

HPC4EnergyInnovation Program: Collaborations for U.S. Manufacturers

The High Performance Computing for Energy Innovation (HPC4EI) Program seeks qualified industry partners to participate in short-term, collaborative projects with the Department of Energy's (DOE's) national laboratories. Through support from the Office of Energy Efficiency and Renewable Energy's Advanced Manufacturing Office (AMO), Fuel Cell Technologies (FCTO), and Vehicle Technologies Offices (VTO) and the Office of Fossil Energy (FE), the selected industry partners will be granted access to high performance computing (HPC) facilities and world-class scientists at DOE's national laboratories. HPC4EI is the umbrella program for the HPC4Manufacturing (HPC4Mfg) and HPC4Materials (HPC4Mtls) Programs. The HPC4Mfg Program is interested in establishing collaborations that address key manufacturing challenges by applying modeling, simulation, and data analysis. The program aims to improve energy efficiency, increase productivity, reduce cycle time, enable next-generation technologies, test control system algorithms, investigate intensified processes, lower energy cost, and accelerate innovation. The HPC4Mtls Program is interested in collaborations that address key challenges in developing, modifying, and/or qualifying new or modified materials that perform well in severe or complex environments through the application of HPC, modeling, simulation, and data analysis.

Outlined below in the Background Section are topics of interest specific to the offices supporting this solicitation.

Eligibility for this program is limited to entities that manufacture or develop products in the United States for commercial applications and the organizations that support them. Selected demonstration projects will be awarded up to \$300,000 to support compute cycles and work performed by the national lab partners. The industry partner must provide a participant contribution of at least 20% of the DOE funding for the project.

In addition, we will consider follow-on projects to previously awarded, successful demonstration projects in these areas. These projects should focus on the further implementation of the demonstrated HPC application in the industrial setting—taking it closer to operational use and broad national impact. Selected follow-on projects will be awarded up to \$300,000 to support computing cycles and work performed by the national lab partners. The industry partner must provide a participant contribution of at least 50% of the DOE funding for the project; of this, at least half should be in cash to support the national laboratory work.

Background

DOE maintains world-class HPC expertise and facilities, currently hosting 5 of the top 12 most powerful computers in the world. From detailed atomic-level simulations to massive cosmological studies, researchers use HPC to probe science and technology questions inaccessible by other experimental methods. Scientific insights gained from these computational studies have drastically impacted research and technology across industrial sectors and scientific fields. Examples include additive manufacturing, oil recovery, drug development, climate science, genomics, and exploration of fundamental particles that make up our universe. From industry to academia, the scientific need for advanced computing continues to drive innovation and development for future high performance computers and their capabilities.

There is high potential for U.S. industry to utilize the power of HPC. The HPC4EI Program is

intended to provide HPC expertise and resources to industry to lower the risk of HPC adoption and broaden its use to support transformational and early-stage technology development. The HPC4EI Program hopes to provide this HPC expertise and resources by supporting targeted collaborations between industry and DOE's national laboratories.

Successful applicants will work collaboratively with staff from one or more of the DOE laboratories to conduct project activities across the various HPC areas of expertise, including development and optimization of modeling and simulation codes, porting and scaling of applications, application of data analytics, as well as applied research and development of tools or methods.

To make the broadest impact across the industry, the project teams are expected to present their results at workshops associated with the program and at regional and national conferences. Publications in appropriate trade journals are also encouraged.

Area 1: HPC4Mfg

DOE's [AMO](#) within [EERE](#) is the primary sponsor of the HPC4Mfg Program. FE and EERE's VTO and Building Technologies Office (BTO) also sponsor select projects in this portfolio. AMO partners with private and public stakeholders to support the research, development, and deployment of innovative technologies that can improve U.S. competitiveness, save energy, and ensure global leadership in advanced manufacturing. AMO supports cost-shared research, development, and demonstration activities in support of crosscutting next-generation technologies and processes that hold high potential to significantly improve energy efficiency and reduce energy-related emissions, industrial waste, and the life-cycle energy consumption of manufactured products.

Improved energy efficiency across the manufacturing industry is one of the primary goals of the HPC4Mfg Program. We solicit proposals that require HPC modeling and simulation to overcome impactful manufacturing process challenges resulting in reduced energy consumption and/or increased productivity. Proposals should provide a realistic assessment of the energy impact, the improvement in U.S. manufacturing competitiveness, and the increase in U.S. manufacturing jobs that a successful outcome of the project could have across the industrial sector.

