



**Manufacturing Innovation Institute for
Smart Manufacturing: Advanced Sensors,
Controls, Platforms, and Modeling for
Manufacturing**
SmartManufacturing@ee.doe.gov

**FOA Webinar
DE-FOA-0001263
10/06/15**

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Manufacturing Innovation Institute for Smart Manufacturing: Advanced Sensors, Controls, Platforms, and Modeling for Manufacturing

Anticipated Schedule:

FOA Issue Date:	09/15/2015
FOA Informational Webinar:	10/06/2015
Submission Deadline for Concept Papers:	11/04/2015
Submission Deadline for Full Applications:	01/29/2016
Submission Deadline for Replies to Reviewer Comments:	03/31/2016
Expected Date for EERE Selection Notifications:	May 2016
Expected Timeframe for Award Negotiations:	August 2016

Notice

- All applicants are strongly encouraged to carefully read the Funding Opportunity Announcement DE-FOA-0001263 (“**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 SmartManufacturing@ee.doe.gov
- There will not be a question and answer time during this presentation. All questions about the FOA are to be submitted to SmartManufacturing@ee.doe.gov
- Also, this presentation will be recorded and a transcript created. Both will be posted on the EERE Exchange website.

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 **Manufacturing Innovation Institute for Smart Manufacturing**, 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 the research, development, demonstration, and transition to industry of the following technologies for Smart Manufacturing:
 - advanced sensing and instrumentation;
 - process monitoring, control, and optimization;
 - advanced hardware and advanced software platforms;
 - and real-time and predictive modeling and simulation technologies
- The Institute will emphasize energy intensive/dependent industries and clean energy product manufacturing

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
 - Teaming Partner List to facilitate the formation of new project teams for this FOA
 - This is both for Applicants looking for partners for their project and for companies and other entities to make themselves available for partnering with potential Applicants
- See Section I.B. of the FOA document for additional background information

FOA Description – Section I.B – Teaming Partner List

- To facilitate the formation of new project teams for this FOA, a Teaming Partner List is available at EERE Exchange at <https://eere-Exchange.energy.gov> under FOA DE-FOA-0001263
- Any organization that would like to be included on this list should submit the following information to SmartManufacturing@ee.doe.gov:
 - Organization Name, Contact Name, Contact Address, Contact Email, Contact Phone, Organization Type, Area of Technical Expertise, and Brief Description of Capabilities
- By submitting this information, you consent to the publication of the above-referenced information
- By facilitating this Teaming Partner List, EERE does not endorse or otherwise evaluate the qualifications of the entities that self-identify themselves for placement on the Teaming Partner List

Technical Topic Area and FOA Goals – Section I.C

Smart Manufacturing Institute will address key needs identified in the DOE Quadrennial Technology Review (2015) for realizing Smart Manufacturing:

- Open standards and interoperability for manufacturing devices and systems;
- Real-time measurement of machine energy consumption and waste streams;
- Integration of manufacturing facilities with the electric grid to allow dynamic energy optimization and guide choices of fuel/power use and generation and purchase decisions;
- Low-power, resilient wireless sensors and sensor networks for pervasive sensing;
- Platform infrastructures for orchestration of data across heterogeneous and human systems while addressing issues of privacy and cybersecurity;
- Theory and algorithms for model-based control of manufacturing processes; and
- Cybersecurity and privacy protection for sensitive data and systems.

Technical Topic Area and FOA Goals – Section I.C

Institute Technical Focus Areas - Advanced Sensors, Controls, Platforms, and Modeling for Manufacturing

- Emphasis on energy intensive and energy dependent industries as well as clean energy and energy efficient product manufacturing industries
- Institute interest is research, development and widespread industrial adoption of technologies and solutions that can capture, share, and process in real-time the increasing amounts of information that, by enabling dramatically improved process control and operation, will enable benefits such as improved energy efficiency; equipment reliability; productivity gains; as well as related improvements in safety, quality, and yield in manufacturing processes
- Benefits should be realized in manufacturing processes across all industries regardless of the type of processes used (e.g. discrete, batch, or continuous).
- Institute shall promote Smart Manufacturing related technologies in processes that reduce energy use and greenhouse gas emissions (GHG) from manufacturing.
- Institute will be organized as a public-private partnership to address key gaps limiting the adoption of Smart Manufacturing technology such as those identified in the DOE Quadrennial Technology Review 2015 including: complexity and initial cost of existing technologies; rapid changes in enabling technologies; know-how within existing manufacturing industries; trained workforce availability, and cyber-physical security.
- The Institute shall collaborate with the other Manufacturing Innovation Institutes.

