RESEARCH CALL TO DOE/FEDERAL LABORATORIES

U. S. Department of Energy
National Energy Technology Laboratory

"Cybersecurity for Energy Delivery Systems (CEDS) 2019 Research Call"

Announcement Type: New

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Issue Date:	**April 16, 2019**
Revision Date	**June 5, 2019**
Concept Paper Due Date:	**May 6, 2019 at 3:00:00 PM Eastern Time**
Notice to Proceed Date:	**No Later Than May 24, 2019**
Full Proposal Due Date:	**June 14, 2019 at 3:00:00 PM Eastern Time**

Only Federally Funded Research and Development Centers (FFRDCs), such as National Laboratories, are eligible to apply for funding as a prime awardee under this Research Call.

This Research Call (RC) will remain open until the Proposal Due Date indicated on the cover page. However, proposals may be submitted any time before this date.

It is strongly recommended that proposal submissions begin well in advance (at least 48 hours) of the Proposal Due Date. ALL proposals in response to this RC must be submitted to

CEDSLabCall@netl.doe.gov.

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SECTION I – OVERVIEW AND PURPOSE

A. SUMMARY

The Department of Energy's (DOE's) National Energy Technology Laboratory (NETL) on behalf of the Office of Cybersecurity, Energy Security, and Emergency Response (CESER) is seeking proposals under this Research Call (RC) to conduct research, development, integration and demonstrations (RDI&D). This RDI&D will lead to (1) next generation tools and technologies, (2) techniques to implement cybersecurity framework and (3) integration of tools and technologies to help provide greater situational awareness, that are not available today and will become widely adopted throughout the energy sector to reduce the risk that a cyber incident could disrupt energy delivery.

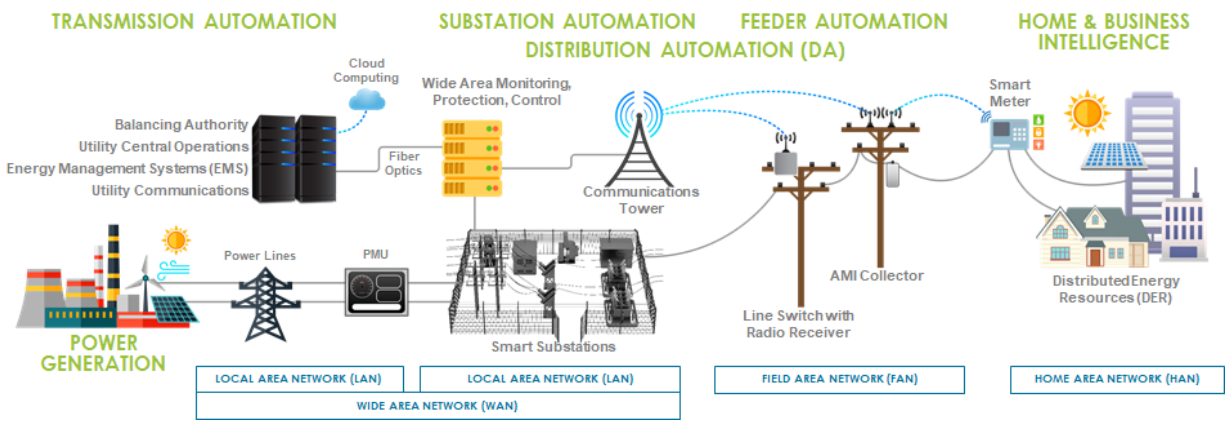
Only Federally Funded Research and Development Centers (FFRDCs), such as National Laboratories, are eligible to apply for funding as a prime awardee under this RC. See Section III. Part A of this RC for a full discussion of eligibility information.

B. BACKGROUND INFORMATION

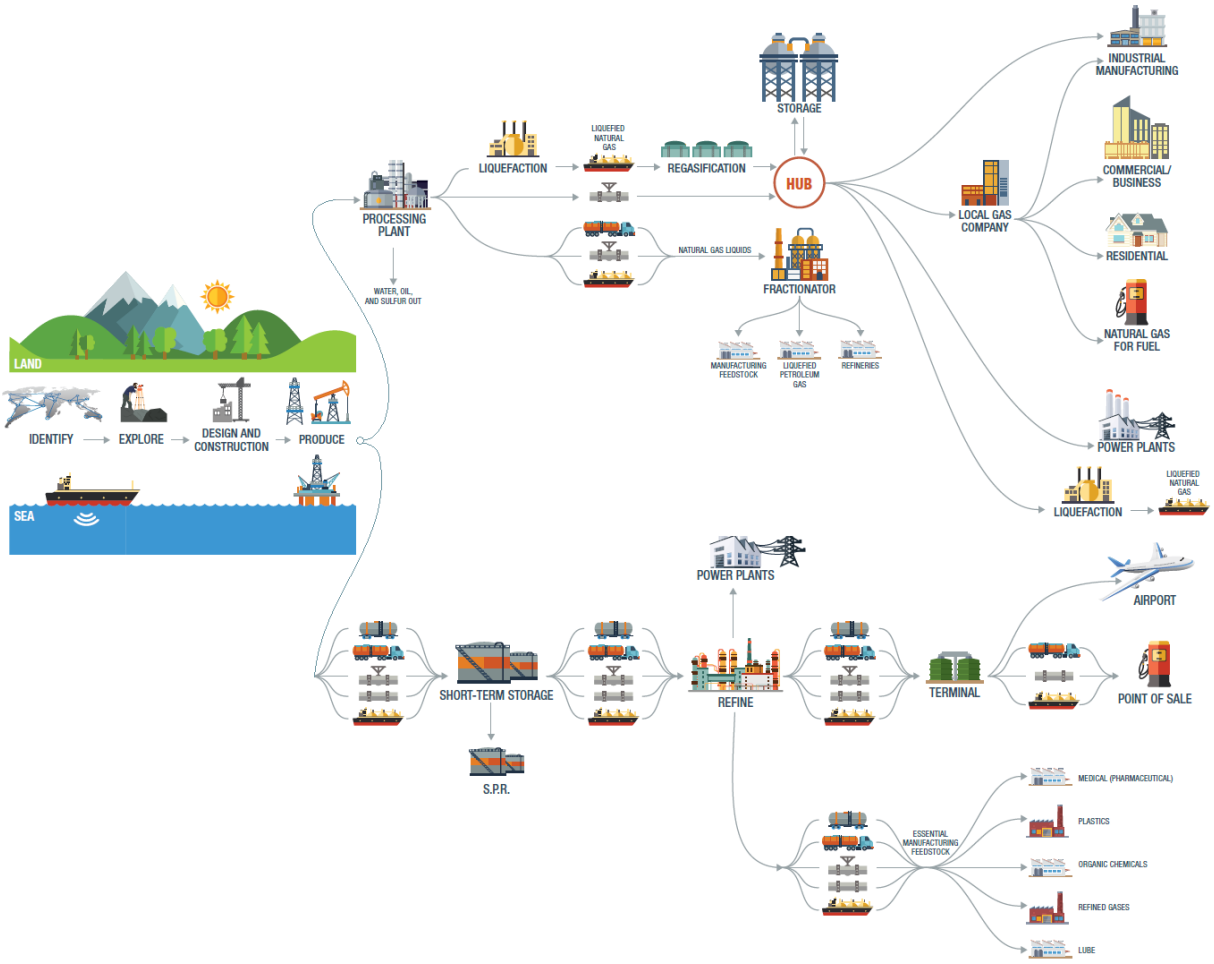
The Cybersecurity for Energy Delivery Systems Research and Development (CEDS R&D) Program within the Office of Cybersecurity, Energy Security, and Emergency Response (CESER) is conducting this RC seeking innovative approaches to advance cyber resilient energy delivery systems that are designed, installed, operated and maintained to survive a cyber-incident while sustaining critical functions.

