

Creating Opportunity: Advancing the Massachusetts Battery Energy Storage Innovation Ecosystem

A Virtual Working Symposium

December 9, 2020

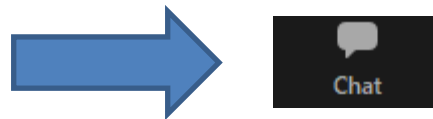
9:00 AM – 3:30 PM



UMassAmherst

Zoom Logistics

- **Guiding Document and Google Folder:** The *Agenda and Logistics Document* is the guiding document for the day. This was emailed to you and is located in a Google folder here: <https://tinyurl.com/y4r3l5cg>. We'll put the link to the Google folder in the chat now.
- **Please re-name yourself in Zoom if needed:** If your name in Zoom does not accurately represent your name, affiliation, or pronoun, feel free to click on the three dots in the upper right of your image and choose *Rename*.
- **Questions for facilitators:** Feel free to ask questions throughout the program using the **Chat feature**.
 - The icon can be found at the bottom of the screen.
 - To ask your question verbally, please unmute yourself.



Zoom Logistics

- **Session Zoom links:** The *Agenda and Logistics Document* contains all Zoom links for the plenary and all breakout sessions.
 - There is a single Zoom link for all plenary gatherings
 - There are multiple Zoom links for breakout meetings.
 - To join a breakout, you will choose the Zoom link for the group you wish to join, leave the plenary meeting, and join the breakout meeting. At the end of the breakout meeting, you will need to re-join the plenary using the plenary Zoom link.
 - Participants should feel free to move independently between breakout meetings.

11:15 AM (5 min)	Intro to Working Sessions (Plenary)	- Zoom mtg link: https://umass-amherst.zoom.us/j/96357137334 - Meeting ID: 963 5713 7334
11:20 AM (55 min)	Breakout Sessions: <i>Bottlenecks, Needs and Opportunities</i> <ul style="list-style-type: none">• Breakouts are organized by Ecosystem Sector	Academic / Research - Zoom mtg link: https://umass-amherst.zoom.us/j/92901822085 - Meeting ID: 929 0182 2085

Symposium Logistics

Your Host: **UMass Amherst Clean Energy Extension**

- **Dwayne Breger**, Director
- **River Strong**, Associate Director
- **John Fabel**, Project Consultant, BES Study, Report & Symposium
- **Shira Yeskel-Mednick**, Intern
- **Francisco Alonso**, Project Consultant



With appreciation for support from:



UMassAmherst

Agenda Overview

Introduction, Setting the Stage

- **Keynote** – Galen Nelson, MassCEC

BES Steering Committee, Introductions and Comments

Strengthening Connections Across the Ecosystem

- Plenary and Breakout sessions

Working Session 1: *Bottlenecks, Challenges and Opportunities*

- Breakout sessions, by ecosystem sector

Networking Lunch / Break, including Remo networking platform

Working Session 2: *Specific Discussion Topics*

- Breakout sessions, by Topic

Working Session 3: Next Steps for Massachusetts BES Initiative

Wrap-up & Thank You

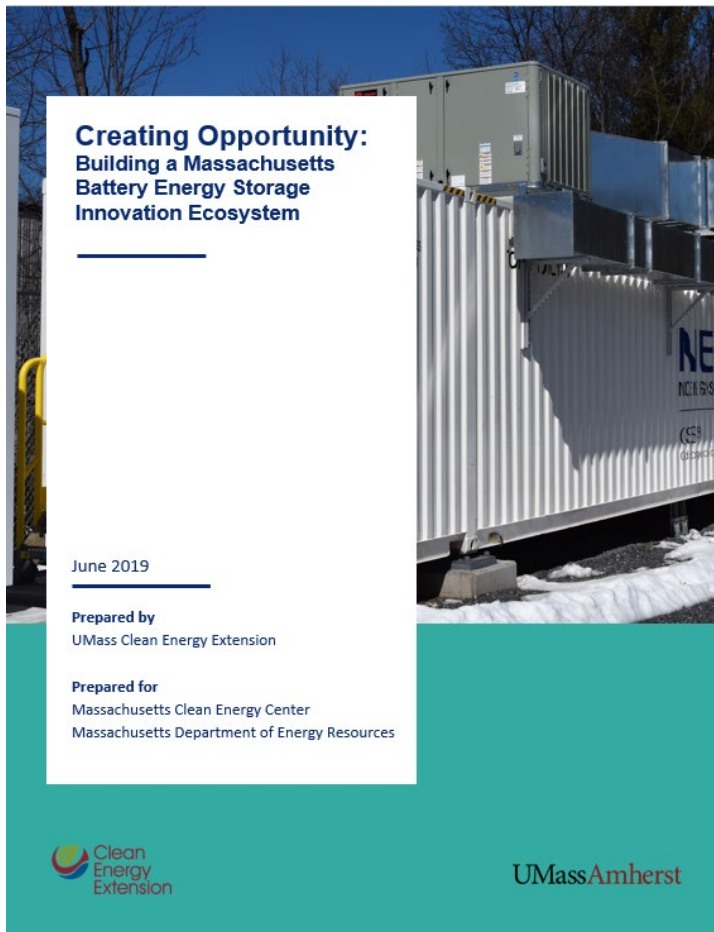


Project Origins

- Project originated by the **Massachusetts State Legislature and the Special Legislative Commission on Battery Energy Storage**. Key interest in understanding need/opportunity for a publicly-accessible BES testing facility in MA.
- 2018 CEE report **“Energy Storage and Battery Test Facilities: National Benchmarking Report”** surveyed national battery testing facilities.
- Access to technology testing equipment could greatly benefit battery entrepreneurs and emerging energy storage companies, but not clear this was a real critical need.
- More apparent was that MA did have a robust innovative BES ecosystem, and there was expressed interest in being better connected, integrated, and recognized.
- This led to a **2018 study** commissioned by the MA DOER and MassCEC. Report **“Creating Opportunity: Building a MA Battery Energy Storage (BES) Innovation Ecosystem”** completed in June 2019.
- **Legislative Briefing** in Oct 2019 met with great interest and support for next steps.



Creating Opportunity: Building a MA Battery Energy Storage (BES) Innovation Ecosystem



Key Research Question:

MA is aware of its leadership in battery research, entrepreneurship, and commercialization ...

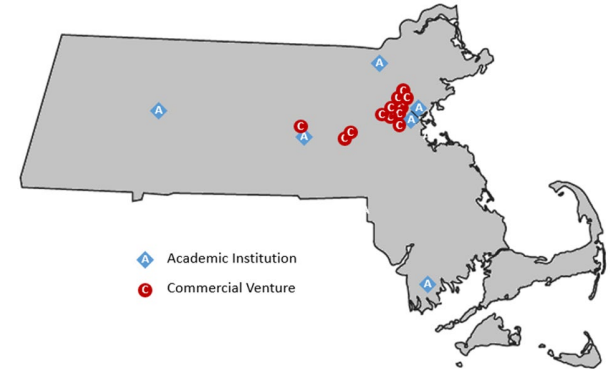
... but what more can we do more to enhance this innovation ecosystem to benefit battery innovation for the world and our local economic development?



UMassAmherst

Study Design

- 20 hours of commercial and academic interviews and site visits
- 11 academic research participants across 6 institutions
- 13 commercial ventures
- Collaborations with MassCEC, DOER, and Greentown Labs
- Research sources: industry reports, patent filings, technical journal publications, trade publications, market research resources, job listings



Academic Sector Participants

Institution	Study Participant(s)
Massachusetts Institute of Technology	Dr. <u>Fikile Brushett</u> Dr. Yet-Ming Chiang
UMass Boston	Dr. <u>Niya Sa</u>
UMass Amherst	Dr. Wei Fan Dr. <u>D. Venkataraman</u> Dr. Wei Fan Dr. James Watkins
UMass Lowell	Dr. <u>Ertan Agar</u> Dr. <u>Fuqiang Liu</u>
UMass Dartmouth	Dr. Patrick Cappillino
Worcester Polytechnic Institute	Dr. Yan Wang

Commercial Sector Participants

Company	Study Participant(s)
24M, Inc.	Dr. Yet-Ming Chiang
Ambri, Inc.	Phil Giudice
Battery Resourcers, Inc.	Dr. Yan Wang
Battrion, Inc.	(Katie MacDonald)* (Victor Marttin)*
Form, Inc.	Dr. Yet-Ming Chiang Mateo Jaramillo
Greentown Labs	Katie MacDonald Victor Marttin
Lionano, Inc.	Dr. Siyu Huang
Lithio Storage, Inc.	Dr. Anthony D'Angelo
NEC Energy Solutions, Inc.	Michael Hoff
Sparkplug Power, Inc.	Sean Becker
Titan Advanced Energy Solutions	Dr. Steven Africk, Ashish Sreedhar
Toyota Research Institute	Dr. Brian Storey
Vionx Energy Corp.	Dr. Shazad Butt

*Greentown Labs on behalf of Battrion, Inc.

