Mobile and Transportable Energy Storage Systems – Technology Readiness, Safety, and Operation

Industry Connections Activity Initiation Document (ICAID)

Version: 1.0, 12 February 2022

IC22-003-01 Approved by the CAG 14 March 2022

Instructions

- Instructions on how to fill out this form are shown in red. It is recommended to leave the instructions in the final document and simply add the requested information where indicated.
- Shaded Text indicates a placeholder that should be replaced with information specific to this ICAID, and the shading removed.
- Completed forms, in Word format, or any questions should be sent to the IEEE Standards Association (IEEE SA) Industry Connections Committee (ICCom) Administrator at the following address: industryconnections@ieee.org.
- The version number above, along with the date, may be used by the submitter to distinguish successive updates of this document. A separate, unique Industry Connections (IC) Activity Number will be assigned when the document is submitted to the ICCom Administrator.

1. Contact

Provide the name and contact information of the primary contact person for this IC activity. Affiliation is any entity that provides the person financial or other substantive support, for which the person may feel an obligation. If necessary, a second/alternate contact person's information may also be provided.

Name: Farid Katiraei
Email Address: fkatiraei@quanta-technology.com
Employer: Quanta Technology
Affiliation: Quanta Technology

IEEE collects personal data on this form, which is made publicly available, to allow communication by materially interested parties and with Activity Oversight Committee and Activity officers who are responsible for IEEE work items.

2. Participation and Voting Model

Specify whether this activity will be entity-based (participants are entities, which may have multiple representatives, one-entity-one-vote), or individual-based (participants represent themselves, one-person-one-vote).

"Entity-Based"

3. Purpose

3.1 Motivation and Goal

Briefly explain the context and motivation for starting this IC activity, and the overall purpose or goal to be accomplished.

In line with de-carbonization of electric utility industry and driven by greater focus on power system reliability and resiliency enhancement, many utilities have initiated programs to explore use of transportable and mobile energy storage solutions. This can be immediately suggested as a replacement for a large fleet of diesel generator-based units maintained by utilities for emergency response and day-to-day customer support.

The primary goal of this IC Activity is to engage industry leaders and subject matter experts to capture state-of-the-art on standards, technologies and application associated with mobile and transportable energy storage solutions. The key topics of focus are use cases, technology readiness, safety considerations, performance requirements and tracking, and business case development for fleet deployment.

The IC Activity will build on extensive knowledge and experience from standardization of stationery energy storage applications and use of certain battery technologies in electric cars. The growing industry interest necessitates development of safety and performance standards to support cost effective deployment and widespread utilization.

There is also ambiguity in available technologies and vendor products that can be reliably used in mobile energy storage applications. In that regard, the design, engineering and specifications of mobile and transportable energy storage systems (ESS) projects will need to be investigated.

3.2 Related Work
Provide a brief comparison of this activity to existing, related efforts or standards of which you are aware (industry associations, consortia, standardization activities, etc.).

a) Most standards, guidelines and certification documents for safety and operation of stationary batteries are applicable to this work; however, the specifications need to be reviewed and adjusted to further cover mobile applications. Examples of main document to use are:

- NFPA 855-202 in Section 4.5 has briefly discussed the mobile applications
- UL 9540 is a reference document for safety and fire prevention
- IEEE standard 2030.2 and IEEE P1547.9 will be relevant for the interconnection and application considerations

b) The work in the areas of Electric Vehicles (EV) with on-board chargers are also relevant, since they can also serve as vehicle to the grid (V2G) to power up a building/facility or exchange power with the electric grid. Examples are:

- IEEE 2030.1.1-2021: Technical Specifications of a DC Quick and Bi-directional Charger for Use with Electric Vehicles
- SAE J3072: Grid interconnection aspects of on-board inverter/chargers

3.3 Previously Published Material
Provide a list of any known previously published material intended for inclusion in the proposed deliverables of this activity.

List the previously published material, if any.
None

3.4 Potential Markets Served
Indicate the main beneficiaries of this work, and what the potential impact might be.

- Energy Storage
- Electric Utility
- Critical infrastructure: Data centers, airports, hospitals
- Mining and construction
- Transportation electrification (increasing use of EV charging and V2X for backup).

3.5 How will the activity benefit the IEEE, society, or humanity?
Describe how this activity will benefit the IEEE, society, or humanity.

The activity will identify gaps in current standards and can potentially support development of a few PARs for forming standards development working groups, and identifying subject matter experts that are willing to participate and develop relevant standards and guidelines – as the next step after IC activity.

The primary application of mobile energy storage systems is for replacement of polluting and noisy emergency diesel generators that are widely used in various utilities, mining, and construction industry. Mobile ESS can reduce use of diesel generators and provide a cleaner and sustainable alternative for reduction of GHG emissions. The benefit goes to environment and society. The focus on resiliency enhancement and providing means of backup power during outages and restoration time after major storms or natural disasters also bring significant benefit to society.

Mobility can potentially improve the business case for widespread use of Energy Storage System, to benefit from applications requiring seasonal or frequent relocation of ESS.

4. Estimated Timeframe
Indicate approximately how long you expect this activity to operate to achieve its proposed results (e.g., time to completion of all deliverables).

Expected Completion Date: 03.2024

IC activities are chartered for two years at a time. Activities are eligible for extension upon request and review by ICCom and the responsible committee of the IEEE SA Board of Governors. Should an extension be required, please notify the ICCom Administrator prior to the two-year mark.

5. Proposed Deliverables
Outline the anticipated deliverables and output from this IC activity, such as documents (e.g., white papers, reports), proposals for standards, conferences and workshops, databases, computer code, etc., and indicate the expected timeframe for each.