Proposed solutions to this RC need to support and ensure a more secure, resilient and reliable energy delivery system through targeted improvements to one or more of the following energy sector processes. The energy sector includes electricity and oil and natural gas delivery systems.

1. Electricity generation, transmission, or distribution



2. Oil and natural gas production, refining, storage or distribution



The DOE ***Multiyear Plan for the Energy Sector Cybersecurity (MYP)*** compliments the Roadmap and articulates the primary objectives of CEDS R&D to research, develop and demonstrate tools and technologies that can be transitioned to the energy sector to (i) prevent, detect, and mitigate cyber incidents in today's energy delivery systems; and (ii) change the game so that tomorrow's resilient energy delivery systems can survive a cyber incident. The MYP outlines a DOE strategy for improving the cybersecurity and resilience of the Nation's energy system through the coordinated action of government and industry and supports the Administration's ***National Cyber Strategy***. The MYP provides a common organizing framework that integrates existing government efforts in concert with energy sector owners and operators and key energy stakeholders.

C. STATUTORY AUTHORITY

The statutory authority for the CEDS program is provided by Public Law No. 109-58 [Energy Policy Act (EPAct) of 2005].

D. RESEARCH CALL DESCRIPTION

The objective of this RC is to enhance the reliability and resilience of the nation's energy infrastructure through innovative RDI&D cybersecurity solutions and developing techniques to implement cybersecurity framework for testing that can be used to verify and validate OT equipment, software and the underlying control system architecture. This includes electricity generation, transmission and distribution as well as the production, refining, storage and distribution of oil and gas in accordance with DOE's energy infrastructure role defined in Presidential Policy Directive 21 (PPD-21). Solutions should be interoperable, scalable, and readily manageable advanced technologies and techniques that do not impede critical energy delivery functions, that are innovative and that implement common methods and best practices.

This RC will support national laboratory and private sector collaborations, comprising a Federally Funded Research and Development Centers (FFRDCs), such as a National Laboratory, as a prime awardee, and at least one energy sector stakeholder, engaged in multi-year high-risk, high-payoff research and development of techniques and technologies to enhance the cybersecurity of energy delivery control systems. The one or more energy sector stakeholders may include, but are not limited to, those defined in Section III. Part A of this RC. **Letters of commitment are strongly encouraged for all collaboration partners, but not required for the Concept Paper**. **Letters of commitment are required for the full proposal**.

Proposed solutions should be interoperable, scalable, readily manageable advanced tools, technologies and techniques that do not impede critical energy delivery functions and are compatible with common methods and best practices. The proposals should culminate in a demonstration at a relevant end-user to validate clear energy sector acceptance. It is expected that a strategy for transitioning solutions into practice throughout the energy sector, for example through commercialization or by making the solution available through open source, will be included.

E. FFRDC/NATIONAL LABORATORY GUIDING PRINCIPLES

To ensure alignment with DOE CESER CEDS R&D principles, offerors should consider the following when developing their proposals in response to the Topic Areas below:

- At a minimum, **20% of the total federal funds** requested, must be allocated to the sub-awardee project team member(s).
    - *Example*: A $2M federal share will result in $400k going to sub-awardee project team members. Non-government project team members will be subject to federal cost share requirements in proportion to their federal share, as described herein.
- All projects must include annual milestones, deliverables, and go/no-go decisions.
- Each proposal submitted in response to this announcement must include phases/tasks for research and development (R&D), as well as demonstration of the proposed technology under a real-world situation. **As such, the inclusion of both a commercialization entity and an energy asset owner/operator in the offeror team is**

