U.S. DEPARTMENT OF ENERGY | OFFICE OF ELECTRICITY

Supercharge Energy Storage Webinar

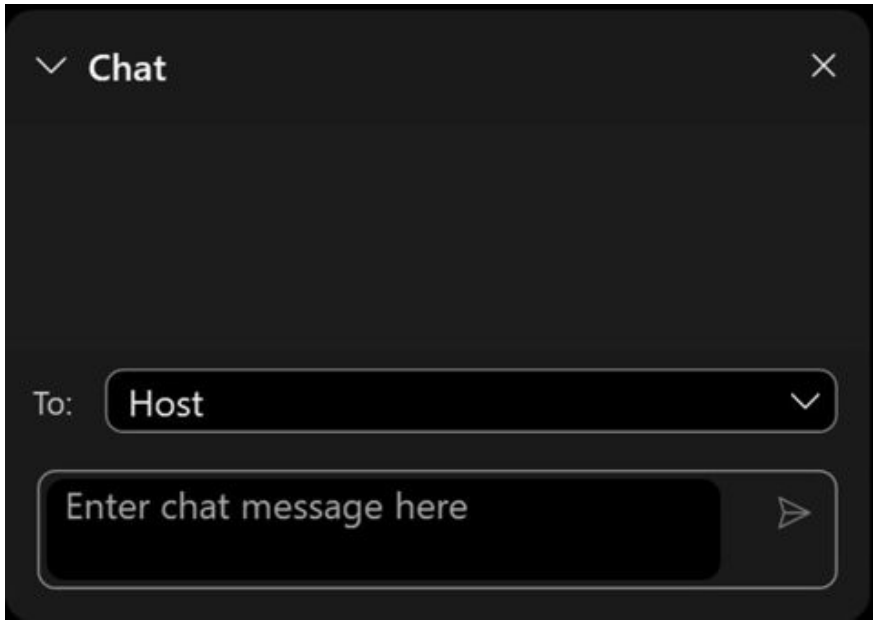
Technology Liftoff FOA

Demonstration and Validation FOA

August 29, 2023

Housekeeping

- Questions?
  - Please submit all questions directly through the chat box and indicate which FOA your question is for.
  - If you have technical questions – please put them in the chat box for the host.



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U.S. DEPARTMENT OF ENERGY | OFFICE OF ELECTRICITY

Storage Innovations 2030: Technology Liftoff FOA

8/29/23

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LONG DURATION STORAGE SHOT TARGET

Reduce storage costs by **90%** from a 2020 Li-ion baseline...

...in storage systems that deliver **10+** hours of duration

...in **1** decade

Affordable grid storage for clean power – any time, anywhere

ENERGY earthshots U.S. DEPARTMENT OF ENERGY | Storage™

LDSS Technology Strategy Assessments

- Released on July 19th, 2023
- Results from the Storage Innovations 2030 Flight Paths and Framework stakeholder engagement and analysis efforts

Eleven Reports Released

1. Methodology
2. Lithium-ion Batteries
3. Lead-Acid Batteries
4. Flow Batteries
5. Zinc Batteries
6. Sodium Batteries
7. Pumped Storage Hydropower
8. Compressed Air Energy Storage
9. Thermal Energy Storage
10. Supercapacitors
11. Hydrogen Storage

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SI 2030: Technology Liftoff Summary

$15 million Funding Opportunity Announcement (FOA) to tackle pre-competitive technology R&D barriers!

SI 2030 Technology Strategy + Structured Technology Partnerships + Pre-competitive R&D + $5 million awards

RFI Released	RFI comments due	FOA Opens	Concept Papers Due	Full Applications Due	Selections Made
March 8, 2023	April 3, 2023	July 25, 2023	September 15, 2023	December 4, 2023	Q1 2024

SI Technology Liftoff Objective 1

- ***Partnership development***: Entities will organize by coordinating with each other, engaging in meetings and discussions, and setting up durable channels of communication to effectively collaborate through this award period and afterwards. Such means of collaboration may include email, periodic meetings (virtual or in-person), collaborative online platforms, site visits, conference participation, polls, newsletters, websites, or knowledge sharing beyond the scope of the pre-competitive R&D project. Entities are encouraged to think creatively to develop lasting partnerships.
  - **Partnering List**: DOE will make a partnering list available specific to this FOA that organizations can list their contact information in to facilitate forming potential project partnerships. Please email FOA3020@NETL.DOE.GOV to submit your information using the template at: https://netl.doe.gov/grid-resilience/FOA3020. You may find the most up to date partnering list at the same URL.