Technical Topic Area and FOA Goals – Section I.C

Institute Technical Focus: Smart Manufacturing: Advanced Sensors, Controls, Platforms, and Modeling for Manufacturing

Develop and Standardize Open Software and Communication Platforms

- Methods needed to design and build platform infrastructures that integrate computing and communication capabilities together with the sensing and actuation functions of components.
- Open-architecture, open-standard, and open-source (when possible) software and communication platforms can enable plug-and-play connectivity to ease integration and customization across energy related Smart Manufacturing components, different manufacturing requirements, and the latest Information Technology (IT) hardware and standards.
- New platforms based on interoperable technologies must also ensure that a holistic approach to cyber security is met at a low implementation cost.
- Expected to advance open Smart Manufacturing platform technologies, and coordinate with public and private sector organizations from across manufacturing sectors that set or coordinate interoperability standards, such as the National Institute for Standards and Technology (NIST). The open software and communication platforms technical area also offers the opportunity for collaboration with the DOD's DMDI Institute.
- Another area for the coordination and testing of interoperability standards is between Smart Manufacturing and Smart Grid technologies.

Technical Topic Area and FOA Goals – Section I.C

Develop Advanced Sensors

- Advanced sensors needed throughout manufacturing to enable improved process control.
- Advanced sensors needed to monitor each stage of manufacturing will be subject to requirements of packaging for survivability, accuracy, low power consumption, connectivity (e.g., wireless communication), and very low installation and maintenance cost.
- Institute expected to develop advanced new *plug-and-play* sensors with embedded knowledge that makes them smarter and easier to integrate into wired/wireless sensor networks employed in manufacturing for energy-intensive industries with harsh operating environments.
- Institute expected to develop reliable sensor systems that can measure across many length scales at high bandwidth enabling combined sensor fusion for advanced real-time energy management and process control methodologies.
- Potential for providing a test-bed facility for accelerated sensor development and testing at increasing technical readiness levels to validate the functionality, capability, and reliability necessary for subsequent first-of-kind Smart Manufacturing process site demonstrations.

Technical Topic Area and FOA Goals – Section I.C

Develop Improved Real-Time Data Analytics and Control Systems

- Technology development needed for using real-time data from multiple sensors to evaluate current conditions, identify options, and optimize the system to improve the energy efficiency and productivity of manufacturing processes.
- Gathering and interpreting huge amounts of information through the development and application of big data analytics and advanced computational real-time modeling can also enable dramatically improved manufacturing process control.
- Institute expected to focus on exploiting data collected from large-scale distributed sensor networks to provide near real-time situational awareness of the factory, including identification of process abnormalities, and to enable suitable automated responses.
- Advanced data compression techniques and the development of low cost automated control approaches using model-predictive control are key opportunity areas.
- The sensor analytics developed, tested, and deployed to industry by the Institute must be interoperable, not only with different sensor types but also with backward capability to existing sensors, while forward looking to incorporate a systems-level holistic approach to cyber security.

Technical Topic Area and FOA Goals – Section I.C

Develop Improved Real-Time Data Analytics and Control Systems (cont'd)

- Technology needs to improve control systems and data analytics include:
 - 1) algorithms for prediction, control, and performance optimization;
 - 2) control strategies to enable the use of pervasive low cost monitoring solutions;
 - 3) advanced analytics to capture, manipulate, fuse, and display the collected sensor data that provides the operator with options for process improvement and control;
 - 4) verification and validation (V&V) and uncertainty qualification (UQ) of prediction models.
- Provide capability to investigate, develop, and test the functionality of new controls system and data analytical tools in manufacturing relevant environments through both hardware-in-the-loop system testbeds and in first-of-kind manufacturing deployments.