***highly encouraged*.**

- Any non-FFRDC/National Laboratory or other non-government entity that is proposed on a project team (hereafter referred to as 'non-government project team members') must provide cost share in proportion to the federal funding that the entity will receive on the project in accordance with EPAct 2005, §988.
    - *Example*: *CorpA* proposes to utilize $500,000 in federal funding as a team member on *ProjectA*. *CorpA* must commit to provide 20% cost share for their R&D activities (assuming the use of $400,000 in federal funds for R&D requiring $100,000 awardee cost share) and 50% cost share for their demonstration tasks/activities (assuming $100,000 in federal funds for demonstration requiring $100,000 in awardee cost share).
- Proposals should be prepared so that R&D and demonstration tasks (along with associated budget estimates) are segregated and can be readily identified. Moreover, since cost share requirements differ for R&D (20%) and demonstration (50%) projects, the ability to distinguish between R&D and demonstration work will result in a more accurate determination of overall project cost share for non-government project team members.
- DOE strongly encourages projects that bring together partners from the energy sector, facilitating collaboration and leveraging expertise and core or enabling capabilities.

NOTE ON TOPIC AREAS:

- Offerors may submit more than one proposal and may submit multiple proposals per Topic Area; however, the Offeror may not submit identical proposals under more than one Topic Area.
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- Offerors must clearly identify the Topic Area they are applying to in the Project Narrative.
- If the DOE believes a proposal fits more appropriately in a Topic Area other than the one to which it was submitted, DOE may evaluate the proposal under the more appropriate Topic Area.

F. TOPIC AREAS

This Research Call includes seven (7) Topic Areas. **Only proposals that specifically address Topic Areas described in the following section will be accepted under this Research Call.**

Next Generation Tools and Technologies

1. TOPIC AREA 1: SUPPLY CHAIN

Energy delivery systems are comprised of components from a variety of sources. It is important to understand the chain of custody of the software and firmware components and the level of confidence that can be afforded. In this topic area, the proposer should research, develop and demonstrate a tool or technology that ensures secure provenance of software and firmware. This tool or technology must not impede critical energy delivery functions; must not introduce a burden for operating and maintaining the system; must be manageable by asset owners; must recognize grid reliability as a priority; must be demonstrated at a relevant end-user site to validate

a clear path to industry acceptance; and must be red-team tested by an independent third party, using project funds, to confirm the developed tool or technology is cyber secure.

2. TOPIC AREA 2: SECURITY OF ENERGY STORAGE SYSTEMS

   In this topic area, the proposer should research, develop and demonstrate a tool or technology that enables energy storage systems to survive cyber or physical attacks while sustaining critical functions. This tool or technology must not impede critical energy delivery functions; must not introduce a burden for operating and maintaining the system; must be manageable by asset owners; must recognize grid reliability as a priority; must be demonstrated at a relevant end-user site to validate a clear path to industry acceptance; and must be red-team tested by an independent third party, using project funds, to confirm the developed tool or technology is cyber secure.

3. TOPIC AREA 3: BIG DATA COLLECTION AND ANONYMIZATION

   In this topic area, the proposer should research, develop and demonstrate a solution for anonymization of data collected from operational technology (OT) networks. The selected solution will be deployed within an already-selected architecture deployed within an Amazon Web Service (AWS) private cloud. Anonymization must preserve natural relationships within the data. Anonymization solutions must process data for anonymization accurately and quickly across volumes as large as tens of terabytes in size. In the event of a need to reassemble the original data, the ideal solution would allow re-assembly of the original data to its transmitted state before anonymization took place.

Techniques to Implement Cybersecurity Framework

4. TOPIC AREA 4: CYBERSECURITY VERIFICATION AND VALIDATION FRAMEWORK

   In this topic area, the proposer should develop or enhance, and implement, a framework of testing criteria that can be used to verify and validate the cybersecurity of both OT equipment, and the control system architectures within which the equipment resides. The framework should include testing criteria that are broadly applicable across equipment types and system architectures, as well as a clear process that provides for tailoring the test criteria to a specific device and control system architecture, in partnership with the equipment vendor/supplier. The framework will be made available to the energy sector, for instance, independent entities who may choose to use the test criteria for verification and validation of OT equipment.

   A Proposer for this topic area is expected to develop a plan for implementation of the testing criteria framework to validate the cybersecurity of OT equipment, and system architectures. This plan must clearly articulate the circumstances under which implementation of the testing criteria framework would require the unique role of a national laboratory, for instance, where intelligence information may be necessary to implement the testing process. Partnership with the equipment vendor/supplier throughout the testing process is required and must be clearly articulated in the National laboratory implementation plan.

State of the Art Solution Integration for Situational Awareness

5. TOPIC AREA 5: VISUALIZATION TOOLS FOR THE ENERGY SECTOR

   In this topic area, the proposer should research, develop, integrate and demonstrate technology or techniques to provide a situational awareness interface based on geospatial data. The solution should include but is not limited to: US energy sector assets, Utility operational boundaries, Communications channels and other relevant energy sector information. The solution must also have a standard API to allow for the flexibility of additional data ingestion by DOE as it becomes available. This proposed solution should create or enhance the energy relevant information needed for greater situational awareness interface to be used by DOE.

6. TOPIC AREA 6: ANALYTIC TOOLS FOR DOE BIG DATA PLATFORM

   In this topic area, the proposer should research, develop, integrate and demonstrate technology or techniques that automatically analyze Operational Technology (OT) or Information Technology (IT) network data that will be fed into the Big Data Platform (BDP). BDP is a DOE Office of the Chief Information Officer (OCIO) managed cloud infrastructure based in AWS GovCloud. This proposed solution is expected to, at a minimum, integrate multiple commercially available tools into the BDP allowing for these tools to analyze data shared by all energy sector asset owner and operators.

   Note: There will not be an opportunity for commercial products to run this data set on proprietary systems, however benefit will be for the ability to gain access to a unique data set that is not available outside of this DOE environment to conduct analysis.