SI Technology Liftoff Objective 2

- ***Pre-competitive R&D:*** Partnerships will receive funding to perform "pre-competitive" R&D projects at a research institution, such as (but not limited to) a DOE National Laboratory. "Pre-competitive R&D" includes activities that are of interest to multiple or all entities in the partnership. Such activities should propel an entire technology industry forward, and the outputs of this work should provide value to all participating members of the partnership. Further discussion of pre-competitive R&D is provided in the SI 2030 Technology Strategy Assessments. These assessments also provide themes and examples of activities consistent with DOE strategy. Applicants are strongly encouraged to leverage the Technology Strategy Assessments in identifying and proposing pre-competitive R&D.

Technical Elements that Must be Included in Applications

- Partnership management and operation plan (should show durability or longevity after project award period)
- If applicable, connection to the Storage Innovations 2030 strategy outlined in the LDSS Technology Strategy Assessments. Proposals should show connection to the R&D described in those reports, and connection to R&D activities with high potential to lower cost.
- Technical outcomes from pre-competitive R&D
- Detailed workplan to perform R&D

Eligible Applicants

- Following domestic entities are eligible to participate as a prime or subrecipient:
  - Institutions of higher education;
  - For-profit entities;
  - Non-profit entities; and
  - State and local governmental entities, and Indian tribes.
- FFRDCs (ex. National Labs) are eligible to apply as a subrecipient, but not as a prime recipient.
  - FFRDC funds are expected to be awarded by the recipient to FFRDC.

Research Institutions

- Each partnership must also connect with a participating research institution, such as a DOE National Laboratory, to perform the pre-competitive R&D. The research institution may or may not be considered a “member” of the partnership, but the R&D must have impact for all members of the project.
- In this opportunity, a “research institution” is defined as a shared facility or capability made equitably available to all project partners for the purposes of advancing a technical barrier associated with a technology. Such a facility must be one of the following:
  - DOE National Laboratory
  - Other Federally Funded Research and Development Center (FFRDC)
  - Institution of Higher Education
  - Nonprofit institution with an R&D mission

Applications Not of Interest

- Submissions that fall outside the technical parameters specified in Section I, “Funding Opportunity Description; Objectives/Topic Areas/Areas of Interest” of the FOA, including but not limited to:
  - Submissions for proposed technologies that are not based on sound scientific principles (e.g., violates the laws of thermodynamics).
  - Submissions with fewer than two entities.
  - Submissions that propose R&D that is not “pre-competitive” R&D. Projects under this announcement should benefit all members of the partnership and propel a whole technology industry (not just one specific entity or proprietary solution) forward.
  - Submissions to enable technologies not capable of electricity-in/ electricity-out long-duration energy storage.
  - Topics related to hydrogen storage. Proposed work related to hydrogen energy storage should be directed towards other DOE programs that focus on hydrogen (such as sections 40313, 40314, and 40315 of the Bipartisan Infrastructure Law).

Estimated Funding

Topic Area/Area of Interest	Estimated Federal Funding	Anticipated No. of Awards	Maximum Individual Award Size		
			DOE Share $/%	Cost Share $/%	Total $
1	$15,000,000	3	$5,000,000	$1,250,000	$6,250,000
Total					

Estimated project period of performance: between 2 and 4 years.

Concept Papers (6 pages maximum)

- Cover Page (1 page max.)
- Project Description
  - Describe proposed R&D project, impact, risks, and alignment with DOE strategy
- Project Team/ Addendum
  - List of partnering organizations, team member experience, research institution, and equipment/ facilities

Full details listed in FOA document.

