adequacy the plan to keep the Institute resources and approach relevant during the award period and after the end of the award period; and
- Reasonableness of the extended profit and loss estimates for an additional three years beyond the award period.

Replies to Reviewer Comments

- EERE provides applicants with reviewer comments
- Applicants have approximately three business days to prepare a Reply to Reviewer Comments (“Reply”) to respond to comments
 - Page Limit: 3 Pages, including charts, graphs, etc.
- Applicants are not required to submit a Reply. It is optional.
- To be considered by EERE, a Reply must be submitted by the deadline and submitted through EERE Exchange.
- Please see Sections IV.F. and V.A.3 for additional information regarding Replies to Reviewer Comments

Pre-Selection Interviews

- EERE may invite one or more applicants to participate in Pre-Selection Interviews
- All interviews will be conducted in the same format.
- EERE will not reimburse applicants for travel and other expenses relating to the Pre-Selection Interviews, nor will these costs be eligible for reimbursement as pre-award costs
- Participation in Pre-Selection Interviews with EERE does not signify that applicants have been selected for award negotiations

Selection Factors

The Selection Official may consider the merit review recommendation, program policy factors, and the amount of funds available in arriving at selections for this FOA

Program Policy Factors

- The Selection Official may consider the following program policy factors in making his/her selection decisions:
 - The degree to which the proposed project, including proposed cost share, optimizes the use of available EERE funding to achieve programmatic objectives and alignment with national manufacturing goals and objectives⁹⁶
 - The level of industry involvement and demonstrated ability to commercialize energy or related technologies
 - Technical, market, organizational, and environmental risks associated with the project
 - Whether the proposed project will accelerate transformational technological advances in areas that industry by itself is not likely to undertake because of technical and financial uncertainty
 - The degree to which the proposed project directly addresses EERE's statutory mission and strategic goals

⁹⁶ National Science and Technology Council. "A National Strategic Plan for Advanced Manufacturing." Web. February 2012. http://www.whitehouse.gov/sites/default/files/microsites/ostp/iam_advancedmanufacturing_strategicplan_2012.pdf

Registration Requirements

- To apply to this FOA, Applicants must register with and submit application materials through EERE Exchange: <https://eere-Exchange.energy.gov>
- Obtain a “control number” at least 24 hours before the first submission deadline
- Although not required to submit an Application, the following registrations must be complete to received an award under this FOA:

Registration Requirement	Website
DUNS Number	http://fedgov.dnb.com/webform
SAM	https://www.sam.gov
FedConnect	https://www.fedconnect.net
Grants.gov	http://www.grants.gov

Means of Submission

- Concept Papers, Full Applications, and Replies to Reviewer Comments must be submitted through EERE Exchange at <https://eere-Exchange.energy.gov>
 - EERE will not review or consider applications submitted through other means
- The Users' Guide for Applying to the Department of Energy EERE Funding Opportunity Announcements can be found at <https://eere-Exchange.energy.gov/Manuals.aspx>

Key Submission Points

- Check entries in EERE Exchange
 - Submissions could be deemed ineligible due to an incorrect entry
- EERE strongly encourages Applicants to submit 1-2 days prior to the deadline to allow for full upload of all application documents
- Make sure you hit the submit button
 - Any changes made after you hit submit will un-submit your application and you will need to hit the submit button again
- For your records, print out the EERE Exchange Confirmation page at each step, which contains the application's Control Number

Applicant Points-of-Contact

- Applicants must designate primary and backup points-of-contact in EERE Exchange with whom EERE will communicate to conduct award negotiations
- It is imperative that the Applicant/Selectee be responsive during award negotiations and meet negotiation deadlines
 - Failure to do so may result in cancellation of further award negotiations and rescission of the Selection

Questions

Questions about this FOA? Email FRCManufacturing@go.doe.gov

- All Q&As related to this FOA will be posted on EERE Exchange
 - You must select this specific FOA Number in order to view the Q&As
- EERE will attempt to respond to a question within 3 business days, unless a similar Q&A has already been posted on the website
- Problems logging into EERE Exchange or uploading and submitting application documents with EERE Exchange? Email EERE-ExchangeSupport@hq.doe.gov.
 - Include FOA name and number in subject line
- All questions about the FOA must be submitted to:
FRCManufacturing@go.doe.gov