7. TOPIC AREA 7: LARGE SCALE ENERGY SECTOR ANALYTICS
   Research, develop, demonstrate and integrate technology or techniques that automatically analyze the output of the Analytic Tools for **DOE Big Data Platform described in Topic Area 6**. The solution is expected to, at a minimum, aggregate the results to provide understanding and clarification of nationwide energy sector scale trends and analysis, provide appropriate output from the analytics which will be used as input for the **Visualization Tools for the Energy Sector in Topic Area 5** and deliver near real-time alerts/visualization capability for identification of coordinated events over large or disparate areas of the country.

SECTION II – AWARD INFORMATION

A. TYPE OF AWARD INSTRUMENT

DOE anticipates providing funding for selected projects to Federally Funded Research and Development Centers (FFRDCs) such as the DOE-Sponsored National Laboratories. Any project awarded as a result of the Research Call will be processed through NETL as a Field Work Proposal (FWP), an Inter Entity Work Order (IEWO), Interagency Agreement (IA) or any other allowable

method deemed appropriate by the Government.

B. ESTIMATED FUNDING

Up to approximately $35,000,000 is expected to be available for new awards under this announcement. This funding will support up to three (3) years of the multi-year award.

Funding for all awards and future budget periods is contingent upon the availability of funds appropriated by Congress for the purpose of this program and the availability of future-year budget authority.

C. EXPECTED NUMBER OF AWARDS

DOE anticipates making between 10 and 15 awards under this announcement depending on the size of the awards. The DOE reserves the right to fund, in whole or in part, any, all, or none of the proposals submitted in response to this Research Call and will award the number of instruments that serves the public purpose and is in the best interest of the Government.

D. ANTICIPATED AWARD SIZE AND PROJECT TEAM REQUIREMENTS

DOE anticipates that it will issue several awards of varying size with up to $3,000,000 per award. However, Topic Areas (5-7) under the State-of-the-Art Solution Integration for Situational Awareness may be combined in one effort and may go above the $3M funding threshold per award.

A Federally Funded Research and Development Center (FFRDC), such as a national laboratory, is required to serve as a prime awardee, which must be documented with a formal letter of commitment provided as part of the full proposal to this Research Call. A team of FFRDCs may be proposed, but one FFRDC must be identified as the prime awardee for the proposed award.

Collaboration **must** involve one or more energy sector stakeholders, defined in Section III.A – *Eligible Offerors*, as project team member sub-awardees. At a minimum, 20% of the total federal share requested, must be allocated to the sub-awardee project team member(s). While involvement with one or more energy sector stakeholders is required, no more than 50% of the total federal funding can be provided to a single non-government project team member.

Sub-awardee participation must be documented with formal letters of commitment. Letters of commitment are strongly encouraged but not required for the Concept Paper. Letters of commitment are required for the full proposal.

NOTE: This information is for estimating purposes only and in no way commits the Government**.**

E. PERIOD OF PERFORMANCE

DOE anticipates making awards with an estimated project period not to exceed three (3) years. The DOE reserves the right to set the expected period of performance to meet DOE's objectives for national security interest and serve the best interest of the Government.

Projects must be divided into phases, with go/no-go decision points at the end of each phase. A decision will be made by DOE regarding continuation, redirection, or termination of the project at each decision point.

SECTION III – ELIGIBILITY INFORMATION

A. ELIGIBLE OFFERORS

Only Federally Funded Research and Development Centers (FFRDCs), such as National Laboratories, are eligible to apply for funding as a prime awardee. FFRDCs may also be proposed as a project team member sub-awardee.

Collaboration must involve one or more energy sector stakeholders, such as, but not limited to, the following, as a team member sub-awardee:

- suppliers and integrators of energy delivery control systems and components;
- energy utilities;
- energy asset owners and operators;
- providers of cybersecurity services for energy delivery control systems; and/or
- educational institutions.

NOTE: NETL is not considered eligible for award under this announcement and may not be proposed as a team member on another entity's proposal.

SECTION IV – SUBMISSION REQUIREMENTS

A. SUBMISSION INSTRUCTIONS

Research Call Concept Paper:

- A three (3) page Concept Paper must be submitted electronically to the following email address **no later than May 6, 2019 at 3:00 PM Eastern Daylight Time**:
  - CEDSLabCall@netl.doe.gov
- See Section V herein for Research Call Concept Paper requirements.

Full Proposal, following notification to proceed from DOE (DOE will not review a full proposal if the offeror did not receive a favorable review of their Research Call Concept Paper):

- A full proposal must be submitted electronically to the following email address **no later than June 14, 2019 at 3:00 PM Eastern Daylight Time**:
  - CEDSLabCall@netl.doe.gov
- See Section VI herein for full Proposal requirements.

Due to e-mail attachment constraints, please ensure that the emails including the attachments are less than 25 Megabytes. The offeror is encouraged to request a return notification to verify receipt of proposal.

CONCEPT PAPERS RECEIVED AFTER THE CONCEPT PAPER DEADLINE AND FULL PROPOSALS RECEIVED AFTER THE FULL PROPOSAL DEADLINE WILL NOT BE REVIEWED OR CONSIDERED FOR

AWARD.

B. PROPOSAL TIMELINE

DOE anticipates notification to successful offerors by July 22, 2019 with awards no later than September 30, 2019.

SECTION V – CONCEPT PAPER PREPARATION

A. PREPARATION OF CONCEPT PAPER

The Concept Paper must not exceed **three** (**3) pages**, be single spaced, 1" margins (top, bottom, left, right), and when printed will fit on size 8 1/2" by 11" paper. The type must be legible and not smaller than 11 point. In order to produce a comprehensive proposal for the Research Call Concept Paper, the offeror shall address, at a minimum, the areas listed in the Table of Contents:

Section
Description of Proposed Technology with Comparison to the Current State of the Art and Research Gap(s) Addressed (i.e. Why is the technology needed today and how is it different from existing capabilities?)
Technical Approach
Project Team Members and Estimated Project Cost

The Concept Paper should be saved as a single PDF file under the following file name: "Concept Paper - Lab Name - PI", e.g., "Concept Paper - NETL – Smith"

Each Concept Paper must identify one Topic Area for consideration to proceed with the preparation of a full proposal.