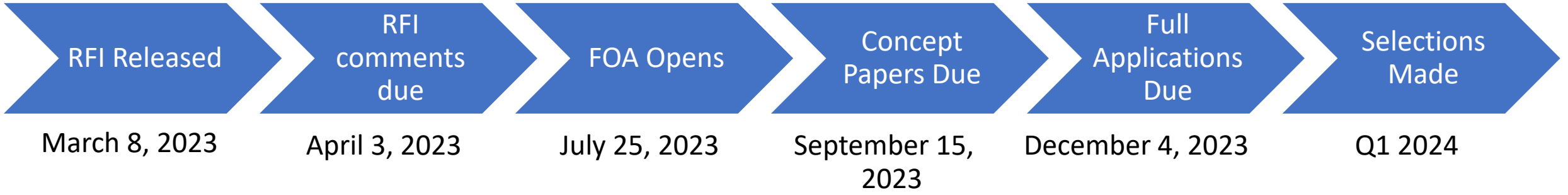
Due on September 15, 2023.

Full Application Merit Review Criteria

- Criterion 1: Technical Merit, Innovation, and Impact (30%)
- Criterion 2: Partnership Strength, Team, and Resources (30%)
- Criterion 3: Project Execution and Management Approach (25%)
- Criterion 4: Community Benefits Plan (15%)

Upcoming Deadlines

- Concept Papers due on **September 15, 2023**
  - Submit to FOA3020@NETL.DOE.GOV
- Full applications due **December 4, 2023**



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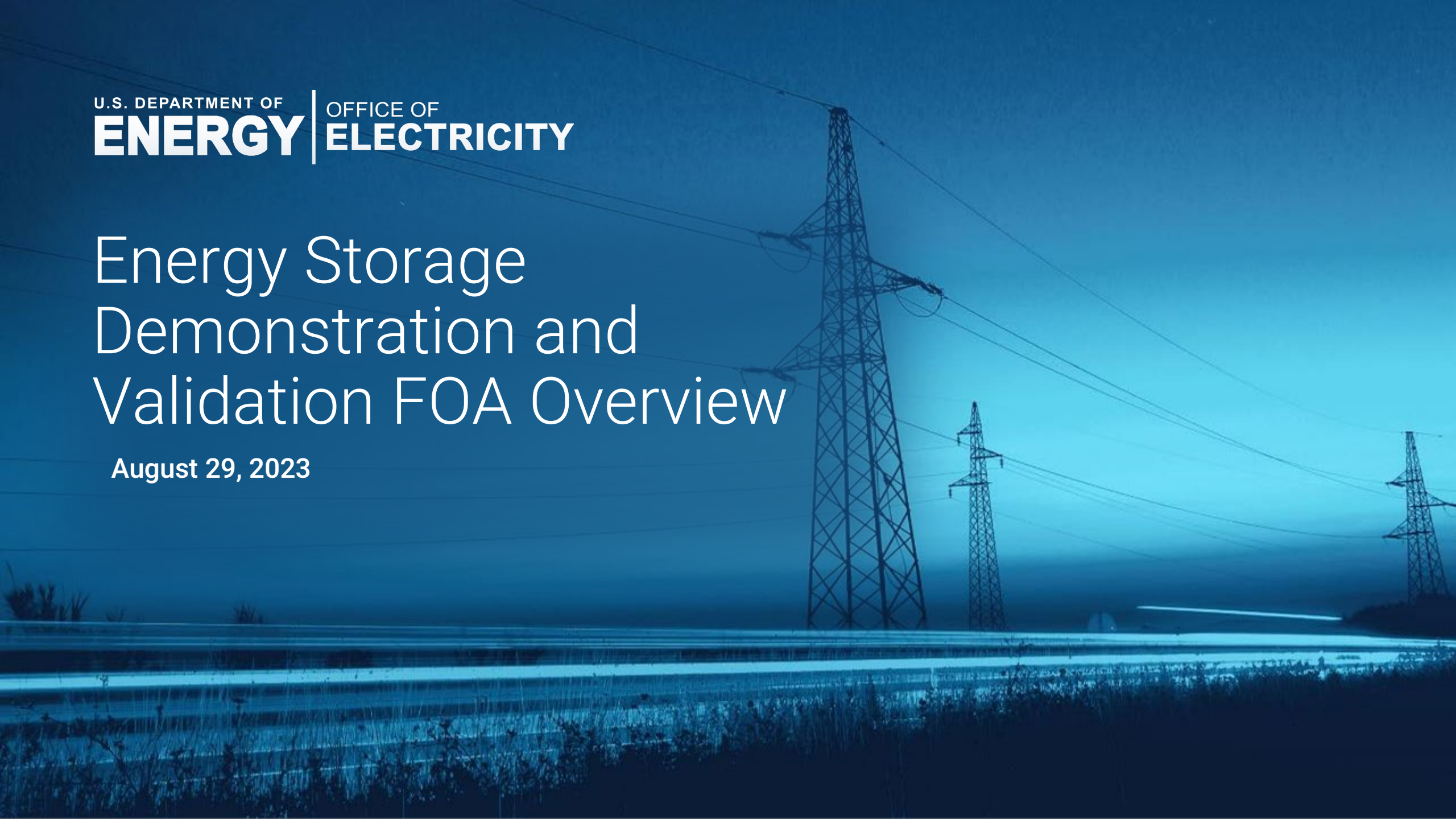