Technical Topic Area and FOA Goals – Section I.C

Advanced High Fidelity Modeling

- High fidelity modeling and simulation of energy intensive/dependent processes and clean energy and energy efficient product manufacturing industries contributes to optimized operational performance by enabling productivity improvements and energy savings.
- Accurate, robust, and predictive physics-and chemistry-based models needed to simulate, improve, and control advanced manufacturing processes to achieve optimized operational performance.
- Deployment of advanced control approaches requires high-fidelity, data-driven modeling at the level of the unit process, the plant, the facility, and the enterprise which form a framework for V&V and UQ, testing, and developing accurate prediction and control algorithms and methods.
- Potential to develop and validate high fidelity models of energy intensive/dependent and clean energy and energy efficient product manufacturing processes, demonstrate the value of such models in first-of-kind demonstrations of Smart Manufacturing processes, and stimulate the development of tools to enable wide-spread adoption of high-fidelity, physics-based, and data-driven modeling by manufacturers for low non-recurring cost Nth-of-kind deployment of Smart Manufacturing in clean energy manufacturing processes.

Technical Topic Area and FOA Goals – Section I.C

Develop First-of-Kind Application Toolkits for Smart Manufacturing Deployment

- A Smart Manufacturing platform, based on an open-standards and open-source framework, would enable plug and play connectivity to ease integration and customization across Smart Manufacturing components and environments.
- Ability to integrate different manufacturing requirements with current IT hardware and standards as well as emerging cloud-based systems, while ensuring that a standard of performance for process control, cyber security, and cyber-resiliency are met.
- Toolkits and application programs can provide a range of data depending on the information desired, such as real-time key performance indicators at the level of process, facility, enterprise or supply-chain.
- Develop and validate an initial set of process control applications to take advantage of the open communication platform.
- Expected to develop application toolkits using an open-standards or open-source architecture for workflow design, sensor integration and validation, process modeling, process monitoring, and big data analysis of processes.
- Expected to facilitate distribution of the toolkits, as well as update the toolkits with best practices based on data and results of first-of-kind Smart Manufacturing process demonstrations.
- Toolkits may have many manufacturing applications for energy intensive/dependent and clean energy and energy efficient product manufacturing processes, or may be specialized to a particular application area.

Technical Topic Area and FOA Goals – Section I.C

Enable Availability of Appropriate Testbeds

- Testbeds needed to ensure that the technologies developed under the aforementioned technical topic areas are verified and validated in conditions similar to those in relevant clean energy intensive/dependent and clean energy and energy efficient product manufacturing environments to reduce risk and break down barriers associated with implementation.
- Possible role to provide operationally relevant hardware-in-the-loop testbed capabilities for Smart Manufacturing technologies (TRL 5-6) not commonly available to individual firms, particularly small and medium sized enterprises.
- Provide opportunities for first-of-kind testing (TRL 6-7) of Smart Manufacturing technologies and solutions via pilot demonstrations in representative industrial manufacturing environments through partnerships.
- The data and results of such first-of-kind testing will be used to verify and validate the models, sensors, and control approaches developed by the Institute as well as to measure and validate the realized energy and waste savings associated with these new Smart Manufacturing approaches as replicable models.
- May tap existing resources within industry and regional centers to maximize all available resources.
- Serve as a test bed for emerging technologies and/or services pertinent to energy efficient manufacturing.

Technical Topic Area and FOA Goals – Section I.C

FOA Goals and Objectives

The Smart Manufacturing Institute must address the following key elements consistent with the design model for Manufacturing Innovation Institutes:

- Develop advanced manufacturing technology that is adopted for energy efficient manufacturing and clean energy and energy efficient product manufacturing;
- Be substantially self-sustaining after 5 years;
- Train an advanced manufacturing workforce; and
- Enrich the innovation ecosystem and strengthen U.S. manufacturing competitiveness.