The only appendices accepted associated with Concept Paper submissions include project team member letters of commitment. Letters of commitment are strongly encouraged for all collaboration partners, but not required for the Concept Paper. Project team member letters of commitment will be required for offerors that receive notification to proceed with the preparation of a full proposal.

Merit Review Criteria 1-3 will be used to evaluate the concept papers.

B. NOTIFICATION PROCESS FOR PROPOSAL

DOE will review all Concept Papers submitted before the published deadline. Each Concept Paper offeror will receive notice to proceed or not to proceed with a full proposal no later than May 24, 2019, at 11:59:59 PM EST. Notification to proceed or not to proceed will be communicated from CEDSLabCall@netl.doe.gov.

SECTION VI – PROPOSAL PREPARATION

A. PREPARATION OF PROPOSAL *UPON APPROVAL OF CONCEPT PAPER*

It is requested that the Project Narrative not exceed 25 pages (excluding the resume file and commitment letters) be single spaced, 1" margins (top, bottom, left, right), and when printed will fit on size 8 1/2" by 11" paper. The type must be legible and not smaller than 11 point. Evaluators will review only the number of pages specified. Therefore, any proposals exceeding these limitations may result in a lower overall score due to the lack of review of excess proposal pages. In order to produce a comprehensive proposal for this Research Call, the offeror should address, at a minimum, the areas listed in the Table of Contents below.

Section	Section Number
Table of Contents	I
List of Tables (if applicable)	II
List of Figures (if applicable)	III
List of Acronyms (if applicable)	IV
Project Narrative	V
Extended Field Work Proposal	VI
Resume File	VII
Commitment Letters	VIII
Appendices (see below)	As Needed

The entire proposal, that includes all materials included in the Table of Contents, should be saved as a single PDF file under the following file name: “Lab Name - PI”, e.g., “NETL – Smith”

The **Project Narrative** must include:

- Project Objectives: This section should provide a clear, concise statement of the specific objectives/aims of the proposed project.

- Technical Discussion: The proposed research, development, integration and demonstration approach to meeting the identified Topic Area should be clearly described. Tasks for research and development of the proposed technology and a verification/demonstration test of the technology in a test bed, laboratory, or other environment that simulates a real-world situation should be specified.

- Commercialization and/or transition to practice plan for the proposed technology or methodology must be included. Proposals must not include the development of a test bed for the verification/demonstration test. Proposals that fail to address the research, development, verification/demonstration, and commercialization of the proposed technology will not be considered for award.

- Merit Review Criterion Discussion: This section should be formatted to address each of the merit review criterion and sub-criterion listed in Section VII B. Provide sufficient information so that reviewers will be able to evaluate the proposal in accordance with these merit review criteria. DOE WILL EVALUATE AND CONSIDER ONLY THOSE PROPOSALS THAT ADDRESS SEPARATELY EACH OF THE MERIT REVIEW CRITERION AND SUB-CRITERION.

- Description of Proposed Technology with Comparison to the Current State of the Art and Research Gap(s) Addressed: This section should explain why the technology is needed today and how it differs from existing capabilities.

- Relevance and Outcomes/Impacts: This section should explain the relevance of the effort to the objectives in the program announcement and the expected outcomes and/or impacts.

- Roles of Participants: Describe the roles and the work to be performed by each participant, business agreements between the prime offeror and participants, and how the various efforts will be integrated and managed.

- Project Coordination: The primary offeror must identify each sub-awardee contact and provide a "Coordination and Management Plan" that describes the organization structure of the project. This plan should be included as an appendix and, at a minimum, include:
    - process for making decisions on scientific/technical direction;
    - publications;
    - intellectual property issues;
    - communication plans;
    - procedures for resolving conflicts; and
    - roles and administrative, technical, and scientific responsibilities for the project.

  A Coordination and Management Plan appendix will not count in the project narrative page limitation.

- Bibliography & References Cited Appendix: Provide a bibliography of any references cited in the Project Narrative. Each reference must include the names of all authors (in the same sequence in which they appear in the publication), the article and journal title, book title, volume number, page numbers, and year of publication. Include only bibliographic citations. Offerors should be especially careful to follow scholarly practices in providing citations for source materials relied upon when preparing any section of the proposal. In order to reduce the number of files attached to your proposal, please provide the Bibliography and References Cited information as an appendix to your project narrative. This appendix will not count in the project narrative page limitation.

- Facilities & Other Resources Appendix: This information is used to assess the capability of the organizational resources, including sub-awardee resources, available to perform the effort proposed. Identify the facilities to be used (Laboratory, Computer, Office, and Other). If appropriate, indicate their capacities, pertinent capabilities, relative proximity, and extent of availability to the project. Describe only those resources that are directly applicable to the proposed work. Describe other resources available to the project (e.g., machine shop, electronic shop) and the extent to which they would be available to the project. In order to reduce the number of files attached to your proposal, please provide the Facility and Other Resource information as an appendix to your project narrative. This appendix will not count in the project narrative page limitation.

- Equipment Appendix: List major items of equipment already available for this project and, if appropriate, identify location and pertinent capabilities. In order to reduce the number of files attached to your proposal, please provide the Equipment information as an appendix to your project narrative. This appendix will not count in the project narrative page limitation.