Of particular interest to AMO are:

1. Proposals that require HPC modeling and simulation to overcome impactful manufacturing process challenges resulting in reduced energy consumption and/or increased productivity
2. Proposals that uniquely exploit HPC modeling and simulation to significantly reduce national energy consumption through improved product design.

Area 2: HPC4Mtls

The HPC4Mtls Program is sponsored by FE and EERE's FCTO and VTO to enhance the U.S. materials-development, fabrication, and manufacturing industry to investigate, improve, and scale methods that will accelerate the development and deployment of materials that perform well in severe and complex energy application environments. This solicitation is aimed at demonstrating the benefit of HPC toward these goals within one year.

We seek proposals that will address key challenges in developing, modifying, and/or qualifying new or modified materials that perform well in severe and complex energy application environments through the use of HPC modeling, simulation, and data analysis. For each of the program offices supporting this solicitation, we provide a brief description of their mission and the topics of interest to them.

The Office of Fossil Energy

[FE](#) is the primary sponsor for this HPC4Mtls Program. FE plays a key role in helping the United States meet its continually growing need for secure, reasonably priced, and environmentally sound energy from our abundant fossil energy resources. The Office of Fossil Energy Research and Development (FER&D) Program advances transformative science and innovative technologies that enable the reliable, efficient, affordable, and environmentally sound use of fossil fuels. Fossil energy sources constitute over 80% of the country's total energy use and are critical to the nation's security, economic prosperity, and growth. It partners with industry, academia, and research facilities in transformative science and innovative technologies that enable the reliable, efficient, affordable, and environmentally sound use of fossil fuels. FE supports cost-shared research, development, and demonstration activities in support of early-stage crosscutting next-generation technologies and processes that further the development of advanced fossil technologies.

Of particular interest to FE in this solicitation are:

- Predicting material behavior in specific severe environments, such as high-temperature or corrosive environments, found in fossil fuel power plants
- Exploring the kinetics of materials behavioral degradation
- Improved performance of alloys (e.g., ferritic alloys by 50 °C)
- Obtaining improved high-temperature mechanical performance for lower-cost alloys as compared with more costly, high nickel/cobalt alloys
- Overcoming barriers to scale up new material production from grams to kilograms, and from kilograms to tonnes
- Improving the understanding of detailed processes in critical focus areas such as oxidation, corrosion, and electrochemical interactions
- Overcoming barriers to the manufacture of components with High Entropy Alloys (HEA)
- Developing modeling and simulation tools that will reduce the time to qualification and certification of materials (e.g., American Society of Mechanical Engineers code materials)
- Developing modeling and simulation tools that will reduce the time to qualify and certify novel manufacturing processes such as chemical etching, diffusion bonding, and additive manufacturing, for high nickel alloys
- Overcoming barriers to the manufacture of components for fuel cells
- Developing machine learning capabilities to predict new materials for energy storage
- Developing the capability to predict the mechanical behavior and properties of additively manufactured components for use in advanced power cycles such as supercritical carbon dioxide cycles.

The Fuel Cell Technologies Office

[FCTO](#) focuses on early-stage research and development (R&D) to advance hydrogen and fuel cells for transportation and diverse applications that contribute to U.S. energy independence, security, and resiliency and that add to a strong domestic economy. FCTO addresses challenges facing the development of hydrogen and fuel cell technologies by integrating basic and applied research and technology-development activities. These include cost-shared R&D efforts to address key technological barriers in the areas of fuel cell cost and durability, hydrogen production cost, and hydrogen storage capacity. Three FCTO-supported consortia within the [Energy Materials Network](#), ElectroCat, HydroGEN and HyMARC, directly address these R&D areas.

Specific topics of interest to FCTO in this solicitation include:

- Improving performance and durability of electrocatalysts, such as Platinum Group Metals (PGM) free catalysts in fuel cells and electrolyzers
- Improving materials and interfaces for advanced water-splitting technologies, including electrochemical, thermochemical, and photoelectrochemical approaches
- Developing machine learning capabilities to predict new materials, such as for hydrogen storage, PGM-free electrocatalysts, membrane separators, and energy converters (e.g., semiconductors for photoelectrochemical hydrogen and redox materials for thermochemical hydrogen)
- Improving understanding and modeling of interactions in complex systems (e.g., coupling of changes in material properties, mass transport, and thermal management during hydrogen-release reactions in materials-based hydrogen storage systems and in materials-based water-splitting systems with additional requirements on modeling the oxygen release reactions).