Technical Topic Area and FOA Goals – Section I.C

The goals of the Smart Manufacturing Institute are to:

- a) Lead a national effort to develop, test, and widely deploy to industry Smart Manufacturing technologies and solutions for energy intensive/dependent and clean energy and energy efficient product manufacturing with an Institute membership that includes initial members as well as new members that were not part of the Institute application;
- b) Support a Smart Manufacturing-related shared RD&D infrastructure that enables affordable access to cutting-edge 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 development. This infrastructure leverages relevant existing private and public sector resources and facilities such as industry laboratories, university centers, national laboratories, and other government investments;
- c) Provide capabilities for and collaboration in open, pre-competitive work among multiple parties including the collaboration around the development of open architecture, open standard and open source software platforms and tools in an Intellectual Property (IP) protected environment, as well as proprietary activities as appropriate, to engage stakeholders as relevant to the Smart Manufacturing technology area;

Technical Topic Area and FOA Goals – Section I.C

The goals of the Smart Manufacturing Institute are to (cont'd):

- d) Be a financially self-sustaining, world-leading innovation hub that brings together private and public entities to co-invest in the development and deployment of innovative Smart Manufacturing technologies;
- e) Establish a technical education and workforce development program to support technical and career education that will leverage relevant existing resources to develop the Smart Manufacturing workforce needed to develop new Smart Manufacturing technologies and solutions and deploy these solutions widely within U.S. industry; and
- f) Define and implement clear operating structures and strategies for participation by a wide range of stakeholders in the Institute and, in particular, to engage small and medium-sized enterprises (SMEs), minority-owned businesses, and women-owned businesses through outreach and intermediaries, including programs like the National Institute of Standards and Technology Manufacturing Extension Partnership (NIST MEP) where appropriate, and provide sufficient financial and contractual mechanisms for collaboration with all stakeholders along the supply chain, including end-users, to allow them to benefit from the Institute resources.

Technical Topic Area and FOA Goals – Section I.C

The Applicant shall propose a plan to address the following objectives for the Smart Manufacturing Institute:

- 1) Demonstrate through Smart Manufacturing technologies, at least a fifteen percent (15%) improvement in energy efficiency in first-of kind demonstrations at manufacturing plants or major processes within five years of Institute operation, supporting a goal of at least fifty percent (50%) improvement in energy productivity in ten years following initial Federal support for the Smart Manufacturing Institute.
- 2) Develop tools and technologies to reduce the cost of deploying Smart Manufacturing in existing processes by fifty percent (50%) relative to the existing state of the art within five years, on a pathway to at least installed and operating cost parity for the adoption of Smart Manufacturing technologies recovered through savings in energy efficiency and productivity improvements.
- 3) Demonstrate significant industry adoption of Smart Manufacturing technology in each of the following topic areas within five years: advanced sensors; control systems and data analytics; high fidelity modeling; and toolkits.
- 4) Establish a portfolio for technology RD&D and workforce development that directly replaces the initial Federal funding, i.e., \$14 million per year, starting in the sixth year of operation.
- 5) Train at least fifty education/training professionals per year in Smart Manufacturing technologies for clean energy including energy management practices, i.e., train the trainers, by year 3.

Technical Topic Area and FOA Goals – Section I.C

The Applicant shall propose a plan to address the following objectives for the Smart Manufacturing Institute (cont'd):

- 6) Train at least 500 students per year in Smart Manufacturing technologies and solutions, including energy management practices, by year 3.
- 7) Develop an annual planning process that includes how the best emerging and new ideas and new participants will be included in Institute activities on an ongoing basis. The management and operations plan and budget must include adequate funding and a plan to ensure there is sufficient funding available to encourage openness and new participants as the Institute goes forward. Plans should also include how changes to the strategic plan will be managed to align with roadmaps and enable partnerships with other Federal government agencies.
- 8) Develop a roadmap for Smart Manufacturing technologies for energy intensive/dependent industries and clean energy and energy efficient product manufacturing that is updated on an annual basis, including engaged contribution from stakeholders from both inside the Smart Manufacturing Institute and across an emerging Smart Manufacturing industry;
- 9) Document the existence and growth of a domestic supply chain that is the focus of the Smart Manufacturing Institute, document the Institute capabilities supporting the elements of the domestic supply chain, and assess the health of the domestic supply chain annually.
- 10) Demonstrate the participation of underrepresented groups including but not limited to small and medium enterprises, minority-owned businesses, and women-owned businesses in technology development, workforce development, and Institute governance.