The IC activity will focus on arranging meetings and webinars with guest speakers that are subject matter experts in various relevant areas to the topic, such as mobile technologies, safety, and design. Some outreach activities will include survey and gap analysis by interviewing experts and potential future end-users of the technology.

The IC activity is planned to deliver:

- Task 1 - Events: 1 dedicated symposium / conference per year and 2 webinars on associated topics
- Task 2 – Survey 1: Use cases for mobile and transportable ESS
- Task 3 – Survey 2: Gap analysis in standards and technologies
- Task 4 - White paper 1: Business case for mobile and transportable ESS
- Task 5 - White paper 2: Safety and operational considerations
- Task 6 - Preparation proposals for standards: The aim would be to prepare proposals for one or two standard development topics, including tentative plans and timeline for initiating subsequent work needed on standardization of design and safety of Mobile ESS.

Timeline	Q2/2022	Q3/2022	Q4/2022	Q1/2023	Q2/2023	Q3/2023	Q4/2023	Q1/2024
Task 1 - Events	Webinar	In-person	Webinar	Webinar	Webinar	In-person	Webinar	Webinar
Task 2 – Survey 1								
Task 3 – Survey 2								
Task 4 – Wp1								
Task 5 – Wp2								
Task 6 – Std. Proposals								

5.1 Open Source Software Development

Indicate whether this IC Activity will develop or incorporate open source software in the deliverables. All contributions of open source software for use in Industry Connections activities shall be accompanied by an approved IEEE Contributor License Agreement (CLA) appropriate for the open source license under which the Work Product will be made available. CLAs, once accepted, are irrevocable. Industry Connections Activities shall comply with the IEEE SA open source policies and procedures and use the IEEE SA open source platform for development of open source software. Information on IEEE SA Open can be found at https://saopen.ieee.org/.

Will the activity develop or incorporate open source software (either normatively or informatively) in the deliverables? No

6. Funding Requirements

Outline any contracted services or other expenses that are currently anticipated, beyond the basic support services provided to all IC activities. Indicate how those funds are expected to be obtained (e.g., through participant fees, sponsorships, government, or other grants, etc.). Activities needing substantial funding may require additional reviews and approvals beyond ICCom.

Specify funding requirements and sources, if any.

None is expected – If any fund is required for supporting in-person events, it will be raised through supporting standard committee or participating entities

7. Management and Procedures

7.1 Activity Oversight Committee

Indicate whether an IEEE Standards Committee or Standards Development Working Group has agreed to oversee this activity and its procedures.

Has an IEEE Standards Committee or Standards Development Working Group agreed to oversee this activity?

Not yet – However, we had discussion with IEEE ESSB committee (Babu Chalamala – Chair of ESSB; Steve Vechy - Vice Chair and Jason Wallis - Secretary of ESSB). They will have an internal committee meeting on March 4th, 2022 that will discuss this IC activity. They believe a joint effort between ESSB and SCC21 can be considered, which we are aiming to secure their sponsorship in a follow up meeting in mid March (after their internal meeting).

If yes, indicate the IEEE committee's name and its chair's contact information.

IEEE Committee Name: Committee Name
Chair's Name: Full Name
Chair's Email Address: who@where

Additional IEEE committee information, if any. Please indicate if you are including a letter of support from the IEEE Committee that will oversee this activity.

Not at this stage.

IEEE collects personal data on this form, which is made publicly available, to allow communication by materially interested parties and with Activity Oversight Committee and Activity officers who are responsible for IEEE work items.

7.2 Activity Management

If no Activity Oversight Committee has been identified in 7.1 above, indicate how this activity will manage itself on a day-to-day basis (e.g., executive committee, officers, etc.).

The following IC Activity management structure is proposed:

The activity will for a management board consisting of :
- A chair
- A vice-chair
- A secretary
- Two or three workstream leads

  o The Activity will identify 2 or 3 workstreams for each year of operation to focus on the key topics of interest and progress toward specified deliverables.

The IC activity management board and contributing members will hold a minimum of one workstream meeting per quarter and one in-person meeting per year.

7.3 Procedures

Specify the policies and procedures document to be used. Attach a copy of chosen policies and procedures.

We propose to follow Option (a)

8. Participants

8.1 Stakeholder Communities

Electric utilities, Energy Storage vendors, Medium and heavy-duty EV vendors, National Labs, Developers, Consulting and Engineering companies, Universities.

8.2 Expected Number of Participants

Number of entities or number of individuals.

10 to 15 entities are expected – six (6) entities are confirmed at this time.

8.3 Initial Participants

Entity Name	Primary Contact Name	Additional Representatives
Quanta Technology	Farid Katiraei	Shadi Chuangpishit
National Grid - USA	Babak Enayati	
Florida Light & Power	Zach Egerton Cooper	
Hitachi Energy	Hamideh Bitaraf	
Luma Energy (Puerto Rico)	Alex Nassif	
Pacific Northwest National Laboratory	Ryan Franks	

Individual Name	Employer	Affiliation

8.4 Activity Supporter/Partner
Indicate whether an IEEE committee (including IEEE Societies and Technical Councils), other than the Oversight Committee, has agreed to participate or support this activity. Support may include, but is not limited to, financial support, marketing support and other ways to help the Activity complete its deliverables.

Has an IEEE Committee, other than the Oversight Committee, agreed to support this activity?
Yes

If yes, indicate the IEEE committee's name and its chair's contact information.

IEEE Committee Name: IEEE Transportation Electrification Community (TEC)
Chair's Name: Bruno Lequesne
Chair's Email Address: Bruno.lequesne@ieee.org

Please indicate if you are including a letter of support from the IEEE Committee.

A supporting letter is included.