

RESEARCH CALL TO DOE/FEDERAL LABORATORIES



**Cybersecurity for Energy Delivery Systems Research Call
RC-CEDS-2014**

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SECTION I – GENERAL INFORMATION

A. SUMMARY

The Department of Energy's (DOE) National Energy Technology Laboratory (NETL) on behalf of the DOE, Office of Electricity Delivery and Energy Reliability (OE), is seeking applications to conduct research, development and demonstrations leading to next generation tools and technologies that will become widely adopted to enhance and accelerate deployment of cybersecurity capabilities for the U.S energy infrastructure, including cyber secure integration of smart grid technologies. This Research Call includes four (4) areas of interest:

Area of Interest 1 - Moving Target Defense (MTD)

Area of Interest 2 - Secure Integration of Distributed Energy Resources

Area of Interest 3 – Self-Healing Energy Delivery Control Systems

Area of Interest 4 – Innovative Technologies that Enhance Cybersecurity in the Energy Sector

B. BACKGROUND INFORMATION

The U.S. Department of Energy's Office of Electricity Delivery and Energy Reliability, in collaboration with the U.S. Department of Homeland Security's Science and Technology Directorate and Energy Sector Control Systems Working Group (ESCSWG) in support of the Electricity Sub-sector Coordinating Council, Oil and Natural Gas Sector Coordinating Council, and the Government Coordinating Council for Energy under the Critical Infrastructure Partnership Advisory Council (CIPAC) Framework, facilitated the development of the Roadmap to Achieve Energy Delivery Systems Cybersecurity¹. The Roadmap synthesizes expert input from the energy delivery control systems community, including owners and operators, commercial vendors, national laboratories, industry associations, and government agencies. The Roadmap presents a strategic framework supported by key milestones that must be met to achieve the Roadmap vision that by 2020 resilient energy delivery systems are designed, installed, operated and maintained to survive a cyber-incident while sustaining critical functions.

This research call focuses on providing tools and technologies research, development and demonstration to support the Cybersecurity for Energy Delivery Systems Program (CEDS) within the Power Systems Engineering Research and Development (PSE R&D) Division of the Office of Electricity Delivery and Energy Reliability (OE). The CEDS program has established partnerships over the past several years throughout the energy sector, government, national laboratories and universities to reduce the risk of energy delivery disruption resulting from a cyber-event. The CEDS program desires to advance research, development and demonstration of tools and technologies that align with the strategic framework of the energy sector's Roadmap, address Roadmap milestones and work toward achieving the Roadmap vision.

The objective of this Research Call is to perform research, development and demonstrations of tools and technologies that will enhance the cybersecurity of energy delivery control systems. 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

¹ (www.controlsystemsroadmap.net)

role defined in Homeland Security Presidential Directive (HSPD) 7. This also includes tools and technologies to assist in the compliance with North American Electric Reliability Corporation-Critical Infrastructure Protection (NERC-CIP) requirements for cybersecurity. Solutions should be interoperable, scalable, cost-effective advanced tools and technologies that do not impede critical energy delivery functions, that are innovative and that is compatible with common methods and best practices. The proposed projects should culminate in a demonstration at an end-user site 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 for no cost, will be included. DOE NETL requests applications that address the topics outlined below.

C. PROJECT AREA

Area of Interest 1 - Moving Target Defense (MTD)

Research, develop and demonstrate technology or techniques that implement moving target defense (MTD) for energy delivery systems. The technology or techniques could change system configurations dynamically to defeat reconnaissance and attack planning or could perform dynamic reconfiguration during an incident to maintain critical functions. The technology should be manageable by the asset owner, allowing the asset owner to continually know the state of the network at any point. The technology or techniques must not impede critical energy delivery functions and must be demonstrated to validate a clear industry acceptance.