Technical Topic Area and FOA Goals – Section I.C

Manufacturing Innovation Institute Best Practices

The DOE has identified several best practices for management and operations of Manufacturing Innovation Institutes. The Applicant's plans to address these points must be included in the project narrative section of the application. Deviations from these best practices must be adequately justified by the applicant with a strong alternative plan.

- The Institute management is expected to be primarily focused on the operation and management of the proposed Institute. The Institute Director/Executive is expected to be a full time position and key management staff (i.e., Deputy Directors, Chief Technology Officer) give >75% time commitment to the Institute.
- The Institute organization is encouraged to be an independent not-for-profit entity that can support and maintain a neutral and non-biased role during the execution of the Institute effort and during any subsequent period as a self-sustaining Institute.
- In the case where a new not-for-profit entity will be established for the management and execution of the Institute, a clear plan and timeline for establishing the not-for-profit Institute as a new legal entity should be provided. DOE prefers for the new not-for-profit to obtain a DUNS number prior to submitting a Concept Paper so the entity can register in Exchange and apply as the Prime Applicant.
- As a public-private partnership, the Institute should expect that DOE (and other Federal government participants identified by DOE) will participate in decision-making bodies (boards/committees) at both a strategic and technical level within the Institute.

Technical Topic Area and FOA Goals – Section I.C

- The Advanced Manufacturing National Program Office (AMNPO) has issued two additional draft documents regarding Manufacturing Innovation Institutes and the National Network for Manufacturing Innovation, one about Intellectual Property Rights and the other on Performance Metrics.
- Applicants to this FOA are not required to follow the guidance in these documents released by the AMNPO but are encouraged to review them and consider what guidance may be appropriate to incorporate.
- The Guidance on Intellectual Property Rights for the National Network for Manufacturing Innovation and Draft Institute Performance Metrics and summaries of the public comments on these documents for the National Network for Manufacturing Innovation documents can be found on the AMNPO website, http://manufacturing.gov/pubs_resources.html.

Non-Responsive Applications – Section III.D

The following types of applications will be deemed nonresponsive and will not be reviewed or considered (See Section III.D of the FOA):

- Applications that fall outside the technical parameters specified in Section I.C of the FOA, including but not limited to Smart Manufacturing technology development and demonstration that is primarily *not* focused on energy efficient manufacturing or is solely focused on technology development with no relevant application to energy intensive/dependent industries or clean energy/energy efficient product manufacturing.
- Applications that focus primarily on Smart Manufacturing demonstrations at industrial facilities without the research, development and demonstration of technology or sharing of pre-competitive knowledge as a resource in a public-private partnership.
- Applications for proposed technologies that are not based on sound scientific principles (e.g., violates the law of thermodynamics).

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 and Work Authorizations
Period of Performance	Up to 60 months, divided into budget periods: Budget Period 1 approximately 6 months [†] ; Budget Periods 2-4 approximately 12 months each; and Budget Period 5 approximately 18 months.
Cost Share Requirement	50% of Total Project Cost (required minimum)

* Subject to the availability of appropriated funds and congressional direction

[†] The first 6 month budget period is intended to provide resources for the startup phase consisting of formalization of industrial partnerships as well as finalizing technical development plans

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 nondisclosure 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 allowable costs for the Institute.
- 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
For-profit entities	FAR Part 31
All other non-federal entities	2 CFR Part 200 Subpart E - Cost Principles