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Energy Storage Demonstration and Validation FOA Overview

August 29, 2023

Demonstration and Validation FOA

Background

2023 Appropriations Bill directs OE to establish:. *"…a competitive pilot demonstration grant program, as authorized in section 3201 of the Energy Act of 2020, for energy storage projects that are U.S-controlled, U.S.-made, and North American sourced and supplied. The Department is directed to include in this program large scale commercial development and deployment of long cycle life, lithium-grid scale batteries and their components."*

Goals

- Fund Innovative Energy Storage System (ESS) demonstration projects, host "Demo Day"
- Will fulfill CDA and align with Long Duration Storage Shot and other relevant DOE goals
- Demonstrations will support OE's Rapid Operational Validation Initiative (ROVI)

Demonstration and Validation FOA

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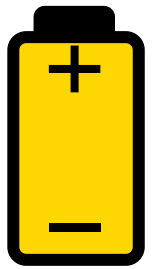
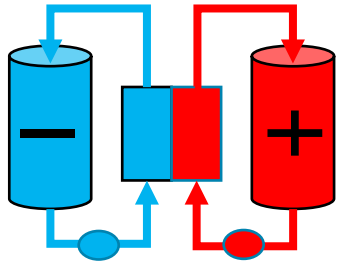
Approach: $15 million FOA with three topic areas, 1 demo and $5 million per topic area

Topic 1: Lithium Batteries



Topic 2: Flow Batteries



Topic 3: Innovative ESS

Other Innovative ESS

Demonstration and Validation FOA Requirements

Required Partnership Structure:

Technology Providers	Host Site/Offtaker Organization
+ A private energy storage company	+ Tribes/Tribal Organizations
+ An institution of higher education	+ Electric Utility
+ Other organizations involved in Engineering, Procurement, and Construction (EPC) of an ESS	+ Political Subdivision of a State
	+ Facility or Campus Owner
	+ Other organization that would own, operate, use, or benefit from the ESS

Storage System Requirements For All Topics:

+ Electricity-in, Electricity-out system
+ Capable of at least 100 kWe of output
+ Capable of at least 10+ hours of discharge duration*
+ LCOS ≤ $.05/kWh*
+ "U.S.-controlled, U.S.-made, and North American sourced and supplied."
+ Will operate and provide data to ROVI for at least 12 months

