EERE 205: FOA Applicant Webinar Presentation

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Modular Chemical Process Intensification Institute For Clean Energy Manufacturing

ModularChemicalPI@ee.doe.gov

FOA Webinar
DE-FOA-0001578
May 11, 2016

Anticipated Schedule:

FOA Issue Date:	5/05/2016
FOA Informational Webinar:	5/11/2016
Submission Deadline for Concept Papers:	6/15/2016
Submission Deadline for Full Applications:	8/17/2016
Submission Deadline for Replies to Reviewer Comments:	9/15/2016
Expected Date for EERE Selection Notifications:	Fall 2016
Expected Timeframe for Award Negotiations:	120 days

Notice

- All applicants are strongly encouraged to carefully read the Funding Opportunity Announcement DE-FOA-0001578 **("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 ModularChemicalPI@ee.doe.gov.

Agenda

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

FOA Description – Section I.A

- EERE's AMO establishes Manufacturing Innovation Institutes in the National Network for Manufacturing Innovation (NNMI) as shared research, development, and demonstration facilities to overcome cross-cutting challenges related to the manufacturing of clean energy and energy efficiency products, in addition to challenges associated with improving the energy efficiency of the manufacturing sector across the board.
- This FOA supports the establishment of a Manufacturing Innovation Institute on *Modular Chemical Process Intensification for Clean Energy Manufacturing*.
- Modular chemical process intensification represents an emerging opportunity for processing industries in the U.S. manufacturing sector to improve energy efficiency, reduce feedstock waste, and improve productivity by merging and integrating separate unit processes (mixing, reactions, separation) into single modular hardware elements of reduced size, with higher efficiency and providing inherent scalability.

FOA Description – Section I.B

- Section I.B. provides the following Background Information:
  - Overview of the Manufacturing Innovation Institutes
    - Purpose, TRL/MRL focus, etc.
  - Overview of Modular Chemical Process Intensification
    - Description, background, benefits
  - Teaming Partner List
    - How to participate

FOA Description – Section I.B

Definition of Modular Chemical Process Intensification

- Modular chemical process intensification is a set of technologies that bring significant reduction in equipment size, and improvement in energy efficiency, for the manufacturing of products requiring chemical processes.
- At the core of process intensification is the optimization of process performance by focusing on molecular level kinetics, thermodynamics, and heat and mass transfer.
- These improvements translate into reductions in: complexity, equipment requirements, and facility footprint, and thereby, minimize risk and uncertainty of construction and operation in chemical manufacturing facilities, for both existing and new products.

Technical Topic Area and FOA Goals – Section I.C

Introduction

- Three **Application Focus Areas** for Modular Chemical Process Intensification are:
  1) energy intensive industries,
  2) modular and decentralized manufacturing, and
  3) other energy related industries.
- DOE expects a Modular Chemical Process Intensification Institute will have a balanced portfolio of technologies and workforce development, resulting in positive and direct benefit in all three of these impact areas.
- Applicants must address how they will engage with and have impact in all of these areas, as well as any other well justified application areas.

Technical Topic Area and FOA Goals – Section I.C

Application Focus Areas

1. **Energy intensive industries:** Manufacturing accounts for approximately one quarter of total U.S. energy consumption.

- Energy-intensive industry sectors of chemicals, petroleum refining, pulp and paper, and primary metals production, are the largest manufacturing sector energy consumers – each consuming more than 1 quadrillion BTUs (Quad) of energy per year.
- EERE Bandwidth studies show these industries also offer large opportunities for potential energy reductions in the manufacturing sector.
- As a technology which increases chemical reaction efficiency and more closely couples latent heat from reactions to process heating of chemical feedstocks, process intensification has the potential to greatly improve energy efficiency in chemical manufacturing.