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 contributions

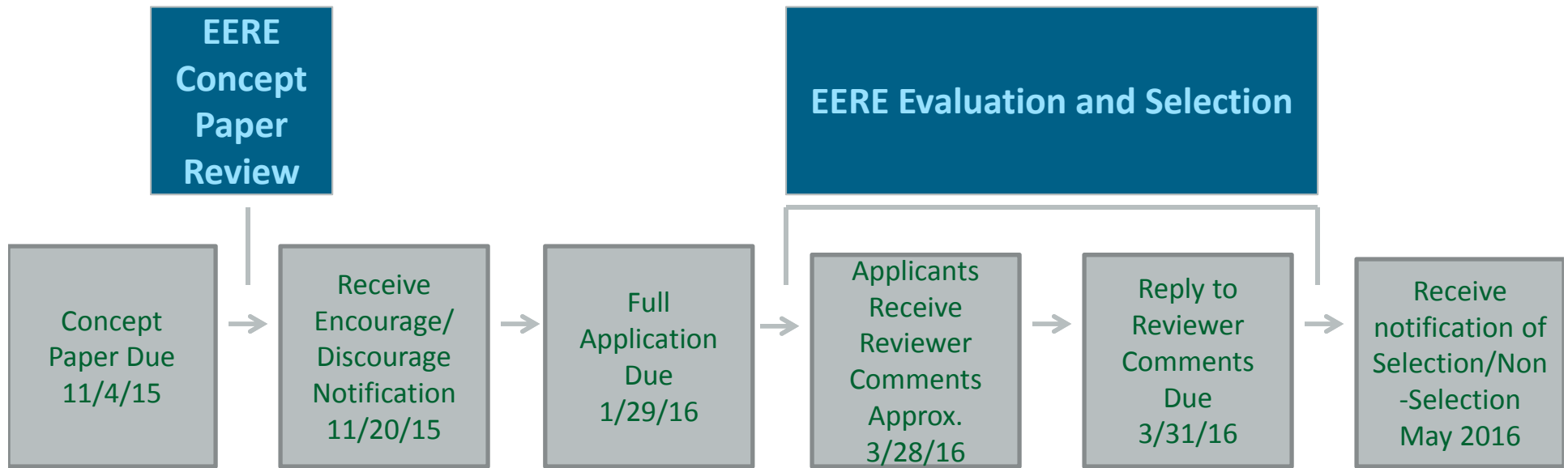
Unallowable Cost Share

- 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
 - 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 by August 2016

Concept Papers

- Applicants must submit a Concept Paper
 - Each Concept Paper must be limited to establishment of an Institute focused on Smart Manufacturing as described in Section I of the FOA
- The Concept Paper must include a Technical Approach description (See Section IV.C of the FOA)
 - The Technical Approach description is limited to 6 pages
 - The Team and Resources description is limited to 4 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 5 pages)
- Concept Papers must be submitted by 11/4/15, 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 may include (2) the general reviewer comments

Concept Paper Review

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

Criterion 1: Technical Approach Description (40%)

This criterion involves consideration of the following factors:

- Quality of the proposed integrated Smart Manufacturing Institute technical approach for the core focus areas identified in the FOA;
- The proposed application areas are well-defined and ideally have quantitative technical objectives for the proposed Smart Manufacturing Institute;
- The Applicant's understanding of the current state-of-the-art in the field of Smart Manufacturing, including key opportunities, shortcomings, limitations, and challenges;
- A description of how the proposed integrated Institute approach for the operations and management, shared RD&D facilities, initial R&D project focus, stakeholder engagement and road-mapping efforts, strategic planning, technical education and workforce development, and commercialization activities will address the opportunities, shortcomings, limitations, and challenges in Smart Manufacturing;
- The estimated impact that the proposed Institute would have on U.S. energy intensive/dependent industries and clean energy and energy efficient product manufacturing, in addition to Smart Manufacturing product and service value/supply chains; the key risks/issues associated with the proposed Institute technology development plan and Institute operations and the plan for the mitigation of these risks.

Criterion 2: Team and Resources (30%)

This criterion involves consideration of the following factors:

- Whether the Principal Investigator (Institute Director/Executive) and Project Team have the skill and expertise needed to successfully execute the project plan;
- Whether the Applicant has prior experience which demonstrates an ability to perform tasks of similar risk and complexity;
- Whether the Applicant has worked together with its teaming partners on prior projects or programs;
- Whether the Applicant has adequate access to equipment and facilities necessary to accomplish the effort and/or clearly explain how it intends to obtain access to the necessary equipment and facilities.

Criterion 3: Operations and Management Approach Description (30%)

This criterion involves consideration of the following factors:

- The proposed management and operations structure and approach, including the role of the U.S. government in the management of the proposed Institute;
- The identified key management personnel for the proposed Institute;
- Strategy for participation of a wide range of stakeholders in the Institute, in particular, to engage with SMEs.