The following proposal requirements must also be provided for each non-government project team member:

- Intellectual Property: A discussion of any potential intellectual property developed under the proposed agreement by non-government project team member(s) must be provided as an appendix to the project narrative. See Section IX. Part I. herein for additional information regarding rights in technical data and an invention that is conceived or first actually reduced to practice under a DOE award with a non-government entity. The Intellectual Property appendix will not count in the project narrative page limitation.

- Budgets for Sub-awardees: Budgets for Sub-awardees, other than FFRDCs, must be submitted for each sub-awardee that is expected to perform work estimated to be $100,000 or more. Offerors shall use the Detailed Budget Justification form provided as Attachment 2 to this Research Call.

- Data Management: Each non-government project team member must submit a Data Management Plan. The Data Management Plan outlines the proposed plan for data sharing or preservation. The Data Management Plan should include: (1) a description of the types of data that will be generated under the project, (2) a description of the types of data that will be made publicly available, and (3) a description of any restrictions that will be placed on the data. If software is anticipated to be developed under the project, the Data Management Plan should also include a plan for its distribution (e.g., open source or commercial licensing). The Data Management Plan for each non-government entity should not exceed 6 pages when printed using standard 8.5" by 11" paper with 1-inch margins (top, bottom, left, and right) single spaced. The Data Management appendix will not count in the project narrative page limitation.

The following proposal requirements must also be provided for each FFRDC project team member:

- Budgets for Sub-awardees: Budgets for Sub-awardees must be submitted for each sub-awardee that is expected to perform work estimated to be $100,000or more. Offerors shall use the Detailed Budget Justification form provided as Attachment 2 to this Research Call.

B. EXTENDED FIELD WORK PROPOSAL

The offerors shall prepare an Extended Field Work Proposal. **See Attachment 1 – NL Extended Field Work Proposal and Attachment 2 – Detailed Budget Justification.**

C. RESUME FILE

Provide a resume for each key person proposed, including sub-awardees if they meet the definition of key person. A key person is any individual who contributes in a substantive, measurable way to the execution of the project.

Each resume must not exceed 2 pages when printed on 8.5" by 11" paper with 1" margins (top, bottom, left, and right) with font not smaller than 11 point and should include the following information, if applicable:

- *Education and Training*: Undergraduate, graduate, and postdoctoral training, including institution, major/area, degree and year.
- *Professional Experience*: Beginning with the current position list, in chronological order, professional/academic positions with a brief description.
- *Publications*: Provide a list of up to 10 publications most closely related to the proposed project. For each publication, identify the names of all authors (in the same sequence in which they appear in the publication), the article title, book or journal title, volume number, page numbers, year of publication, and website address if available electronically. Patents, copyrights and software systems developed may be provided in addition to or instead of publications.
- *Synergistic Activities*: List no more than 5 professional and scholarly activities related to the effort proposed.

D. COMMITMENT LETTERS

Include separate Commitment Letter(s) for ***all*** proposed project partners, including other Federally Funded Research and Development Centers (FFRDCs), if applicable.

- **Commitment Letters from Team Members Contributing to Cost Sharing:** If the project team member is required to comply with federal cost share requirements (i.e. non-FFRDCs) then the commitment letter from that team member must include a firm commitment to providing a specific minimum dollar amount of cost sharing. The commitment letter should also identify the proposed cost sharing (e.g., cash, services, and/or property) to be contributed. Commitment letters must be signed by the person authorized to commit the expenditure of funds by the entity and be provided in a PDF format. If firm commitments are not available, offerors shall provide a plan to obtain the funding for the non-FFRDC's share of the project cost. The plan must describe any limitations, conditions, or other factors that could affect the availability of funding.

Section VII – EVALUATION AND SELECTION

A. INITIAL REVIEW CRITERIA

Prior to a comprehensive merit evaluation, DOE will perform an initial review to determine that:

(1) the information required by the Research Call has been submitted;
(2) all mandatory requirements are satisfied; and
(3) the proposed project is responsive to the objectives of the Research Call.

Proposals that do not meet the initial criteria may be excluded from review.

B. MERIT REVIEW CRITERIA

Each proposal submitted in response to this Research Call will be evaluated and scored in accordance with the criteria and weights listed below:

Criterion 1: Technical Approach and Potential Industry Impact (WEIGHT: 45%)
This criterion will evaluate the approach taken by the offeror and the degree to which the proposed technology or methodology meets the stated objectives of the Research Call and will impact the energy sector's cybersecurity capability:

- Soundness of the proposed technical approach and likelihood of success as demonstrated through scientific or engineering merit.
- Significance of the benefits and impact of the proposed technology or product compared with current technologies, products, or practices and the research gaps that the project intends to address in support of the Roadmap vision. Soundness of the discussion as to why the technology is needed today and how it differs from existing capabilities.
- Thoroughness of the discussion in terms of anticipated performance improvements (technical, operational, and environmental aspects) and cost savings of the proposed technology or product over current practices.
- Degree to which the technology will have broad applicability to the U.S. energy delivery sector and the potential for the selected demonstration (or field test) site to confirm the extent of its technical relevance across the industry.

Criterion 2: Transition to Practice Potential (WEIGHT: 30%)
This criterion will evaluate the degree to which the offeror demonstrates an effective commercialization strategy for the proposed technology or methodology in the energy infrastructure cybersecurity industry:

- Feasibility of the transition to practice strategy for the proposed technology or product and the degree to which it will meet the needs of the energy sector in a cost-effective manner.
- Demonstrated success of project team members in commercializing similar technologies and products.
- Reasonableness of the proposed approach to provide a path for energy sector acceptance by asset owners/operators and commercialization through solution providers (e.g., vendor).

