LDES NATIONAL CONSORTIUM

Demonstrations & Deployments Tiger Team Mission Statement

The National Consortium for the Advancement of Long Duration Energy Storage (LDES) Technologies

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Office of Technology Transitions

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Demonstrations & Deployments Tiger Team Mission Statement

Purpose & Objectives

One of the most significant outcomes of the National Consortium will be a set of recommendations to frame multiple pathways to achieve LDES commercialization over the next decade. Commercialization refers to the steps that must be taken before technologies are successfully launched to affirm or redefine traditional approaches (i.e., pathways) addressing policies, financing and investing, supply, production and distribution, marketing and sales, and customer support.

The purpose of the Demonstrations and Deployments Tiger Team is to identify relevant scenarios where utility scale energy storage technologies can be demonstrated at pilot scale and for small commercial applications. The Demonstrations and Deployments team will work with industry stakeholders to identify the practical challenges that exist with the addition of energy storage to the existing grid infrastructure.

Scope

The scope of this Tiger Team is defined as finding the right use-case for demonstration projects and supporting the techno-economic validation of LDES technologies. Stakeholders in the commercial deployment and demonstration projects would include utilities, ISOs/RTOs, existing technology providers, and upcoming technology providers that do not yet have large scale commercially deployed projects. Assessments of the interactions between diverse LDES technologies and real-world practical constraints will form a large part of the scope of this Tiger Team.

In addition, scope definition and interface with existing hardware, in conjunction with the relevant policies and permitting standards, is a significant part of the scope of deployment and demonstrations. The Demonstrations and Deployments Tiger Team will be assessing the grid interface which will be governed by local policies and regulations. With the grid interface defined, a standard integration plan can be proposed for multiple scenarios, which can be used to inform the development of other projects. A deployment project should have special emphasis on the following grid related aspects: 1) reliability; 2)

operations and maintenance; 3) grid stability; 4) response time and regime; and 5) auxiliary grid services.

Leadership

The Demonstrations & Deployments Tiger Team will be led by two leaders from a national laboratory and one Industry Advisor selected from among participating Teaming Partners. The current leadership for the Demonstrations and Deployments Tiger Team is:

- **Lab Leader:** Henk Laubscher, Sandia National Laboratories, hlaubsc@sandia.gov
- **Lab Back-Up Lead:** Zhiwen Ma, National Renewable Energy Laboratory, Zhiwen.Ma@nrel.gov
- **Industry Advisor:** TBD
- **Subject Matter Experts:** TBD

Activities & Deliverables

A comprehensive assessment of necessary supply chain improvements specific to LDES technologies does not presently exist. (Organized by LDES technology type, a preliminary list of supply chain considerations will be prepared, inclusive of needs pertaining to raw materials, streamlined production processes, standardized installations, manufacturing & assembly efficiency improvements, automated assembly, cost-efficient sourcing, sub-components, etc.

In addition, recommendations will also be included on design optimization, manufacturing tool development, improvements in manufacturing processes, and precision control and optimization across production lines. Intended audience: Output made publicly available on Community of Knowledge & Best Practices and sent directly to Engineering, procurement & construction firms, OEMs, etc.

Presently, there is no publicly available evaluation of LDES technologies against six primary competitive factors. A “competitive factor matrix” will be prepared and made available on the Community of Knowledge and Best Practices that evaluates known LDES technologies against these six competitive factors: 1) nominal duration—measure of how long the storage system can discharge at its maximum power rating; 2) ramp rate—The speed at which a storage system can increase or decrease output; 3) response time—the time it takes for a system to provide energy at its full rated power; 4) levelized cost of

storage (LCOS)—cost of the LDES system measured in $ per MWh; 5) minimum deployment size—smallest capacity deployment that is technically feasible; and 6) footprint—amount of land needed to deploy the system. Intended audience: Output made publicly available on Community of Knowledge & Best Practices and sent directly to State PUCs, financial investment firms, utilities, etc.

Deliverable: Creation of a demonstrations and deployment tracking system which is a data tracking system that keeps track of all the LDES projects, including the definition of the key performance indicators.

Questions To Be Addressed

- How can the challenges with utility scale LDES technologies and commercial deployment be captured in a manner that will benefit competitive technology providers and utilities?
- What scale of demonstration projects that are grid connected would be the right amount of risk for utilities and grid operators to implement as a first commercial iteration of a new technology? What role would public-private partnerships play in the funding of these projects, regarding investor risk appetite?
- What are the most important criteria to use to evaluate the choice of LDES technology (e.g., the reliability, cost, scalability, and other unique attributes of general ES technologies).
- What role does LDES play in the future (carbon-neutral) architecture and how do should the industry define the evolution of the existing infrastructure from what exist today to what the future grid infrastructure would look like?

Schedule

The Demonstrations and Deployments Tiger Team will meet on a monthly basis via a Microsoft Teams platform. Attendance will be taken at each meeting to track in-kind cost sharing contributions among Teaming Partners.

Notes from each meeting will be transcribed and shared with the Leadership Team so that commonalities across Tiger Teams can be identified.

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