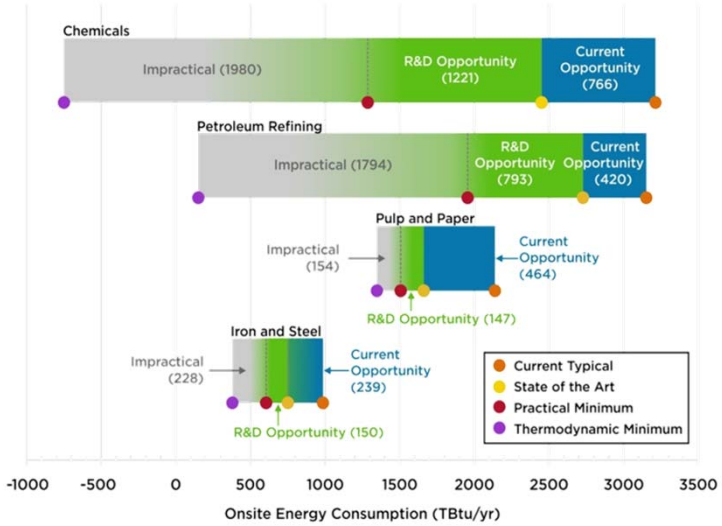

Figure 2. EERE Bandwidth Studies: Energy Savings Potentials for Four Most Energy Intensive Manufacturing Subsectors

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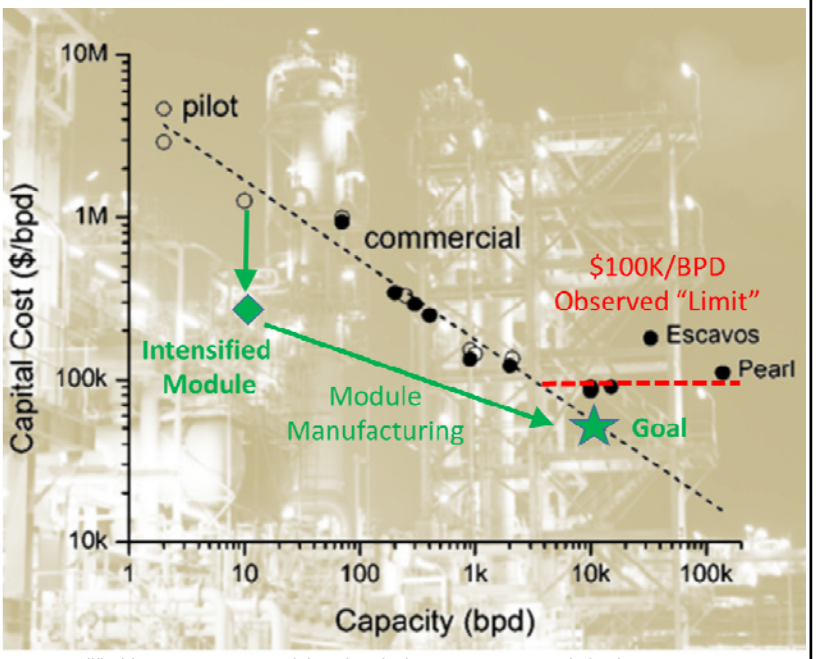
Technical Topic Area and FOA Goals – Section I.C

Application Focus Areas – cont.

2. Modular, decentralized manufacturing:

- The development of modular chemical process intensification approaches will also provide a new basis for scaling of chemical related processes.
- Rather than scaling-up to larger production size for an individual facility (in which economies of scale reduce costs at a cube-square scaling relationship), a modular process can be scaled-out through equipment manufacturing economies of scale and the massive parallelization of identical modules.
- Process intensification provides a new way of achieving cost-reduction, enabled by economies of scale in chemical manufacturing, as the mass-production of the individual modules proceeds down a learning curve.
- Use of multiple modules of lower production capacity to meet production volumes of typical large scale manufacturing will require that the cost of building each successive module decreases as well.



Modified from D.Boysen "Modular Chemical Processes: A Revolution in Process Technology to Capture America's Natural Gas Opportunity" Gas Technology Institute (2015).

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Technical Topic Area and FOA Goals – Section I.C

Application Focus Areas – cont.

3. Other energy-related industries: Process intensification technologies have promising application to many energy-related industries across the DOE portfolio. Process Intensification can be applied in:

- Oil and gas (well-head gas separation, distributed gas-to-liquid conversion, fractional distillation),
- Coal (modular gasification),
- Specialty chemicals (distributed feedstocks),
- Food manufacturing (microwave-enhanced heating and wet-mill separation),
- Biofuels and bio-chemicals (gasification, alcohol separations),
- Tank Waste Processing
- Helium-4 Refining, and
- Others.