Full Applications

- The Full Application includes:
 - **Technical Volume:** The key technical submission - info relating to the technical content, project team members, etc.
 - **Statement of Project Objectives (SOPO):** detailed SOPO for the first two budget periods, as well as an outline for subsequent budget periods (SOPO template available on EERE Exchange)
 - **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%
Description of the Technical Approach, Innovation and Impact	35%
Technical Qualifications and Resources	15%
Operations and Management Plan	30%
Institute Workplan	15%

Full Application Eligibility Requirements

- Applicants must submit a Full Application by 1/29/2016 5PM ET
- Full Applications are eligible for review if:
 - The Applicant is an eligible entity per Section III.A of the FOA;
 - The Applicant submitted an eligible Concept Paper;
 - The Cost Share requirement is satisfied Section III.B of FOA;
 - The Full Application is compliant per Section III.C of FOA; and
 - The proposed project is responsive to the FOA Section III.D of FOA
 - The Full Application meets any other eligibility requirements listed in Section III of the FOA.
 - Applicants may only submit one Concept Paper and one Full Application for consideration under this FOA as the Prime Applicant.

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 (35%)

Technical Merit and Innovation

- Quality of the overall approach for the proposed Institute to develop and enable widespread deployment to industry of innovative Smart Manufacturing technologies that meet national needs and the goals and the objectives of the Institute;
- Degree to which the Applicant adequately addressed the Technical Topic Areas identified in Section I.C. of this FOA, and has identified performance and cost targets required for widespread adoption of Smart Manufacturing technologies;
- Extent to which the Applicant demonstrates a strong understanding of the state of the art, and the sufficiency of technical detail in the application to assess whether the proposed technical work is scientifically meritorious and innovative, including relevant data, calculations and discussion of prior work in the literature with analyses that support the feasibility of the proposed work to achieve the goals and objectives of the Institute;
- The level of innovation of the proposed technology developments and the feasibility of the approaches to accomplish performance and cost targets;
- Quality of the technical education and workforce development plan to support technical education and career training, and leverage existing resources.

Technical Merit Review Criteria

Criterion 1: Technical Merit, Innovation, and Impact (35%) - Continued

Impact

- Extent to which the Applicant demonstrates the likelihood of successful technology adoption by industry and the quality of the Market Transformation plan for the initial proposed projects and technical work;
- Extent to which the Applicant demonstrates a high and credible impact of the Institute for aggregate cumulative energy savings (TBTU) and reduction in GHG (tons of CO2 equivalent) over ten years relative to existing available technologies;
- Extent to which the Applicant demonstrates the potential impact of the Institute to support U.S manufacturing competitiveness for energy intensive/dependent industries and clean energy product manufacturing, in particular to increase energy productivity, domestic production capacity, growth of domestic supply chains, 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;
- Degree to which the Institute will leverage and complement existing resources that will result in more impactful outcomes;
- Degree of commitment to support U.S. manufacturing as demonstrated in the U.S. Manufacturing Plan; and
- The adequacy of Institute's strategy to manage export control compliance and meet the goal of strengthening U.S. manufacturing competitiveness while engaging a wide range of stakeholders that may include foreign participants.

Technical Merit Review Criteria - Continued

Criterion 2: Technical Qualifications and Resources (25%)

Institute Team and Participants

- The capability of the Institute Director(s), to lead the organization and the proposed team to address all aspects of the proposed Institute with a strong chance of success;
- Qualifications, relevant expertise, experience of the proposed Institute Director/Executive and key management staff, e.g., Deputy Director(s), Chief Technology Officer, Chief Operating Officer, in successfully managing a national effort to develop and deploy Smart Manufacturing technologies;
- Level of time commitment to Institute management by the proposed Institute Director/Executive (expected full time role) and other key management staff, e.g., Deputy Director(s), Chief Technology Officer (>75% time commitment);
- Quality of the Institute participants, key technical personnel, and their level of technical capabilities and relevance to achieving the goals and objectives of the Institute and the FOA;
- Quality of the Institute participants and their level of commitment to support U.S. manufacturing competitiveness as defined in the U.S. Manufacturing Plan;

