



## Energy Harvesting Committee (EHC) Minutes 25<sup>th</sup> Jan 2023

Attendees	Apologies/Non attendees	
Toshi Yamamoto, Nichicon John Horzepa, PSMA Lorandt Foelkel, Wurth Sebastian Bader, MIUN Gabriel Barrientos, Nowi Francesco Carobolante, IoTissimo Torben Dankwort, Fraunhofer ISIT Norm Elias, Norm Elias Model/Sim John Fiske, Armor Prateek Asthana, Tyndall Roberto la Rosa, ST Joe Horzepa, PSMA <b>Brian Zahnstecher, PowerRox</b> <b>Mike Hayes, Tyndall</b>	Maeve Duffy, Univ. of Galway Baoxing Chen, Analog Devices Dinesh Kithany, Wired & Wireless Jean Michel Bidault, ITEN Cem Som, Wurth John Flannery, Tyndall Andreas Beckes, FRABA Dusan Vuckovic, <b>TBD</b> 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	Lisa Horzepa, PSMA Peter Spies, Fraunhofer IIS Ningning Wang, Hangzhou DU Denis Pasero, Ilika George Slama, Wurth Renee Yawger, EPC Ronald DeGraaf, NAWA Technologies David Tang, Netbit Thomas Becker, Thobecore Sergiy Tykhonov, FRABA Michalis Kiziroglou, Imperial College London Steve Savulak, Collins Aerospace

(Co-chairs in bold font)

Next meeting:- **Wed 22<sup>nd</sup> Feb 9am Central, Mike to chair, Brian to type.**

### Agenda

1. Welcome any new members/guests.
2. EnerHarv **2024 planning.**
3. APEC 2023 – **briefing note + feedback on our open letter**
4. PTR and technology opportunities... **HIR discussion in January**
5. Industry Event Watch & List of EH companies
6. Media activities
7. **Norm update**
8. 'Treasure Chest' at end of the minutes.

### 1. Welcome new members

**Prateek welcome! Intro provided.**

### 2. EnerHarv 2024 planning Ref [www.enerharv.com](http://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.**
- Will be forming a workshop committee
- Will be EUROPE based, probably May-June? Who is interested in hosting? Tyndall, MIUN/RISE, Wurth (talk with Fraunhofer, FRABA & Thobecore)? Roberto might talk with Palermo or Genoa? **Who else? France? UK?**
- Will be submitting a proposal to PSMA board. Then will be an RFP process.
- Typ. 2.5-3 day event. Will need 4 day venue access.

### 3. APEC 2023 Set for March 19<sup>th</sup>-23<sup>rd</sup> 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.**

- **F2F meeting confirmed for Wed 22<sup>nd</sup> March 12-2pm (local), Rosen Centre Rm. Salon 14. All welcome, esp. guests.**
- People going so far:- Brian, Francesco, Mike, Lorandt (& Co.), Toshi, PSMA office. Possibly John Fiske. Please let us know. Ranajit Sai might be there (Tyndall magnetics expert). Known **NOT** going: Gabriel, Roberto, Sebastian, Torben
- Mike giving presentations at energy management (IS05 – 21<sup>st</sup>) and energy storage (IS24 – 23<sup>rd</sup>) industry sessions. <https://apec-conf.org/conference/sessions/industry/>
- **Mike & Brian plan to re-use & modify previous wording and verbalize the agenda to attract people.**

#### 4. PTR and technology opportunities

- 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 (e.g. chips act). **CALL TO ACTION FOR EHC PARTICIPANTS.**
  - Need 1-2 slides outlining plans for new revision by ~20<sup>th</sup> Feb.
  - Work completion plan Apr/May.
  - Francesco & Mike will share 1<sup>st</sup> draft with EHC shortly.
- 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. Ref. section 6 below for ideas.
- 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)?
  - **BZ SOLICITED INFO FROM TAS. CLOSED, not enough time**
- Toshi Yamamoto, Nichicon – LTO Battery Tech. Possibly leverage material related to Sensors Converge? July onwards.
- Lorandt Foelkel, Würth – EH Tech Update. Working on it. Should have ready by late Feb. April/May possible slot.
- Mike Hayes/Prateek Asthana, Tyndall - either eSiP/testbed or condition monitoring value proposition? July/August.
- Leverage Ranajit Sai presentation from magnetics workshop? – Mike will chat with him.
- Any other topics?

##### (b) Conferences/workshops

- Magnetics workshop APEC2023 (<https://www.psmacom/technical-forums/magnetics/workshop>) – committee has asked for suggestions for EH related magnetics.
  - **Ranajit Sai (Tyndall) will give a presentation**
- 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. **So far Tyndall and Nichicon, maybe Fraunhofer ISIT.**
- 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 will present and also represent the PSMA office.**

##### (c) Publications

- IEEE now looking for feature article on our white paper – lead edits (Thomas, Michalis, Bahareh, Maeve) created a small team.
  - 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.

- 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,  
25<sup>th</sup> Jan 2023.**