To address broad applications an Institute would become a place for innovation in multiple related fields, thereby establishing itself as the globally acknowledged leader in this important emerging technology area.

Technical Topic Area and FOA Goals – Section I.C

Technical Focus Areas:

Applicants are expected to develop their plan of work to address progress they can make on these high-priority technical focus areas

- **Applied research, development and demonstration of methods, tools, technical know-how, and equipment for modular intensified chemical processes with core capabilities to create a sustainable Institute** including, but not limited to:
  - Reaction methods, Separations, Mixing, Heating and Materials
- **Development and test-bed demonstration of intensified integrated process modules**, and the Institute could for example:
  - Share testing facilities and prototype equipment development to demonstrate process intensification processes and equipment at a scale sufficient to demonstrate viability,
  - Develop a representative test bed (including establishing standards for test-bed requirements) or a facility to baseline new processes and equipment,
  - Create a standard modular prototype system where case studies for more specific vertically integrated teams could be executed for more competitively sensitive activities under common parameters to enable proof of concept and de-risk the deployment of such technologies, and
  - Demonstrate complementary information technology related innovations in sensors, controls, and data algorithms (Digital and/or Smart Manufacturing) developed with NNMI Institute partners as scalable and secure cyber-physical systems.

Technical Topic Area and FOA Goals – Section I.C

Technical Focus Areas enabling Modular Chemical Process Intensification – cont.

- **Module manufacturing applied research, development, and demonstration.** The Institute will develop a portfolio of applied RD&D for manufacturing technologies needed to drive down the cost of producing intensified chemical process modules.
- **Applied R&D and knowledge dissemination of cross-cutting process intensification technologies** that include alternative approaches to:
  - Thermal energy input (electro-magnetic technology, direct energy technologies, rotational buoyancy gradient separation, etc.) for process heating and driving forces,
  - Hybrid or multifunctional reactions and separations,
  - Enabling technologies to address fouling and degradation of membranes as well as the regeneration of catalysts,
  - Development of harsh service environment materials for process intensified hardware, and
  - Advanced simulation, processing and data management tools to maximize design and implementation productivity of modular systems.
- **Development of open-architecture, open-standard, and open-source (when possible) software and design tools** for design and application of modular chemical process intensification technologies that are applicable across multiple and diverse industries.

Technical Topic Area and FOA Goals – Section I.C

Technical Focus Areas enabling Modular Chemical Process Intensification – cont.

- Other well justified technical focus areas may be proposed, provided they are relevant to enabling modular chemical process intensification.
- The Institute is expected to establish core technical capabilities, to encourage cross cutting applications, and to address technologies in a precompetitive landscape.
- As technologies mature, the Institute will leverage industry partnerships to demonstrate/de-risk these technologies in specific first-of-kind applications in a realistic manufacturing environment.
- Workforce development and education is a key aspect of manufacturing Institutes. Pilot scale facilities will enable hands-on application, and earlier stage R&D facilities and work will enable students to develop industry-relevant knowledge and experience in creating new processes, designing unit operations, and scaling up technologies.

Technical Topic Area and FOA Goals – Section I.C

FOA Goals

- The NNMI program has defined overall objectives for each Institute:
  - to research, develop and demonstrate high-impact new advanced manufacturing technologies that are adopted into the market at scale for energy efficient manufacturing and clean energy and energy efficient product manufacturing;
  - to be financially self-sustaining after 5 years;
  - to train an advanced manufacturing workforce; and to enrich the innovation ecosystem and strengthen US manufacturing competitiveness; and
  - to establish an industrial consortium as a public-private partnership (including small and medium sized manufacturers).

Technical Topic Area and FOA Goals – Section I.C

FOA Goals – Cont.