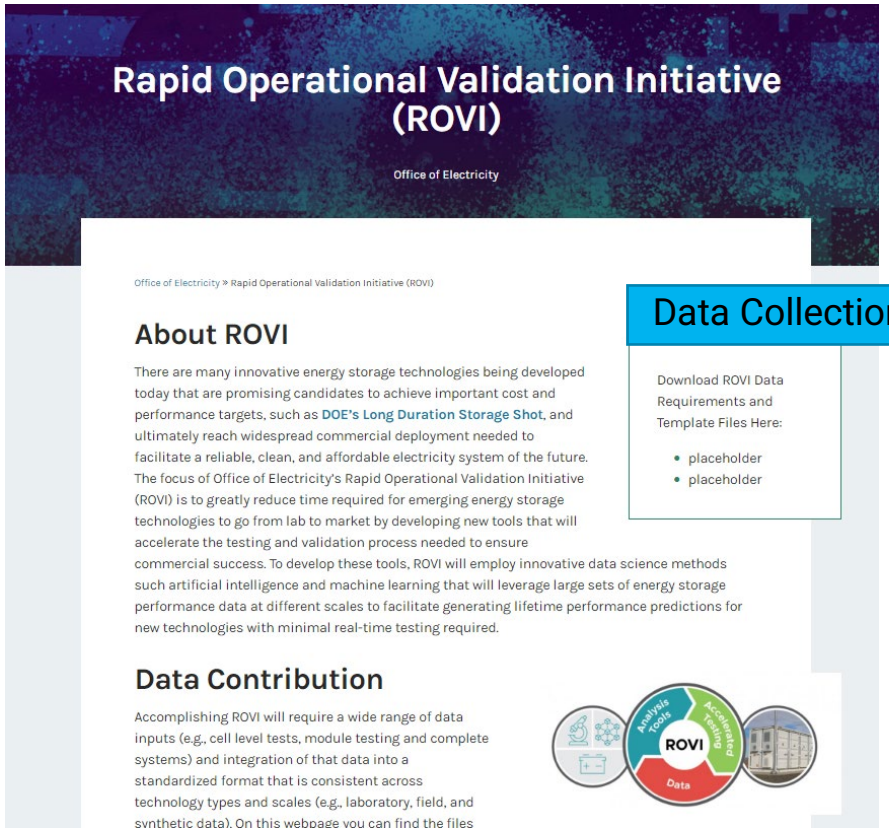
Targeted Use Cases/Applications:

+ Use Case 1: Support the transmission or distribution (T&D) electric grid
+ Use Case 2: Improve resilience or efficiency for facilities or other critical infrastructure
+ Use Case 3: Integrate electric vehicle charging
+ Use Case 4: Used in microgrids, either grid-connected or islanded
+ Will consider: Any other new or innovative use case that ESS can be used for.

Criteria for Innovative Demonstrations:

+ Advancing Innovative Technologies: Projects will help mature a storage technology that is pre-commercial for an intended use case or has not reached targeted scale for deployment (not in early-stage R&D, likely has had some previous demonstration)
+ Innovations for Use Case Applicability: Demonstration will help an ESS technology overcome a technical or commercialization barrier that prevents it from being used in specific use case(s).

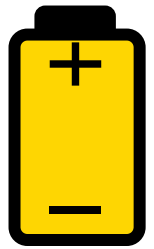
ROVI Integration



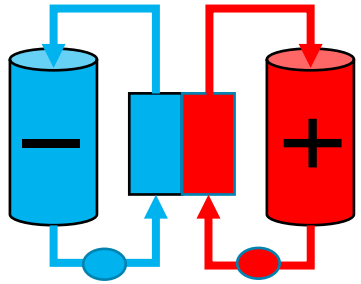
[Rapid Operational Validation Initiative (ROVI) | Department of Energy (doe.gov)]

Data Collection Requirements

Demo Projects Supported by Demonstration & Validation FOA



Lithium Battery



Flow Battery

Other Innovative ESS

Data

ROVI Data Hub

Areas Not of Interest

- Submissions for proposed technologies that are not based on sound scientific principles (e.g., violates the laws of thermodynamics).
- Submissions for basic research aimed solely at discovery and/or fundamental knowledge generation.
- Submissions for large-scale demonstration projects of existing commercial technologies.
- Mobile ESS (either onboard vehicles or relocatable systems)
- Hydrogen based ESS concepts
- ESS built to be used on a testbed or laboratory setting
- New component or material development activities for ESS
- Scaling up or expanding manufacturing capabilities