Findings

Finding #1: MA Has a Wealth of BES Academic Resources and Expertise

The Commonwealth's colleges and universities have substantial technical, intellectual, and developmental BES resources that are of current and potential value to Massachusetts BES commercial ventures.

Finding #2: MA is Both Generating and Attracting BES Businesses

Massachusetts is both generating BES companies and attracting them from outside of the state.

Finding #3: MA has the Elements to Become a Global BES Innovation Center

Massachusetts has the critical BES innovation ecosystem elements necessary for the state to become a global center of BES innovation and commercialization.



Credit: <https://spectrum.mit.edu> - Pilot manufacturing plant at 24M's headquarters in Cambridge

Recommendations

1. Create a Leadership Consortium/Steering Committee
2. Convene and Facilitate BES Industry Events, Symposia, and Networking Opportunities
3. Develop and Disseminate a Massachusetts BES Innovation Ecosystem Brand
4. Develop a Multi-functional Web-based Platform to Connect Ecosystem Resources and Activities



Credit: <https://itechcraft.com>

MA BES Innovation Ecosystem Initiative

Overall Goals and Objectives

- Recognize and maximize the potential of MA leadership in BES research and commercial entrepreneurship
- Enhance MA academic and entrepreneurial contributions to global BES innovation and commercialization
- Reinforce MA as clear location for BES venture start-ups and technology commercialization

Steering Committee Objectives

- Guide development of Symposium
- Form a foundation for an ongoing Steering Committee
- Represent stakeholders across innovation ecosystem

Symposium Goals and Objectives

- **Working Session** (action-oriented, not a conference)
- **Foster connections** and awareness across ecosystem sectors
- **Strategize areas and opportunities to focus on** for improvement, in very actionable ways
- Identify concrete, **actionable next steps**
- **Develop BES Initiative** as vehicle to advance strategies and actions

Symposium Keynote

Galen Nelson

Chief Program Officer

Massachusetts Clean Energy Center



UMassAmherst

Ecosystem Database

- Accessible in Symposium Google Folder (*link in Chat*)
- Editable. We're encouraging all to access and edit during the Symposium
- Tool that participants can use during Symposium
- Establish foundation for longer term database tool of people and resources across the BES ecosystem

Introduction to the MA BES Steering Committee

Fikile Brushett, MIT

Mike Condon, Mass Clean Energy Center

Jessi Duston, UMass Lowell / Greentown Labs

Natasha George, SomEV

Katie Geusz, Greentown Labs

Michael Hoff, formerly NEC

Judith Judson, Ameresco

Galen Nelson, Mass Clean Energy Center

Alistair Pim, Northeast Clean Energy Council

Kavita Ravi, BlueWave Solar

Jeffrey Roy, MA State Representative, Norfolk

Mitch Tyson, NECEC / Tyson Associates

Loren Walker, UMass Amherst

Yan Wang, WPI

Dwayne Breger, UMass CEE

River Strong, UMass CEE

John Fabel, Meristem Partners / UMass Amherst

BREAK: 10 Minutes

10:00

mins: secs: type:

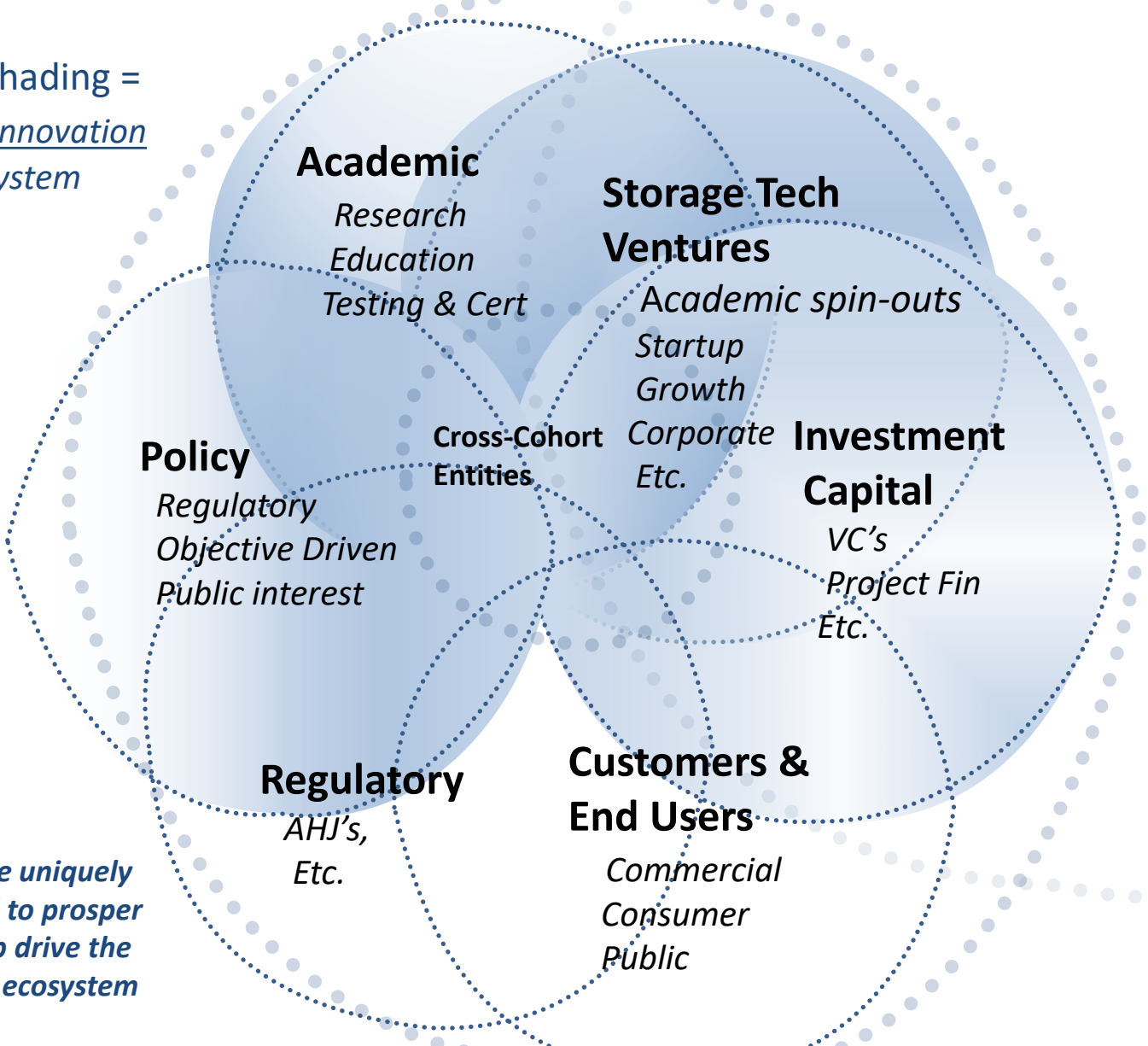
 Breaktime for PowerPoint by Flow Simulation Ltd.

Return to Plenary at 10:10 AM

Generalized Cohorts of the MA BES Ecosystem

Blue Shading =
*BES Innovation
Ecosystem*

*(Larger ecosystem
of tech economy)*



*MA may be uniquely
positioned to prosper
in and help drive the
larger BES ecosystem*

Zoom POLL:

Who's here from where in the Ecosystem?

- Storage Tech Ventures
- Academic / Research
- Ecosystem Entities
- Investment Community
- Policy & Legislative
- Customers and End-users
- Regulatory

Strengthening Connections Across the Ecosystem

Networking Breakouts

10:30 – 11:05

- **Academic / Research** (*Jessi Duston*)
- **Commercial / Entrepreneurial** (*Natasha George*)
- **Ecosystem / Policy** (*Katie Geusz*)
- **Investment Community** (*Francisco Alonso*)
- **Customers / End-users** (*River Strong*)

➤ **Links to Zoom Meetings:** Listed in *Agenda & Logistics Document*, posted in Chat

10 minute Break at 11:05, return to Plenary at 11:15am

BREAK: 10 Minutes

10:00

mins: secs: type:

 Breaktime for PowerPoint by Flow Simulation Ltd.

