



Energy Harvesting Committee (EHC) Minutes 21st Dec 2022

Attendees	Apologies/Non attendees	
Toshi Yamamoto, Nichicon Francesco Carobolante, IoTissimo John Horzepa, PSMA Lorandt Foelkel, Würth John Horzepa, PSMA Thomas Becker, Thobecore Sergiy Tykhonov, FRABA Gabriel Barrientos, Nowi Brian Zahnstecher, PowerRox Mike Hayes, Tyndall	John Fiske, Armor Maeve Duffy, Univ. of Galway Norm Elias, Norm Elias Model/Sim Baoxing Chen, Analog Devices Dinesh Kithany, Wired & Wireless Jean Michel Bidault, ITEN Cem Som, Würth John Flannery, Tyndall Andreas Beckes, FRABA Dusan Vuckovic, Ikea Mike Donnelly, Mentor/Siemens Johan Pederson, Sigma Design Nathan Jackson, Univ of New Mexico Christian Pennisi, Jennova Gary Johnson, Ilika Dan Stieler, PowerFilm Toby Best, FRABA Michalis Kiziroglou, Imperial College London Steve Savulak, Collins Aerospace	Lisa Horzepa, PSMA Peter Spies, Fraunhofer IIS Ningning Wang, Hangzhou DU Denis Pasero, Ilika George Slama, Würth Renee Yawger, EPC Ronald DeGraaf, NAWA Technologies David Tang, Netbit Sebastian Bader, MIUN Torben Dankwort, Fraunhofer ISIT Joe Horzepa, PSMA Roberto la Rosa, ST

(Co-chairs in bold font)

Next meeting:- **Wed 25th Jan 10am Central**, Brian to chair, Mike to type.

Agenda

1. Welcome any new members/guests.
2. EnerHarv **2024 planning**.
3. APEC 2023
4. PTR and technology opportunities... **HIR discussion in January**
5. Industry Event Watch & List of EH companies
6. Media activities
7. 'Treasure Chest' at end of the minutes.

1. Welcome new members

2. EnerHarv 2022 closure Ref www.enerharv.com and [Energy Harvesting Forum | Power Sources Manufacturers Association \(psma.com\)](http://Energy Harvesting Forum | Power Sources Manufacturers Association (psma.com))

- KICK OFF ENERHARV '24 DISCUSSIONS AT APEC '23 F2F MTG. **Teaser preview topic at Jan EHC mtg.**

3. APEC 2023 Set for March 19th-23rd 2023 in Orlando, FL.
PSMA Energy Harvesting Industry Session

7-SLOT DENIED, 4-SLOT (i.e. – THUR PM) AWARDED...WE DECLINED. **Open letter provided to PSMA Exec Comm on Fri 12/16/22...awaiting their review and status on any potential follow-on actions.**

4. PTR and technology opportunities

- PTR committee looking for webinar material from Sept onwards – any volunteers or suggestions? Hope to have 5-7 topics selected by the time the series kicks off.
- HIR 2023 – need to start thinking about what we add, needed Q1-2. **Review content from previous edition and identify opportunities for updates/expansion in this update. Can reserve agenda time in Jan call to strategize in greater detail. CALL TO ACTION FOR EHC PARTICIPANTS.**
- Norm talking with Mentor about integrating simulation models, any suggestions for EH applications, please contact Norm. **Any updates/interest for this month?**

5. Industry Event Watch & List of EH companies

- **Event tracker**
 - Revisit/update the list of good industry events for tracking. Hoping ENABLES2 proposal will be accepted/funded so can continue to share info with EHC and broaden the PowerIoT ecosystem and PSMA EHC communities.
For context check out the EnABLES position paper (& website)
[Position Paper – Access to facilities & expertise \(enables-project.eu\)](#)
 - Next update target June/July '23.
- **Company ecosystem**
 - BZ CONTINUES TO UPDATE AS INFO TRICKLES IN.

6. MEDIA ACTIVITIES

(a) Webinars/ PTR? PERPETUAL OPEN CALL TO EHC FOR WEBINAR SUGGESTIONS.

- Tasmia Rahman, U of Southampton - IBC on PV (esp. flex)?
 1. Interest in topic, take next step to solicit talk proposal (title/abstract), attempt to target a webinar in Q1CY23. BZ WILL SOLICIT INFO FROM TAS.
- Toshi Yamamoto, Nichicon – LTO Battery Tech
- Lorandt Foelkel, Würth – EH Tech Update

