



# IERE Collaboration Project Energy Storage

# Background

- In the survey of May 2019, Energy Storage was selected as one of the topics for the next in-depth research. Based on the additional survey, the Central Office asked SwRI in November 2019 to lead and draft the project. SwRI accepted the request.
- SwRI and the Central Office discussed the topics of the project and SwRI finally selected two topics—“**Modeling Degradation of Battery**,” and “**Evaluation of Battery Fire and Explosion**” — according to the votes on eight proposed topics from potential participants. In August, they requested the Central Office to ask the members if they can provide data information and/or used samples of BESS system.
- ENGIE responded to the inquiries from the Central Office that there is a possibility of providing data to the project. After detailed discussion between SwRI and ENGIE, SwRI drafted the necessary contract between SwRI and participants.
- The Central Office sent the final plan to all members on December 28, 2020 to invite them again to participate. Finally, 10 members answered that they were interested in the project.

# Objectives

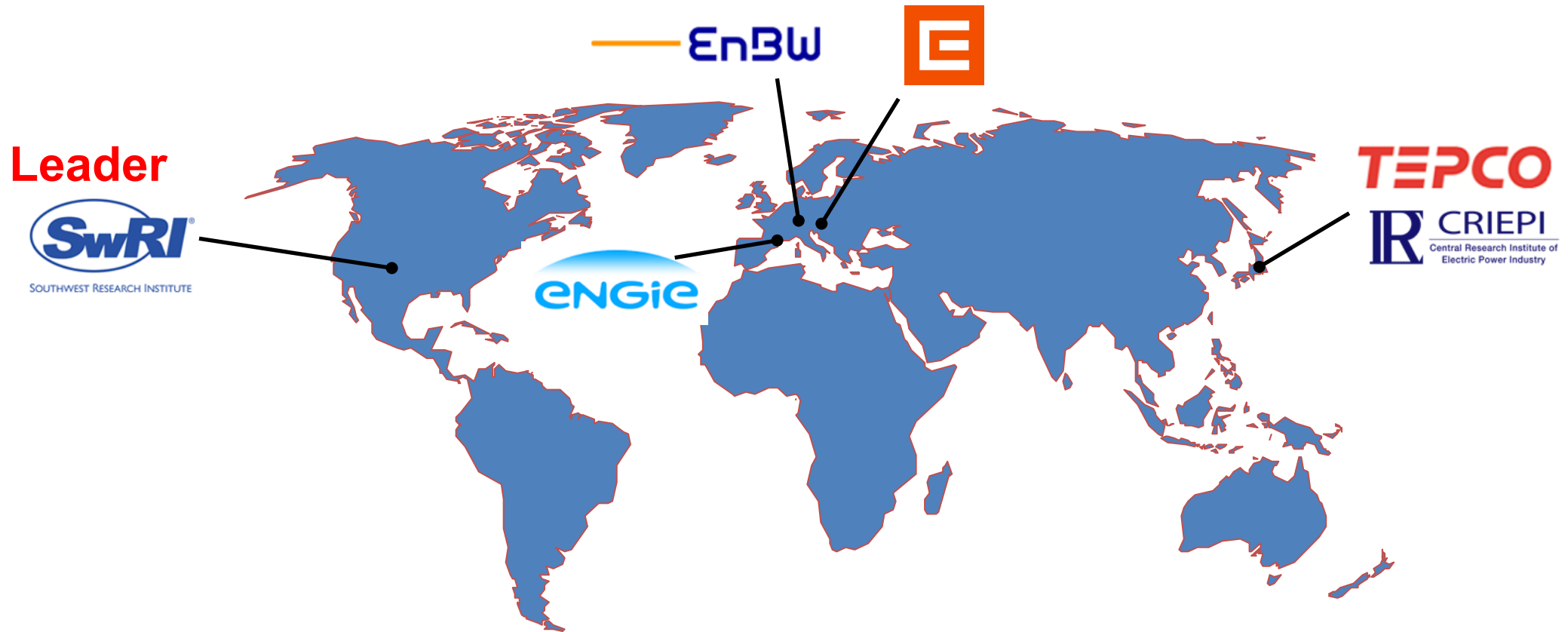
- Modeling Degradation of Battery

To estimate degradation of battery under a “composite grid duty” representing solar shifting, arbitrage, and infrastructure services.

- Evaluation of Battery Fire and Explosion

To instigate and investigate approaches to detect lithium plating/dendrite growth, and to explore real-time implementation of detection method(s) as a part of prognostics and preventive maintenance. Extended objective could include modeling of cell-to-cell fire propagation, efficacy of thermal barrier(s) and of fire suppressant(s).

# Active-participants (as of June. 2021)



# Planned tasks

- Procurement of test article and literature review
- Analysis of field data. design of experiments (simple and non-simple), design difference mixed grid duty
- Laboratory testing to characterize performance degradation and lithium plating/dendrite growth
- Development of a unified model-based method to estimate performance degradation
- Implementation of the unified method for real-time operation
- Demonstration of the unified real-time method on the small grid-connected battery on SwRI campus
- Management of charge profile to reduce lithium plating/dendrite growth

# Duration

- The project will last 18 month and quarterly meeting will be held.