Cost Share Structure

Area of Interest	Estimated Federal Funding	Anticipated No. of Awards	Anticipated Individual Award Size			Maximum DOE Share of Award
			DOE Share $/%	Cost Share $/%	Total $	
1 – Lithium Batt.	$5,000,000	1	$5,000,000/50%	$5,000,000/50%	$10,000,000	$5,000,000
2 – Flow Batt.	$5,000,000	1	$5,000,000/50%	$5,000,000/50%	$10,000,000	$5,000,000
3 – Other	$5,000,000	1	$5,000,000/50%	$5,000,000/50%	$10,000,000	$5,000,000

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2 – Flow Batt.	$5,000,000	1	$5,000,000/50%	$5,000,000/50%	$10,000,000	$5,000,000
3 – Other	$5,000,000	1	$5,000,000/50%	$5,000,000/50%	$10,000,000	$5,000,000

Awardee cost share amount <u>can be reduced to 20%</u> if the prime applicant is one of the following:

- Tribe or Tribal Organization
- Institution of Higher Education
- Small Utility
- Disadvantaged community
- Small Business Technology Developer

Anticipated Individual Award Size			Maximum DOE Share of Award
DOE Share $/%	Cost Share $/%	Total $	
$5,000,000/**80%**	**$1,250,000/20%**	**$6,250,000**	$5,000,000
$5,000,000/**80%**	**$1,250,000/20%**	**$6,250,000**	$5,000,000
$5,000,000/**80%**	**$1,250,000/20%**	**$6,250,000**	$5,000,000

Concept Papers Requirements

- Submissions Due **September 15**
- Must not exceed 8 pages
- Must be limited to a single area of interest
- Content will include:
  - A brief description of the proposed approach to achieve this FOA's objectives.
  - The proposed work, if successfully accomplished, would clearly meet the objectives as stated in the FOA.
  - The applicant clearly describes the proposed technology, describes how the technology is unique and innovative, and how the technology will advance the current state-of-the-art
  - The applicant has identified risks and challenges, including possible mitigation strategies, and has shown the impact that DOE funding and the proposed project would have on the relevant field and application; and
  - The applicant has the qualifications, experience, capabilities, and other resources necessary to complete the proposed project
- DOE will review concept papers and notify applicants that they either encourage or discourage a full application
- <u>Applicants must submit a concept paper to be eligible to submit a full application</u>

Full Application Requirements

- Submissions Due **December 4**
- Review FOA Section C. Full Applications (Pg. 29 – 30) for entire list of required documents including Budget Justification, Community Benefits Plan, etc..
- Project Narrative must not be more than 30 Pages, Sections Specific to this FOA Include:
  - Description of Technology
  - Description of the proposed Demonstration and Validation
  - Cost and Performance Justification
  - ROVI Data Collection Workplan

Full Application Evaluation Criteria

Description of Detailed Criteria Factors on Pages 61-65 of FOA

- CRITERION 1: TECHNICAL MERIT AND EVALUATION (25%)
- CRITERION 2: SIGNIFICANCE AND IMPACT (20%)
- CRITERION 3: PROJECT EXECUTION AND MANAGEMENT APPROACH (15%)
- CRITERION 4: TEAM AND RESOURCES (20%)
- CRITERION 5: COMMUNITY BENEFITS PLAN (20%)

Demonstration and Validation FOA Timeline

September 15, 2023 | October 10, 2023 | December 4, 2023 | Q1 2024 | Q2 2024

Demonstration and Validation FOA Timeline

Concept Papers Due	Concept Paper Responsiveness Feedback	Full Applications Due	Expected Selection Notifications	Expected Award Date
September 15, 2023	October 10, 2023	December 4, 2023	Q1 2024	Q2 2024

Questions? Email: FOA3036@netl.doe.gov

Important Links

Most up to date FOA version: FedConnect: Opportunity Summary

ROVI Requirements: Rapid Operational Validation Initiative (ROVI) | Department of Energy

Partnering List: Partnering List | NETL & Partnering List Submission | NETL

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Questions?

Thank You

Storage Innovations 2030: Technology Liftoff - https://netl.doe.gov/grid-resilience/FOA3020

Energy Storage Demonstration and Validation - https://netl.doe.gov/grid-resilience/FOA3036

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