The Vehicle Technologies Office

[VTO](#) funds early-stage, high-risk research on innovative vehicle and transportation technologies to strengthen national security, enable future economic growth, and increase transportation energy efficiency. VTO leverages the unique capabilities and world-class expertise of the national laboratory system to develop innovations in electrification, advanced combustion engines and fuels, advanced materials, and energy-efficient mobility systems. As part of VTO, the Materials Technology Program supports vehicle [lightweighting](#) and improved propulsion (powertrain) efficiency focused on the following cost and [performance targets](#):

- Enable a 25% weight reduction for light-duty vehicles including body, chassis, and interior as compared to a 2012 baseline at no more than a \$5/lb.-saved increase in cost by 2030
- Validate a 25% improvement in high-temperature (300° C) component strength relative to components made with 2010 baseline cast aluminum alloys (A319 or A356) for improved efficiency light-duty engines by 2025.

Specific topics of interest to VTO include the following areas:

- Predicting microstructure of cast materials based on composition, cooling rates, and heat treatment
- Improving mechanical performance of alloys at elevated temperatures (between 330°C and 1100°C)

- Using machine learning and data analytics to identify promising new material compositions (e.g., for high-temperature and for lightweight structural materials relevant to automotive use and cost constraints)
- Developing process structure models for dissimilar material joints (e.g., between advanced high-strength steels, aluminum, magnesium, and carbon fiber composite combinations relevant to high-volume automotive assembly)
- Modeling the aging of adhesives that bond the above four materials, and resultant properties over the life span of an automotive vehicle (how bonds evolve).

Eligibility

Eligibility is limited to U.S. manufacturers, defined as entities that are incorporated (or otherwise formed) under the laws of a particular state or territory of the United States, and that manufacture products in the United States (HPC4Mfg) or that develop and/or manufacture new or modified materials in the United States (HPC4Mtls). U.S. universities, institutes, and other non-profit organizations are also eligible to participate as collaborators. Funding for university participants must be provided by the industrial partner and can be considered a component of the industrial partner's in-kind funding contribution.

Funding Requirements

The DOE monetary contribution for each project will not exceed \$300,000. An industry partner must provide a participant contribution of at least 20% of the DOE funding for the project to support industry expertise to the project. The participant contribution can take the form of monetary funds-in or "in-kind" contributions and must come from non-federal sources unless otherwise allowed by law. Total project size cannot exceed \$500,000. The DOE funding will be provided to the national laboratory (or laboratories) in support of their work under the HPC4EI Program.

Note: THIS IS NOT A PROCUREMENT REQUEST.

Solicitation Process and Timeline

This solicitation comprises a two-stage process consisting of the submission and evaluation of a two-page concept paper submitted by the industrial principal investigator (PI). These will be evaluated by a technical review committee on the technical challenge to overcome; how this advances the state of the art for the industrial sector; how HPC can uniquely contribute to the solution of the technical challenge; and the impact that a successful project can have. To the extent known, the technical plan should be articulated, as well. The program recognizes that those industrial PIs who have not yet identified a national laboratory partner to work with will not necessarily have a complete picture of the technical solution techniques that are possible.

Successful concept papers will be paired with a national laboratory partner for the development of the full proposal. Full proposals will be reviewed by a technical committee against the criteria given below. The portfolio of proposals recommended by the committee will be submitted to DOE senior managers for final selection, subject to the availability of funding. All DOE funding decisions shall be final. Upon approval from DOE, the HPC4Mfg/HPC4Mtls Program Director will issue a response to each applicant and successful applicants will begin a cooperative research and development agreement (CRADA). Once both parties approve the CRADA, the projects can

begin execution. Failure to engage promptly in CRADA negotiations can result in rejection of the project. The portfolio of projects will be posted on the program websites: www.hpc4energyinnovation.org; www.hpc4mfg.org; and www.hpc4mtls.org. The HPC4EI Program reserves the right to select all, a portion, or none of the submissions.

Note that if a concept paper or full proposal is technically strong, but is not selected for funding, the program management team may share them with other DOE program offices for consideration for possible funding through those offices.