Key elements consistent with the design model for all Manufacturing Innovation Institutes:

- **Lead a national effort to research, develop, test, and demonstrate industrially-relevant, high-impact modular chemical process intensification technologies and solutions for energy intensive and clean energy and energy efficient product manufacturing** with an Institute membership that includes initial partners, as well as a structure for new partners that were not part of the Institute application;
- **Establish and support a modular chemical process intensification-related shared RD&D infrastructure** that enables ready and 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;
- **Provide capabilities for and collaboration in open, pre-competitive work among multiple parties** including collaboration around the development of open architecture, open standard, and open source software and design platforms and tools in an Intellectual Property (IP) protected environment, **as well as proprietary activities as appropriate**, to engage stakeholders as relevant to the modular chemical process intensification technology area;

Technical Topic Area and FOA Goals – Section I.C

FOA Goals – Cont.

Key elements –Cont.:

- **Be a financially self-sustaining, world-leading innovation hub that brings together private and public entities** to co-invest in the research, development, commercialization, and deployment of innovative modular chemical process intensification technologies;
- **Establish a technical education and workforce development program** to support technical and career education that will leverage relevant existing resources to develop the modular chemical process intensification workforce needed to research, develop, and commercialize new modular chemical process intensification technologies and solutions and to demonstrate and deploy these solutions widely within U.S. industry; and
- **Define, manage 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

FOA Goals – cont.

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

1. **Demonstrate Energy Efficiency in Process Intensification Technology**: Research, develop and demonstrate intensification in a modular chemical process intensification process at a **20 percent or greater (>20%) improvement in energy efficiency in first-of-kind demonstration in a relevant pilot environment within five years** of Institute operation, supporting a goal of **at least an order of magnitude improvement in energy productivity for at least one representative process within ten years.**
2. **Demonstrate Energy Productivity improvement through Process Intensification Technology through a doubling of energy productivity by a combination of both improvement in capital equipment capacity cost ($/kg per day) and operating cost (due to improved feedstock and fuel efficiencies).**

Technical Topic Area and FOA Goals – Section I.C

3. **Demonstrate Intensification in Individual Chemical Process Modules**: Research, develop and demonstrate **at representative pilot scale with 1,000 hours of operating time,** at least one (or more) modular and intensified process with
   - **10x reduced capacity cost ($/kg per day),**
   - **with improved energy efficiency (kg/kJ), and**
   - **20% lower emissions/environmental waste (kg/kg) relative to commercial state-of-the art at the relevant production rate (kg per day).**
4. **Demonstrate Approaches to Cost-Effective Manufacturing of Process Intensified Modules**: Applied research, development and demonstration of technologies to scale-out manufacturing of intensified process modules, with a modelled cost based on technical advances **that reduce by over 20% the cost/unit of intensified process modules with each doubling in cumulative module manufacturing production.**

Technical Topic Area and FOA Goals – Section I.C

5. **Demonstrate Potential for Cost Effective Deployment of Modular Chemical Process Intensification:** Develop tools and technologies to **reduce the cost of deploying modular chemical process intensification in existing processes by fifty percent (50%) relative to the existing state of the art within five years,** and be **on a pathway** to achieve at least installed and operating **cost parity** for the adoption of modular chemical process intensification technologies at full scale in one or more application areas.
6. **Establish an enabling R&D Portfolio** of enabling technologies for next generation PI processes (materials, catalysts, membranes, sorbents, etc.), with quantitative goals.
7. **Build Industrial Partnership and Eco-System** for significant industry adoption of modular chemical process intensification technology.

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Technical Topic Area and FOA Goals – Section I.C

8. **Build Pathway to Self-Sustainment** with external support that directly replaces the initial Federal funding in the sixth year of operation.
9. **Train the Trainers in Modular Chemical PI with 50+ education/ training professionals trained per year (including energy management practices) by year 3.**
10. **Educate Students in Modular Chemical PI with at least 500+ students trained per year by year 3.**
11. **Establish an Annual Planning Process** that addresses how the best emerging and new ideas and new participants will be included in Institute activities on an ongoing basis, including a plan to ensure there is sufficient funding available to encourage openness and new participants going forward. Plans should also include how the strategic plan will be managed to align with roadmaps and enable partnerships with other Federal government agencies.