(b) Conferences/workshops

- Magnetics workshop APEC2023 (<https://www.psmacom/technical-forums/magnetics/workshop>) – committee has asked for suggestions for EH related magnetics. BZ MAKING SUGGESTIONS AND WILL REACH OUT.
 1. Lorandt reports George already presenting.
 2. Sergiy reports FRABA has interest and may be able to contribute... BZ & SERGIY TO TALK OFFLINE IN EARLY-JAN.
- BZ signed up for Sensors Converge (<https://www.sensorsconverge.com/>) June 20, 2023, in Santa Clara, CA (i.e. – Silicon Valley) – will be looking for speakers for a 4-slot, half-day, pre-conference symposium on EH. Also will include functional demo session at end. Reach out direct to BZ if interested.
- 3D-PEIM (Feb 1-3, 2023, Miami, FL, <http://www.3d-peim.org/program/>), BZ now stepping in to replace Mike's talk since unable to justify going to both 3D PEIM & APEC (time, effort and cost).. "Energy Harvesting at the Edge: When the Package IS the System" BZ has requested financial support from PSMA ExecComm (understand/acknowledge cannot be supported by 3D-PEIM budget). Joe notes PSMA has provided support in past for other events in which they were supporting a booth, but not sure if the same case in this scenario. If BZ can help represent/promote PSMA, then can potentially justify via the PSMA Conference Expenses budget. BZ WILL WORK DETAILS OFFLINE WITH PSMA OFFICE.

(c) Publications

- IEEE now looking for feature article on our white paper – lead edits (Thomas, Michalis, Bahareh, Maeve) created a small team.
 1. PELS mag (submitted end March). BZ Talked with Ashok at ECCE, said we are targeted for June '23 issue, but need to revamp draft to meet formatting/content requirements (tabled below). They also mentioned the draft looked like it was a bunch of excerpts compiled by numerous authors (perhaps not an unfair criticism) so needs work there as well. Working with him on a hard deadline, but the current update needs are clear and can immediately drive update efforts. MICHALIS/THOMAS CAN WORK WITH TEAM TARGETING END-JAN/MID-FEB FOR NEW DRAFT IN INTERIM. BZ has confirmed we are good to for June 23 edition with absolute draft deadline end-Mar. FYI – details of article format/requirements in Nov '22 EHC mtg mins for reference.
 2. John to dig out the endorsement from Bahareh and use it to CREATE PITCH FOR VALUE OF PSMA, ep. Looking for underwriters. PSMA member endorsements now posted on LI/Twitter. JOHN H. TO CHECK WITH MKG COMM ON STATUS.
- Also looking at cross-promotions for IPC – industrial automation, Industry 4.0, smart mobility, etc.
- Any material you want to re-cycle.... once not too much of a sales pitch?
- New suggestions
 - Hoping to mine upcoming events (APEC, EnABLES, APEX, EnerHarv, etc.)*

(d) Virtual conferences, articles, etc.

- Suggestions please

TREASURE CHEST

Approach these items one at a time in future meetings as people raise them.

7A. Sponsorship of a program where students build demonstrators.

- Lorandt has a budget to supply kits
- Help with education links – Qualcomm 'High Tech High'. Francesco will follow up.
- Green story. International dimension. Technology and applications dimensions.
- Wurth running design challenge.
- Keep simple, easy to use
- Competition or roadshow?
- PSMA has money to support.
- Action:- write ½ page strawman for student engagement mechanism **NEED A CHAMPION TO LEAD EFFORT FOR COMM**

“Here are Katherine’s thoughts on the competition:

There are two main styles of the competition that could be developed:

1. Engineering-Style Competition

- planning committee chooses specific EH devices that can be used and the target load
- planning committee also specifies energy input conditions (lighting setup, vibrational input, etc) for testing
- specifications are announced and teams would develop the power converter solution based on the specification
- teams can submit videos and/or reports on their team and proposed idea
- final teams are selected and they test their prototypes on site at an event competition (could be a conference)
- judging is based on technical criteria measured during the test (size, weight, efficiency, etc.)
- implementation is the most important aspect for this style of competition
- over different years, the specification and scenarios would focus on different technologies with the same basic format
- more similar to the International Future Energy Challenge run by PELS

2. Design-Style Competition

- planning committee could choose a theme based on a technology or application (e.g. smart homes, wearables, building monitoring, etc.)
- planning committee may want to specify some constraints or scenarios for the competition
- teams come up with complete EH design ideas (transducers, circuitry, load) and develop a prototype
- teams can submit videos and/or reports on their team and proposed idea
- final teams are selected and they present and demonstrate their prototypes on site at an event competition (could be a conference)
- judging is based on mostly qualitative and some quantitative judging criteria (so balanced judge selection will be important)
- this style of competition is more focused on the idea and design, but implementation is also important

There should probably be some discussion on which style the committee would like to see. The engineering-style requires a lot of prep work before even announcing the competition, while the design-style is more work for the judging and evaluation. I could see either being good for students. I hope someone can take these basics ideas and further development them into a competition.”

8B. Updated Goals

- Open to suggestions.
- We should try to forge links with other groups/sessions, e.g. capacitor, magnetics, packaging. – addressing this via “Tiger Team” effort within PSMA (multiple focused initiatives with small teams from various committees).

8C. Forward-looking Thoughts

- Software? Packaging/Industrial design? Modelling? Hackathon?

- Incorporate some kind of student competition as part of EnerHarv (Best Student Demo/Poster) or otherwise.

Mike Hayes & Brian Zahnstecher,
21st Dec 2022.