Timeline

Event	Date (2018-2019)
Call for Proposal	November 14, 2018
Concept paper due	December 18, 2018
Request for full proposal	Early February 2019
Full proposal due	Mid March
Finalists notified	Mid May
Expected project start	July

Concept Paper Guidelines

Interested parties will submit a concept paper describing the project objectives by the due date provided below. The concept paper will be evaluated against the documented criteria. Successful concept papers will be invited to submit a full proposal.

The concept paper template can be downloaded from the website and should be used to prepare your submission. The concept paper should not exceed two (2) single-spaced pages using 12-point font (Times New Roman preferred), formatted in a PDF file, and it **must include** the following components under the corresponding headings below. A concept paper that does not meet the guidelines may be rejected. A concept paper template is provided.

- **Title Page: (not included in page limit)** *Include the project title; company name, description, and U.S. manufacturing location(s); and company PI(s)'s contact information. Include the DOE office and topic area listed above that your concept paper best fits, and the national lab PI contact information, if known. Acknowledge the required 20% cost-share and that the use of the DOE Model Short Form CRADA is acceptable. Indicate the business sector, process category, and discipline needed (lists provided).*
- **Abstract: (150 words or less):** *Provide a **non-proprietary, publishable** summary of the problem being addressed, why the problem is important to the energy future of the United States, a plan to address the problem, and the impact the solution will have.*
- **Background:** *Explain the technical challenge to be addressed; the state of the art in this area and how this work advances the state of the art; how solving this problem will meet the goals of the HPC4EI Program as defined by the list of topics of interest; the relevant expertise of the industry partners; what national laboratory expertise is needed; and why national laboratory HPC resources are required and how they will be used.*
- **Project Plan and Objectives:** *Describe the technical scope of work to be performed and how*

this project fits into an overall solution strategy for the challenges being addressed. Describe how the results of the project will be validated, including availability of data. If possible, identify specific simulation codes to be used in this effort.

- **Impact:** *Estimate how this specific HPC effort will result in national-scale, long-term energy savings across the industry; the performance improvements that are expected over existing technologies; and the ability of industry to accelerate the adoption of energy-efficient technologies. Describe how this specific HPC work contributes to a transformational change in the energy sector and enduring economic impact. Describe the alternative actions if this effort is not funded including reliance on experimental technologies or other courses of action. Include metrics for energy improvements, performance increases, cost savings, and/or time reductions.*

For follow-on projects, the concept paper should not exceed three (3) single-spaced pages using 12-point font (Times New Roman preferred), should be in PDF file format, and should include all of the components described above. In addition, the following component is required:

- **Results from the prior funded project (one page maximum with figures):** *Review the results and knowledge gained from the Demonstration project. Explain how these results will be used to address the objectives of this proposal. If you believe that the current proposal is distinctly different from the previous project and should not be considered as a follow-on project, please articulate the differences.*

Completed concept papers, derived from the provided template, must be submitted in PDF file format by email to hpc4ei-submissions@llnl.gov by 11:59 p.m. PDT on December 18, 2018. The subject line should include: HPC4EI Concept Submission. Receipt of concept papers will be confirmed within one week of submission. Concept papers will be evaluated against the criteria listed in the Evaluation Criteria Section on Page 10.

Full Proposal Guidelines

Successful concept paper submissions will be notified and paired with a PI from one or a combination of the following laboratories:

- Argonne National Laboratory
- Los Alamos National Laboratory
- Lawrence Berkeley National Laboratory
- Lawrence Livermore National Laboratory
- National Energy Technology Laboratory
- National Renewable Energy Laboratory
- Oak Ridge National Laboratory
- Pacific Northwest National Laboratory
- Sandia National Laboratory
- Other participating laboratories.

Partners will then collaborate on the development of a full proposal. Full proposals will be evaluated against the criteria described in the Evaluation Criteria Section on Page 10.

The full proposal template can be downloaded from the website and should be used to prepare your submission. Proposals should not exceed six (6) single-spaced pages using 12-point font

(Times New Roman preferred), formatted in a PDF file, and they **must include** the following components under the corresponding headings below. Proposals that do not meet the guidelines may be rejected.