Technical Topic Area and FOA Goals – Section I.C

12. **Establish an Industrial Roadmap** for energy intensive/dependent industries and clean energy and energy efficient product manufacturing that is updated on an annual basis with input from stakeholders.
13. **Support an Emerging Supply Chain** by documenting the existence and growth of a domestic PI supply chain, the Institute's capabilities supporting this supply chain, and assessing the health of the domestic supply chain annually.
14. **Support Increased Diversity of Firms and Individuals in the Eco-System** by encouraging participation of e.g. small and medium enterprises, minority-owned businesses, and women-owned businesses in technology development, workforce development, and Institute governance.

The Applicant shall identify clear, quantitative, long-term objectives and milestones that demonstrate annual progress towards these objectives, 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.

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.
  - Institute Management time commitment expectation
  - Institute organizational structure
  - DOE participation in decision making
  - Intellectual Property guidance and work for others or fee for service arrangements
  - Publication of results and data sharing
- See Section I.C. for more information on these best practices.

Non-Responsive Applications

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

1. Applications that fall outside the technical parameters specified in Section I.C of the FOA, including but not limited to modular chemical process intensification technology development and demonstration that is primarily not focused on energy efficient or lifecycle energy manufacturing or is solely focused on technology development with no relevant application to energy intensive or energy related industries or clean energy/energy efficient product manufacturing.
2. Applications that focus primarily on modular chemical process intensification 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.
3. Applications for proposed technologies that are not based on sound scientific principles (e.g., violates the law of thermodynamics).
4. Applications that do not propose the establishment of a pre-competitive public-private consortium with partners from industry (including small and medium-sized firms).

Teaming Partner List

- To facilitate the formation of new project teams for this FOA, a Teaming Partner List is available at https://eere-Exchange.energy.gov under FOA, DE-FOA-0001578.
- Any organization that would like to be included on this list should submit the following information to ModularChemicalPI@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

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Award Information

Total Amount to be Awarded	**$70,000,000***
Average Award Amount	EERE anticipates making awards that range from $35,000,000 to $70,000,000
Types of Funding Agreements	Cooperative Agreements and Work Authorizations
Period of Performance	60 months
Cost Share Requirement	50% of Total Project Costs

*Subject to the availability of appropriated funds

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Statement of Substantial Involvement

EERE has substantial involvement in work performed under Awards made as a result of this FOA. EERE does not limit its involvement to the administrative requirements of the Award. Instead, 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 may redirect or discontinue funding for individual Institute Activities based on the outcome of EERE's evaluation of those activities at the Go/No-Go decision points.
5. EERE participates in major project decision-making processes.
6. 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.
7. 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. 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. (More details in the FOA)
8. 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. (More details in the FOA)

Cost Sharing Requirements

Applicants must contribute a minimum of **50%** of the total project 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
  - Cash can be cash contribution to the Institute
  - Cash can also be project expenses paid by Prime Recipient, Subrecipients, or a Third Party which can include, but are not limited to: personnel costs, indirect costs, facilities and administrative costs, equipment, service, or other resources
  - May be provided by the Prime Recipient, Subrecipients, or a Third Party
- In-Kind Contributions
  - Can include, but are not limited to donated: personnel time volunteered, indirect costs not incurred, 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