Technical Merit Review Criteria - Continued

Criterion 2: Technical Qualifications and Resources (25%) - Continued

Facilities

- The sufficiency of the existing and proposed equipment, facilities and capabilities to support the work;
- Degree to which the Institute will appropriately leverage existing resources and facilities including but not limited to DOE/NNSA FFRDCs, National Institute of Standards and Technology's Manufacturing Extension Partnership (MEP) Centers, National Science Foundation's Advanced Technological Education (ATE) Centers, national laboratories, and other government investments;

Budget and Spend Plan

- Adequacy of budget and spend plan for proposed project to achieve the defined 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 3: Operations and Management (25%)

Management and Governance Approach

- Effectiveness of management approach and governance structure to enable strategic and technical decision-making;
- Degree to which the Institute can operate as an independent, neutral, non-biased coordinating and convening body for a diverse set of stakeholders;
- 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;
- The adequacy and quality of the proposed participation structure (i.e., tiered membership structure, pay-for-use arrangements, etc.) including the benefits and restrictions for each level of participation (such as IP rights) to incentivize broad private sector participation (SMEs, minority-owned businesses, and women-owned businesses);

Technical Merit Review Criteria - Continued

Criterion 3: Operations and Management (25%) - Continued

Operations

- The adequacy and quality of the annual planning process, including the strategic planning and industry roadmap activities, periodic update of the industry roadmap (annual or bi-annual) and incorporation of the industry roadmap to Institute strategic planning;
- Strength of the technical management plan for selecting and prioritizing R&D work, tracking performance and planned periodic (annual) review processes for Institute and project performance;
- Quality of the stakeholder engagement plan and how it demonstrates openness to new participants, in particular with SMEs, minority-owned businesses, and women-owned businesses, and ability to engage stakeholders along the supply chain including end-users;
- 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 strengthening U.S. manufacturing competitiveness;
- 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;
- Extent to which the Applicant demonstrates a strong level of integration across the Institute elements to provide value that is greater than the sum of the individual activities (i.e., how will the shared facilities support the technical education and workforce development plans and project activities);

Technical Merit Review Criteria - Continued

Criterion 3: Operations and Management (25%) - Continued

Intellectual Property Plan

- Adequacy of the IP management plan for supporting the needs of the Institute, its participants, and the broader U.S. manufacturing sector;
- 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 including those outlined in Section VI.B.10 of the FOA;

Transition Plan

- Likelihood that the Institute can achieve financial self-sufficiency from dedicated Federal funding within five years; and
- Reasonableness of the extended profit and loss estimates for an additional three years beyond the award period.

Technical Merit Review Criteria - Continued

Criterion 4: Institute Workplan (15%)

Project Management Plan

- Adequacy, reasonableness, and soundness of the proposed project management plan (coordination of tasks and assignments among team members, schedule, milestones, decision points for assessing the project progress and its potential to be rapidly demonstrated at a convincing scale, appropriate to the TRL level) for accomplishment of the project objectives;

Statement of Project Objectives (SOPO)

- Degree to which the Applicant has identified and clearly described the goals and objectives for the 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;
- Adequacy, appropriateness, and reasonableness of the proposed work and budget distribution among the team members to accomplish the stated objectives;
- Relative to a clearly defined baseline, the strength of the quantifiable metrics, milestones, Go/No-Go decision points, and a mid-point deliverables defined in the application, such that meaningful interim progress will be made; and
- Quality of the SOPO for the first two budget periods (Budget Period 1 and Budget Period 2) that describes the initial startup phase for the Institute and the initial technology development activities, as well as the overall plan for the full 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: 6 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.E. 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 technical merit, the Federal Consensus Board's recommendations, 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;
- The level of industry involvement and demonstrated ability to commercialize energy or related technologies;
- Technical, market, organizational, and environmental risks associated with the project; and
- 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.

Note: Cost sharing above the minimum required will not be considered in the evaluation.

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 sufficient time 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 SmartManufacturing@ee.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: SmartManufacturing@ee.doe.gov