- **Title Page: (not included in page limit)** *Include the project title; company name, description, and U.S. manufacturing location(s); and company PI(s)'s contact information. Include the DOE office and topic area listed above that your concept paper best fits and the national laboratory PI's contact information. Acknowledge the need to provide 20% cost-share and the agreement to enter into the DOE Model Short Form CRADA.*
- **Abstract: (150 words or less):** *Provide a **non-proprietary, publishable** summary of the problem being addressed, why the problem is important to the energy future of the United States, a plan to address the problem, and the impact of the solution. If selected for the HPC4EI Program, this abstract will appear on award announcements sent to the press.*
- **Background:** *Describe the technical challenge to be addressed; the state of the art in this area and how this work advances the state of the art; how solving this problem will meet the goals of the HPC4EI Program as defined by the list of topics of interest; the relevant expertise of the industry partners; what national laboratory expertise is needed; and why national laboratory HPC resources are required and how they will be used. Indicate if 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.*
- **Project Plan and Objectives:** *Describe the technical scope of work to be performed and how this scope will fit into the broader solution for the challenges being addressed, including, for example, relevant experimental work. Outline a set of tasks to be performed and state what work industry partners will perform and what work laboratory partners will perform. Describe how the results of the project will be validated, including availability of data. If possible, identify simulation codes to be used in this effort and any modifications to the software that are needed to solve the proposed problem.*
- **Tasks, Milestones, Deliverables, and Schedules:** *Include goals, timelines, and due dates throughout the life of the project. Not every milestone needs to have a deliverable. Include deliverables from all partners, not just the national lab partner(s). Indicate responsible party(ies) for each deliverable. Include deliverables from one partner to another, as well as those to the DOE program sponsors.*
- **Validation and Verification Plan:** *Summarize how the model will be validated and the simulations verified. Include information about the data that will be used for verification, its nature and source.*
- **Impact:** *Estimate how this specific HPC effort will result in national-scale, long-term energy savings across the industry; the performance improvements that are expected over existing technologies; and the ability of industry to accelerate the adoption of energy-efficient technologies. Explain how this specific HPC work contributes to a transformational change in the energy sector and enduring economic impact. Describe the alternative actions if this effort is not funded including reliance on experimental technologies or other courses of action. Include metrics for energy improvements, performance increases, cost savings, and/or time*

reductions.

- **Implementation and Adoption:** *Describe how this work will be incorporated into company and industry-wide operations. Describe the follow-on activities to extend this effort to solve the broader problem being addressed. If a new or modified technology is developed, can the team provide a preliminary techno-economic analysis by the close of the project?*
- **Appendix A: Project Summary of Tasks and Schedule (not included in page count):** *Provide a summary of the tasks and subtasks in a table format that includes the milestones, deliverables, and schedule. Include a schedule summary in Gantt chart format.*
- **Appendix B: Project Budget (not included in page count)** *Summarize project costs including amount and source of participant contribution in the table provided. Indicate in-kind and/or cash contribution for industry funding. Include an explanation of how this funding will make a large difference relative to existing funding from other sources, including the private sector and why the government should fund this work.*
- **Appendix C: Computational Resources (not included in page count):** *Describe the computational approach, the performance of the codes, and the resources requested (platform and number of core hours).*
- **Appendix D: Pictures for Publication (not included in page count):** *Include one or two **non-proprietary** pictures/images with a short caption that can be used in a press release and posted on the website should this project be funded.*
- **Appendix E: Discussion of How This Work Benefits the Laboratory (not included in page count):** *Briefly discuss new or enhanced capabilities that will be gained by the partner laboratory. Or, explain how this will help to maintain existing laboratory capabilities.*
- **Appendix F: (not included in page limit):** *Include one paragraph **non-proprietary** biography for both the industrial PI and partnering laboratory PI. These may be posted on the website should this project be funded.*
- **Appendix G: Resumes (not included in page limit):** *Include resumes of participants.*

Follow-on project proposals should not exceed eight (8) single-spaced pages using 12-point font (Times New Roman preferred), should be in PDF file format, and should include all the components described above. In addition, the following component is required:

- **Results from the prior funded project (two pages maximum with figures):** *Review the results and knowledge gained from the Demonstration project. Explain how these results will be used to address the objectives of this proposal. If you believe that the current proposal is distinctly different from the previous project and should not be considered as a follow-on project, please articulate the differences.*

Completed proposals, derived from the provided template, must be submitted in PDF file format by email to hpc4ei-submissions@llnl.gov by 11:59 p.m. PDT on the deadline indicated on the submission website. This date will be approximately five weeks after the

concept paper notifications have been issued. The subject line should include: HPC4EI Proposal Submission. Receipt of proposals will be confirmed within one week of submission.