Area of Interest 2 - Secure Integration of Distributed Energy Resources

Research, develop and demonstrate technology or techniques that enhance cybersecurity of Distributed Energy Resource Management Systems. These energy management systems include, but are not limited to, the cybersecurity of systems that manage distributed energy resources such as renewable generation and storage systems; non-renewable generators connected with the distribution-level power systems; load as a resource (such as the utility-side demand response through pre-arranged agreements with the utility's customers and plug-in electric vehicles.) The technology or techniques must not impede critical energy delivery functions and must be demonstrated to validate a clear industry acceptance.

Area of Interest 3 – Self-Healing Energy Delivery Control Systems

Research, develop and demonstrate technology or techniques that continually reduce the attack surface including prior to an attack in energy delivery control systems or components, at the hardware, firmware or software levels. The technology should be manageable by the asset owner, allowing the asset owner to continually know the state of the network at any point. The technology or techniques must not impede critical energy delivery functions and must be demonstrated to validate a clear industry acceptance.

Area of Interest 4 – Innovative Technologies that Enhance Cybersecurity in the Energy Sector

The 2011 Roadmap to Achieve Energy Delivery Systems Cybersecurity provides a strategic framework that directs research and development of cybersecurity solutions for

the energy sector. The energy sector cybersecurity landscape is dynamic. New technologies are being rapidly deployed and legacy technologies are being used in ways that were not previously envisioned, introducing new security considerations. This area of interest requests a proposal that identifies, and proposes a technical solution to address, a research gap that, if addressed, could enhance coverage of the Roadmap goals. Proposals for this category must be innovative technical solutions. The technology and techniques must not impede critical energy delivery functions and must be demonstrated to validate a clear industry acceptance.

SECTION II – AWARD INFORMATION

A. TYPE OF AWARD INSTRUMENT

DOE anticipates providing DOE 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, an Inter Entity Work Order, Interagency Agreement or any other allowable method deemed appropriate by the Government.

B. ESTIMATED FUNDING

Approximately \$10 Million is expected to be available for awards under this announcement.

C. EXPECTED NUMBER OF AWARDS

DOE anticipates making up to 5 awards under this announcement. The Government 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 that number of instruments which serves the public purpose and is in the best interest of the Government.

D. ANTICIPATED AWARD SIZE

DOE anticipates that it will issue several awards of varying size with up to \$3 million per award. This includes awards that have more than one laboratory participation. Collaborations with vendors and asset owners are strongly encouraged. However, no more than 25% of the funding in total can be provided to the non-Federal participants. This information is for estimating purposes only and in no way commits the Government.

E. PERFORMANCE PERIOD

DOE anticipates making awards within 100 days from the date of release of this Research Call with an anticipated performance period not to exceed 3 years. Projects must be divided into phases, with go/no-go decision points at end of each phase. A decision will be made regarding continuation, redirection, or termination of the project at each decision point.

F. TYPE OF PROPOSAL

Projects awarded from previous Research Calls will not be considered for renewal or continuation.

SECTION III – ELIGIBILITY INFORMATION

A. ELIGIBLE OFFERORS

Only FFRDC's such as National Laboratories are eligible to apply as primary recipient. Collaboration involving multiple DOE National Laboratories and other entities (such as educational institutions, utilities, research and development organizations, vendors, etc.) is highly encouraged.

SECTION IV – SUBMISSION REQUIREMENTS

A. SUBMISSION INSTRUCTIONS

Proposals shall be submitted electronically to the following email address no later than May 23, 2014 at 3:00 PM Eastern Daylight Time:

CEDSLabCall@netl.doe.gov

Phone: 304-285-5229

Fax: 304-285-4403

The applicant is encouraged to request a return notification to verify receipt of proposal.