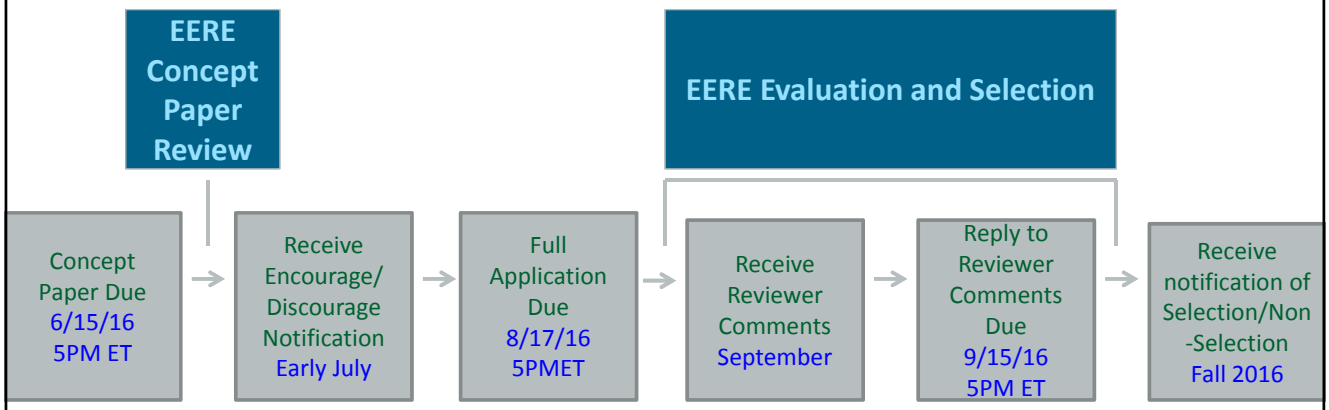
Cost Share Payment

- 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.vi of the FOA.

Program Income

- Further, Applicants are encouraged to review the regulations regarding Program Income and be aware of the ways in which Program Income can be treated during the award. For awards made under this FOA, the default use of program income is Addition (see 2 CFR 200.307(e)(2)).
- Any other treatment of Program Income must be negotiated and approved by the Contracting Officer. Program Income should not be included as cost share in the Applicant's budget.

FOA Timeline



EERE anticipates making awards by Early 2017

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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 qualifications and resources description is limited to 2 pages
  - The operations and management approach description is limited to 2 pages
  - The Concept Paper can also include graphs, charts, or other data (limited to 4 pages)
- Concept Papers must be submitted by June 15, 2016, 5PM ET, through EERE Exchange, and must comply with the content and form requirements in 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: Technical Description, Innovation and Impact (40%)**

  This criterion involves consideration of the following factors:

  - Quality of the proposed integrated modular chemical process intensification technical approach;
  - The proposed technical focus areas are well-defined and have well-defined, aggressive quantitative technical objectives;
  - The Applicant's understanding of the current state-of-the-art in the field of modular chemical process intensification, including key opportunities and challenges;
  - Extent to which the Applicant has described how the proposed technical work will overcome the challenges identified;
  - The estimated energy and competitiveness impact that the proposed Institute would have on clean energy and energy efficient manufacturing;
  - Quality of the approach presented in the technical education and workforce development plan summary;
  - Quality of the approach to strengthen U.S. manufacturing competitiveness while engaging a broad range of stakeholders with both horizontal and vertical reach across and within supply chains.

Concept Paper Review

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

- **Criterion 2: Team and Resources (30%)**

  This criterion involves consideration of the following factors:

  - Extent to which the roles and responsibilities of the leadership team are well-defined;
  - Whether the Principal Investigator (Institute Director/Executive) and Project Team have the skill, expertise and prior experience needed to successfully execute the Institute;
  - Whether the Applicant has adequate access to equipment and facilities necessary to accomplish the effort and/or clearly explains how the proposed Institute 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.

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, 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	2 pages
Technical Description, Innovation and Impact	50 %
Qualifications and Resources	20%
Operations and Management Plan	30%

Full Application Eligibility Requirements

- Applicants must submit a Full Application by August 17, 2016
- 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
  - The Applicant submitted only one Full Application for consideration
  - 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

Nonprofit organizations described in Section 501(c)(4) of the Internal Revenue Code of 1986 that engaged in lobbying activities after December 31, 1995, are not eligible to apply for funding.

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Limitation on Number of Concept Papers and Full Applications Eligible for Review

An entity may only submit one Concept Paper and one Full Application for consideration under this FOA. For example, EERE will only consider one Concept Paper and one Full Application per university for this FOA (not one submission per each college or school under the university). 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 (40%)

Technical Merit and Innovation

- Quality of the integrated technical approach, including core competencies identified for the proposed Institute to research, develop and demonstrate innovative modular chemical process intensification technologies that meet the goals and the objectives of the Institute in Section I.C. and those proposed by the Applicant;
- Degree to which the Applicant has defined and justified the proposed Technical Focus Areas building upon those identified in Section I.C. of this FOA, and has clearly defined Institute objectives, goals, performance metrics including aggressive technical targets to achieve the goals of the FOA;
- 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 as described in the Technical Volume and the SOPO is scientifically meritorious, feasible and innovative, to achieve the technical targets, goals and objectives of the Institute;
- Quality of the technical education and workforce development plan to integrate and support technical education and career training into the Institute ecosystem, and leverage existing resources;