Criterion 3: Collaboration (WEIGHT: 15%)
This criterion will evaluate the degree to which the offeror builds on past efforts and collaborations to achieve the best possible outcomes at the best value for the Government including:

- Effectiveness of the proposed strategic approach to establish a partnership with cybersecurity stakeholders in the energy sector including but not limited to industry, energy utilities (i.e., asset owners and operators), vendors, and academia.
- Extent to which the offeror's approach would lead to dissemination of lessons learned and foster collaboration with entities not immediately involved with the project.
- Degree to which commitment is demonstrated by including letters of intent from all proposed team members.

Criterion 4: Project Management (WEIGHT: 10%)
This criterion will evaluate the soundness of the approach to ensure the project is performed with a well-defined scope and a budget and schedule commensurate with the scope:

- Comprehensiveness of the proposal in explaining how the project will be managed using sound management principles to achieve stated objectives on time and within budget, including identification and coordination of team member roles and responsibilities, go/no-go decision criteria, and risk assessment/mitigation planning.
- Adequacy, appropriateness, and reasonableness of the budget for the prime awardee and sub-awardee team member(s). This includes the labor distribution, purchases, and effort by work breakdown budget structure to accomplish the stated objectives.

C. OTHER PROGRAM FACTORS

The following program factors may be used by the Selection Official during the selection process that are not indicators of the offeror's merit. These factors may assist in determining which of the ranked proposals shall receive DOE funding support:

1. It may be desirable to select project(s) that add technical diversity to the CEDS Portfolio.

2. It may desirable to select project(s) that represent different kinds and sizes of organizations in order to provide a balanced programmatic effort and a variety of different technical perspectives.

3. It may be desirable to select project(s) that demonstrate solutions that are scalable and cost-effective with a clear industry acceptance for commercialization.

4. It may be desirable to select project(s) that support complementary and/or duplicative efforts or projects, which, when taken together, will best achieve the research goals and objectives.

5. It may be desirable to select project(s) that represent a diversity of technologies and technical approaches, methods, and Topic Areas in order to provide a balanced programmatic effort and a variety of different technical perspectives.

6. It may be desirable to select project(s) that are of less technical merit than other project(s) if such a selection will optimize use of available funds by allowing more projects to be

supported and not be detrimental to the overall objectives of the program.

D. SUBMISSION FROM SUCCESSFUL OFFERORS

If selected for award, DOE reserves the right to request additional or clarifying information for any reason deemed necessary, including, but not limited to:

- Indirect cost information;
- Other budget information;
- Name and contact information of the Contracting Officer for the Laboratory;
- Other supporting documentation.

SECTION VIII – AWARD ADMINISTRATION INFORMATION

A. STATEMENT OF SUBSTANTIAL INVOLVEMENT FOR PROJECT TEAM MEMBERS

DOE NETL's Project Manager and the primary FFRDC will enter into a Field Work Proposal (FWP), an Inter Entity Work Order (IEWO), or Interagency Agreement (IA) (hereafter FWP/IEWO/IA).

The primary FFRDC, with guidance and oversight provided by the DOE NETL's Project Manager, will be responsible for the day-to-day administration of the project and activities performed by sub-awardees.

Stewardship activities include, but are not limited to, conducting site visits; reviewing performance and financial reports; providing technical assistance and/or intervention in unusual circumstances to address deficiencies that develop during the project activities; and ensuring that the project objectives have been accomplished.

The responsibilities of a project team member will include, but not be limited to, the following:

- Performing all activities described in the project Statement of Work/Statement of Project Objectives, including providing the required personnel, facilities, equipment, supplies and services;
- Managing and controlling project activities in accordance with established processes and procedures to ensure tasks and subtasks are completed within schedule and budget constraints;
- Notifying the DOE NETL Project Manager and the primary FFRDC principal investigator in a timely manner of issues that arise during the course of the project that may jeopardize the technical objectives, schedule and/or budget;
- Coordinating all project activities with the primary FFRDC principal investigator to ensure effective integration of all work elements;
- Defining approaches and plans, submitting the plans to the primary FFRDC principal investigator for review, and incorporating their comments;
- Attending annual program review meetings and presenting project status and results when requested by the primary FFRDC principal investigator;
- Submitting required reports on a quarterly, annual, and final basis to the primary FFRDC principal investigator for inclusion in their reporting to DOE/NETL; and
- Complying with all Reporting Requirements and Terms and Conditions defined in the sub-awardee's agreement with DOE NETL.

The responsibilities of DOE NETL's Project Manager will include, but not be limited to, the following:

- Collaborating with the Prime Recipient regarding project activities and recommending alternate approaches or delaying/shifting work emphasis, if needed, to adequately address critical project and/or programmatic issues, including goals established by DOE OE, the DOE CEDS program, and the *Roadmap to Achieve Energy Delivery Systems Cybersecurity*;
- Participating in project management planning activities, including risk analysis, to ensure DOE program requirements or limitations are considered in performance of the work elements; and
- Reviewing and approving go/no-go decision points in a timely manner to authorize the continuation of project work.

SECTION IX – OTHER INFORMATION

A. MODIFICATIONS

Notices of any modifications to this Research Call will be sent via e-mail directly to the National Laboratories. The e-mail will contain a web link to the modified version located at the NETL and CESER websites.

B. GOVERNMENT RIGHT TO REJECT OR NEGOTIATE

DOE reserves the right, without qualification, to reject any or all proposals received in response to this Research Call and to select any proposal, in whole or in part, as a basis for negotiation and/or award.

If selected for award, DOE reserves the right to request additional or clarifying information from non-government sub-awardees for any reason deemed necessary, including, but not limited to:

- Budget information;
- Name and phone number of the Designated Responsible Employee for complying with national policies prohibiting discrimination (See 10 CFR 1040.5);
- Representation of Limited Rights Data and Restricted Software, if applicable.