Return to Plenary at 11:15 AM

Working Session 1: 11:15 – 12:30

Bottlenecks, Challenges and Opportunities

Breakouts

11:20 – 12:15

- **Academic / Research** (*Yan Wang*)
- **Commercial / Entrepreneurial** (*Kavita Ravi*)
- **Ecosystem / Policy** (*John Fabel*)
- **Investment Community** (*Francisco Alonso*)
- **Customers / End-users** (*Mike Condon*)

>> Note taking Document available in the Google File (link in chat)

Report Back on Breakout Discussion, in Plenary at 12:15pm

➤ **Links to Zoom Meetings:** Listed in *Agenda & Logistics Document*



UMassAmherst

Networking LUNCH / BREAK

12:30 – 1:30

Attendees can:

- **Stay in Zoom plenary**, for open discussion, and can also go to:

- **The REMO Platform**

The REMO platform mimics a typical conference dining room, with multiple “tables”, and allows participants to move freely from table to table (see link in *Agenda & Logistics Document* and Chat).

Working Session 2:

1:30 – 2:30

Specific Discussion Topics

1:35 – 2:15

Breakouts

- **Dedicated Facilities, Centers of Excellence, etc.** (*Dwayne Breger*)
- **Facilitating Academic / Industry connections** (*Fik Brushett*)
- **Ecosystem and Policy Opportunities (MA as BES Center)** (*Galen Nelson / Mike Condon*)
- **Commercial Sector: Challenges and Opportunities** (*John Fabel*)

>> Note taking Document available in the Google File (link in chat)

Report Back Session on Breakout Discussion, in Plenary at 2:15pm

➤ **Links to Zoom Meetings:** Listed in *Agenda & Logistics Document*.

BREAK

10 Minutes

Return to Plenary at:

2:45 PM

Working Session 3:

2:45 – 3:25

Next Steps for MA BES Initiative

>> Great discussions and ideas today. How do we build on this momentum?

Wrap up Discussion

- **Where do we stand at this point?**
- **Breakout Rooms – discuss recommendations and next steps**
- **Report back and consolidate ideas**

Working Session 3: *Next Steps for MA BES Initiative*

BES Initiative: Where we Currently Stand

2019 Report Recommendations

1. Create a Leadership Consortium/Steering Committee
2. Convene and Facilitate BES Industry Events, Symposia, and Networking Opportunities
3. Develop and Disseminate a Massachusetts BES Innovation Ecosystem Brand
4. Develop a Multi-functional Web-based Platform to Connect Ecosystem Resources and Activities



- Progress/momentum on Recs 1 & 2
- How might we continue and expand this leadership and networking?
- Are Recs 3 & 4 critical next steps to build this ecosystem?
- What other actionable next steps might we take?

Working Session 3: *Next Steps for MA BES Initiative*

20 Minute Break-Out Room Discussions

- **Random assignment to break-out rooms (5-6 people in each)**
- **Consider what we heard and contributed today, and discuss the following questions:**
 - Do you think a BES Innovation Ecosystem initiative is important and worthy to recognize and pro-actively enhance in MA?
 - Are the additional recommended actions from the report (BES Innovation Ecosystem Branding, Multi-functional Web-based Platform to Connect Ecosystem) among the appropriate next steps?
 - Drawing on our work today, what other actionable next steps can you recommend?
- **Report back to Plenary on 3 key takeaways from your breakout discussion**
 - >> Note taking Document available in the Google File (link in chat)

Wrap-Up and Thank You

3:25 – 3:30

- Symposium slides will be available on CEE website
- A survey will be sent to all participants to evaluate Symposium, enable further input, and assess your willingness to engage in continued efforts
- CEE will provide a Symposium report to document discussion and outcomes (no expressions will be attributed to any individuals, without permission)
- We worked very hard today, and accomplished a lot

Thank you to our Steering Committee

Thank you to all of you for your contributions



UMassAmherst



UMassAmherst