SECTION V – EVALUATION AND SELECTION

A. INITIAL REVIEW CRITERIA

Prior to a comprehensive merit evaluation, DOE will perform an initial review to determine that (1) the applicant is eligible for an award; (2) the information required by the Research Call has been submitted; (3) all mandatory requirements are satisfied; and (4) 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

Proposals 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 Project Management (45%)

- This criterion will evaluate the approach taken by the applicant and the degree to which the proposed technology or methodology meets the stated objectives of the funding opportunity announcement:
- Feasibility that the proposed technology or product will address the need or problem.
- Soundness of the proposed approach and likelihood of success as demonstrated through scientific or engineering merit of the proposed approach.
- Reasonableness and completeness of the proposed Statement of Project Objectives (SOPO) to achieve project objectives and measure success.
- Adequacy, appropriateness, and reasonableness of the budget. This includes the labor distribution, purchases, and effort by work breakdown budget structure to accomplish the stated objectives.
- Degree to which the applicant demonstrates sound management principles, and plans for project oversight in the Extended Field Work Proposal to achieve the project objectives on time and within budget.

Criterion 2: Industry Impact (40%)

- This criterion will evaluate the degree to which the proposed technology or methodology will impact the energy infrastructure cybersecurity industry:
- Significance of the benefits and impact of the proposed technology or product compared with state-of-the-art technologies, products or practices.
- Extent to which the proposed effort meets a gap in the state-of-the art.
- Extent to which the benefits and impact of anticipated performance improvements, including technical, operational and environmental performance; cost savings; societal benefits; and potential for the project to meet or exceed the DOE program goals or program vision.

Criterion 3: Collaboration (15%)

Note: This research call focuses on providing tools and technologies research, development and demonstration to support the CEDS Program's mid-term and long-term goals that aligns with energy sector's Roadmap. Industry collaboration/partnership is highly encouraged.

- This criterion will evaluate the degree to which the Applicant builds on past efforts and collaborations to achieve the best possible outcomes at the best value for the government including.
- Reasonableness of the proposed approach to provide a path for industry acceptance and commercialization.
- Effectiveness of the proposed strategic approach to establish a partnership with other national laboratories, FFRDCs, industry and vendors for collaborations and cooperation.
- Extent to which the Applicant's approach would lead to dissemination of lessons learned and foster collaboration with entities not immediately involved with the project.
- Degree to which commitment of the collaboration to the proposed project is demonstrated by including letters of intent from all proposed team members.

Program Policy Factors

The following Program Policy Factors may be used by the Selection Official to assist in determining which of the ranked application shall receive DOE funding support:

1. It may be desirable to select project(s) that has collaborative effort between national laboratories, FFRDC's, academia, industry and vendor.
2. It may be desirable to select project(s) that demonstrate solutions that are scalable and cost-effective with a clear industry acceptance for commercialization
3. It may be desirable to select complementary project(s) and/or duplicative efforts or projects, which, when taken together, will best achieve the research goals and objectives;
4. It may be desirable to select for award a group of projects which represents a diversity of technical approaches and methods;
5. It may be desirable to select a group of projects which represent a diversity of technologies 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) 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.
7. It may be desirable to select project(s) that demonstrate the proposed technology in a real-time environment and includes a commercialization entity and an electric utility (investor owned, municipal or rural electric cooperative).

C. SUBMISSIONS 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 cognizant Contracting Officer.
- Other supporting documentations

SECTION VI – PROPOSAL PREPARATION

A. PREPARATION

It is requested that the Extended Field Work proposal not exceed 20 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. In order to produce a comprehensive proposal for this Research Call, the offeror shall address, at a minimum, the areas listed in the Table of Contents below. The offeror shall use the following Table of Contents:

Section	Page
Table of Contents	I
List of Tables (if applicable)	II
List of Figures (if applicable)	III
List of Acronyms (if applicable)	IV
Extended Field Work Proposal	#
Resume File	#
Commitment Letters	#

- 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”

B. EXTENDED FIELD WORK PROPOSAL

The applicants under this research call shall prepare an Extended Field Work Proposal. See **Attachment 1 – NL Extended Field Work Proposal and Attachment 2 – Budget Justification**

C. RESUME FILE

Provide a resume for each key person proposed, including subawardees and consultants 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

Commitment Letter from partnership with Federally Funded Research and Development Centers (FFRDCs) and other participating entities, if applicable

SECTION VII – 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 NETL and OE website.

B. GOVERNMENT RIGHT TO REJECT OR NEGOTIATE

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

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.