C. EVALUATION AND ADMINISTRATION BY NON-FEDERAL PERSONNEL

In conducting the merit review evaluation, the Government may seek the advice of qualified non-Federal personnel as reviewers. The Government may also use non-Federal personnel to conduct routine, nondiscretionary administrative activities. The offeror, by submitting its proposal, consents to the use of non-Federal reviewers/administrators. Non-Federal reviewers must sign conflict of interest and non-disclosure agreements prior to reviewing a proposal. Non- Federal personnel conducting administrative activities must sign a non-disclosure agreement.

D. NOTICE REGARDING ELIGIBLE/INELIGIBLE ACTIVITIES

Eligible activities under this program include those which describe and promote the understanding of scientific and technical aspects of specific energy technologies, but not those which encourage or support political activities such as the collection and dissemination of information related to potential, planned, or pending legislation.

E. DISCUSSIONS AND AWARD

The Government may enter into discussions with a selected offeror for any reason deemed necessary, including but not limited to: (1) the budget is not appropriate or reasonable for the requirement; (2) only a portion of the proposal is selected for award; (3) the Government needs additional information to determine that the awardee is capable of complying with federal requirements; and/or (4) special terms and conditions are required. Failure to resolve satisfactorily the issues identified by the Government will preclude award to the offeror.

F. PROPRIETARY PROPOSAL INFORMATION

Patentable ideas, trade secrets, proprietary or confidential commercial or financial information, disclosure of which may harm the offeror, should be included in a proposal only when such information is necessary to convey an understanding of the proposed project. The use and disclosure of such data may be restricted, provided the offeror includes the following language on the first page of the project narrative and specifies the pages of the proposal which are to be restricted:

- "The data contained in pages [*Insert pages*] of this proposal have been submitted in confidence and contain trade secrets or proprietary information, and such data shall be used or disclosed only for evaluation purposes, provided that if this offeror receives an award as a result of or in connection with the submission of this proposal, DOE shall have the right to use or disclose the data herein to the extent provided in the award. This restriction does not limit the government's right to use or disclose data obtained without restriction from any source, including the offeror."

To protect such data, each line or paragraph on the pages containing such data must be specifically identified and marked with a legend similar to the following:

- "The following contains proprietary information that (name of offeror) requests not be released to persons outside the Government, except for purposes of review and evaluation."

G. INTELLECTUAL PROPERTY DEVELOPED UNDER THIS PROGRAM

This section is only applicable to non-government team members.

Patent Rights. The government will have certain statutory rights in an invention that is conceived or first actually reduced to practice under a DOE award. 42 U.S.C. 5908 provides that title to such inventions vests in the United States, except where 35 U.S.C. 202 provides otherwise for nonprofit organizations or small business firms. However, the Secretary of Energy may waive all or any part of the rights of the United States subject to certain conditions. (See "Notice of Right to Request Patent Waiver" below.)

Rights in Technical Data. Normally, the government has unlimited rights in technical data created under a DOE agreement. Delivery or third-party licensing of proprietary software or data developed solely at private expense will not normally be required except as specifically negotiated in a particular agreement to satisfy DOE's own needs or to insure the commercialization of technology developed under a DOE agreement.

Program Covered Under Special Protected Data (December 2014)

Special Protected Data Statutes. This program is covered by a special protected data statute. The provisions of the statute provide for the protection from public disclosure, for a period of up to five years from the development of the information, of data that would be trade secret, or commercial or financial information that is privileged or confidential, if the information had been obtained from a non-Federal party. Generally, the provision entitled, Rights in Data Programs Covered Under Special Protected Data Statutes (Item 4 under 2 CFR 910 Appendix A to Subpart D), would apply to an award made under this announcement. This provision will identify data or categories of data first produced in the performance of the award that will be made available to the public, notwithstanding the statutory authority to withhold data from public dissemination and will also identify data that will be recognized by the parties as protected data.

H. NOTICE OF RIGHT TO REQUEST PATENT WAIVER

Offerors may request a waiver of all or any part of the rights of the United States in inventions conceived or first actually reduced to practice in performance of an agreement as a result of this announcement, in advance of or within 30 days after the effective date of the award. Even if such advance waiver is not requested or the request is denied, the awardee will have a continuing right under the award to request a waiver of the rights of the United States in identified inventions, i.e., individual inventions conceived or first actually reduced to practice in performance of the award. Any patent waiver that may be granted is subject to certain terms and conditions in 10 CFR 784. See http://www.energy.gov/gc/services/technology-transfer-and-procurement/office-assistant-general-counsel-technology-transf-1 for further information. Domestic small businesses and domestic nonprofit organizations will receive the patent rights clause at 37 CFR 401.14, i.e., the implementation of the Bayh-Dole Act. This clause permits domestic small business and domestic nonprofit organizations to retain title to subject inventions. Therefore, small businesses and nonprofit organizations do not need to request a waiver.

I. CONFERENCE SPENDING

The awardee shall not expend any funds on a conference not directly and programmatically related to the purpose for which the agreement was awarded that would defray the cost to the United States Government of a conference held by any Executive branch department, agency, board, commission, or office for which the cost to the United States Government would otherwise exceed $20,000, thereby circumventing the required notification by the head of any such Executive Branch department, agency, board, commission, or office to the Inspector General (or senior ethics official for any entity without an Inspector General), of the date, location, and number of employees attending such conference.

J. NOTIFICATION OF SELECTION/NON-SELECTION

DOE NETL anticipates completing the project selection process and notifying prime offerors of the final results by July 22, 2019. DOE NETL will notify primary offerors of selection results via email from CEDSLabCall@netl.doe.gov.

K. QUESTIONS/AGENCY CONTACTS

Specific questions about this research call should be submitted via e-mail to CEDSLabCall@netl.doe.gov. To ensure fairness across all labs, individual DOE or DOE NETL staff cannot answer questions while the research call remains open. To keep all interested entities informed, DOE NETL will send questions and answers to all primary offerors via periodic e-mail communication from CEDSLabCall@netl.doe.gov.