Technical Merit Review Criteria - Continued

Criterion 1: Technical Merit, Innovation, and Impact (40%) - Continued

Statement of Project Objectives

- Adequacy, appropriateness, and reasonableness of the proposed work and schedule overall and allocation 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;
- 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;

Impact

- The quality of the Market Transformation plan for the initial proposed projects and technical work and the extent to which the Applicant demonstrates the likelihood of successful technology adoption by industry and supports precompetitive technology development;

Technical Merit Review Criteria - Continued

Criterion 1: Technical Merit, Innovation, and Impact (40%) - Continued

Impact - Continued

- 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 clean energy and energy efficient manufacturing and supply chains, such as increased domestic production capacity, growth of domestic supply chains, impact on domestic job creation, as well as regional economic development, etc. as a result of successful technology deployment and commercialization from Institute related activities over ten years;
- Degree of commitment to support U.S. manufacturing as demonstrated in the U.S. Manufacturing Plan; and
- Degree to which the Applicant illustrates how DOE funding will enable acceleration of RD&D, and how the Institute will appropriately leverage existing resources and that will result in more impactful outcomes 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.

Technical Merit Review Criteria - Continued

Criterion 2: Qualifications and Resources (30%)

- Quality of the Institute key technical personnel and their level of technical capabilities and relevance to achieving the goals and objectives of the Institute and the FOA;
- Qualifications, relevant expertise, experience and time commitment 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 modular chemical process intensification technologies;
- The sufficiency of the existing and proposed equipment, facilities and capabilities to support the work and horizontal and vertical supply chain activities;
- Adequacy of budget and spend plan for the proposed project to achieve the defined objectives;
- Quality and clarity of the cost share contributions (cash, in-kind) including the source of cost share, as well as how Program Income, if applicable, is expected to be generated and utilized; 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 (30%)

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 (e.g., 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);

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;

Technical Merit Review Criteria - Continued

Criterion 3: Operations and Management (30%) - Continued

Operations - Continued

- Strength of the technical management plan for selecting and prioritizing RD&D work, tracking performance, and planned periodic (annual) review of 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;
- 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;
- Adequacy of how metrics will be tracked to gauge success of the Institute and impact in the technology area;

Technical Merit Review Criteria - Continued

Criterion 3: Operations and Management (30%) - Continued

Project Management

- Adequacy, reasonableness, and soundness of the proposed project management plan for accomplishment of the Institute objectives;
- 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);

Intellectual Property Management Plan

- Adequacy of the IP management plan for supporting the needs of the Institute and its participants, which addresses the precompetitive landscape and the broader U.S. manufacturing sector;
- Quality of the IP Management plan and any other IP agreements (attached as an Appendix to the Narrative) demonstrating that the IP issues inherent with collaborations and/or multi-user facilities are addressed, including those outlined in Section VI.B.x of the FOA;

Technical Merit Review Criteria - Continued

Criterion 3: Operations and Management (30%) - Continued

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.

Replies to Reviewer Comments

- EERE provides applicants with reviewer comments
- Applicants are not required to submit a Reply - it is optional
- To be considered by EERE, a Reply must be submitted by September 15, 2016 at 5:00PM ET and submitted through EERE Exchange
- Content and form requirements:

Section	Page Limit	Description
Text	5 pages max	Applicants may respond to one or more reviewer comments or supplement their Full Application.
Optional	1 page max	Applicants may use this page however they wish; text, graphs, charts, or other data to respond to reviewer comments or supplement their Full Application are acceptable.

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 determining which Full Applications to select for award negotiations:

- The degree to which the proposed project optimizes the use of available EERE funding to achieve programmatic objectives;
- The level of industry involvement and demonstrated ability to accelerate commercialization and overcome key market barriers; and
- The degree to which 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 eere-Exchange.energy.gov 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 application documents and to avoid any potential technical glitches with EERE Exchange
- 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 ModularChemicalPI@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