Evaluation Process and Criteria

Both concept papers and full proposals will be evaluated by a Technical Merit Review Committee consisting of experts in the application of HPC modeling, simulation, and data analysis from each of the principal DOE national laboratories, and members of the DOE program offices with knowledge of the U.S. industry. Subject Matter Experts will be consulted to verify claims, including the description of current state of the art and estimate of project impact (e.g., cost and energy savings).

Concept papers will be evaluated primarily on the technical challenge and potential impact of using HPC to solve the industrial challenge. Concept papers should articulate, to the extent possible, the technical plan for performing the work. The committee recognizes that those industrial PIs who have not yet identified a national laboratory partner to work with may not have a complete picture of the technical solution techniques that are possible.

Full proposals will be evaluated against all of the criteria listed below. Because the industrial partner will have been assigned a laboratory partner to work with to develop the full proposal, the technical plan and feasibility will be expected to be well articulated. In addition, strong evidence of communication and planned collaborations between the national lab and industrial participants is expected in the full proposals.

Evaluation Criteria

- **Advances the State of the Art in the Industrial Sector:**
(HPC4Mfg) Does the proposed work take the industrial sector to a new level; provide a wholly new capability; or make an existing, energy-intensive technology obsolete in the manufacturing sector?
(HPC4Mtls) Does the proposed work take materials performance and behavior to a new level in a specific energy application environment; scale up the production of a new or modified material; provide a wholly new capability; or dramatically decrease the time required to certify or qualify a new or modified material?
- **Technical Feasibility:** Does the proposal have a clearly stated technical approach; a description of the software to be used, including any needed modifications; clear roles and responsibilities for the participants (both the industrial partner and national laboratory); realistic time frames for each technical step; and, if necessary, validation data available to the team?
- **Relevance to HPC:** Does the proposed work fully utilize the unique expertise and capabilities at the DOE national laboratories to solve a problem that could not be solved in any other way? Does it demonstrate the ability to use large fractions of the machine to solve a truly large-scale problem and provide clear estimates of the compute cycles necessary for the work to be performed?
- **Impact, Including Life-Cycle Energy Impact:**
(HPC4Mfg) Does the proposal provide clear, evidence-based energy savings that will have *broad (national-scale) industrial impact* through development and/or improvement of energy-efficient manufacturing technologies, as well as an impact on employment and manufacturing in the United States? Does the proposal have a clearly stated plan for broad deployment of project artifacts or knowledge gained?
(HPC4Mtls) Does the proposal provide clear, evidence-based improved materials performance, energy savings, or reduced time to market that will *have broad (national-scale) industrial*

impact, as well as an impact on employment in the United States? Does the proposal have a clearly stated plan for broad deployment of project artifacts or knowledge gained?

- **Project Management and Team:** Does the proposal match team expertise to the problem to be solved; have modeling expertise on both the national laboratory and industry sides, and process experts for the model validation if necessary? Does the proposal clearly state roles and responsibilities for the participants and provide evidence of a strong collaboration between the industrial and national partners through joint milestones and deliverables?

Point of Contact

During the period of the call for proposals, all questions relating to this announcement should be directed to the HPC4Mfg/HPC4Mtls Program Director at hpc4ei-submissions@llnl.gov. Industrial partners that are interested in submitting applications should refrain from contacting national laboratory proposal partners during the call for proposals.

Intellectual Property and Proprietary Data

The HPC4EI Program respects the importance of industry's intellectual property and data security.

Awardees are expected to enter into a DOE Model Short Form CRADA with the national laboratory or laboratories that will be performing the work. This CRADA contains provisions relating to proprietary information and intellectual property. Because of the need for accelerated placement and execution of the projects, terms of the CRADA will not be subject to negotiation. To review the proposed terms that make up the DOE Model Short Form CRADA, please see the example posted on the HPC4Mfg and HPC4Mtls solicitation websites.

A Non-Disclosure Agreement can be put into place during development and submission of the proposal to facilitate discussions while protecting the partner's proprietary information.

To the extent possible, it is preferred that proprietary information NOT be included in the submitted proposal. If company proprietary information is included in the proposal, the specific information should be marked as such. The HPC4EI Program officials will utilize reasonable efforts to treat the information as business sensitive.

Significant delays by the industry partner to finalize the CRADA could result in rejection of the proposal.