



Energy Harvesting Committee (EHC) Minutes 11th Sept 2023

Attendees	Apologies/Non attendees	
John Horzepa, PSMA Matthias Kirn, WTO Joe Horzepa, PSMA Sebastian Bader, MIUN Toshi Yamamoto, Nichicon Thomas Becker, Thobecore Torben Dankwort, Fraunhofer ISIT Prateek Asthana, Tyndall Soumyajyoti Maji, Univ of Galway Juan Carlos Rodriguez, ADI Roberto la Rosa, ST Jean Michel Bidault, ITEN Cristina Rusu, RISE Brian Zahnstecher, PowerRox Mike Hayes, Tyndall	Pallawi Joshi, Juniper Networks Dan Stielers assistant, PowerFilm Maeve Duffy, Univ. of Galway Francesco Carobolante, IoTissimo John Fiske, Armor James Rohan, Tyndall Ed Spence, TMIG (guest) Justin Henspeter, IBM Eric Swenson, IBM Pulugurtha Markondeya Raj, (Dr. Raj), FIU Gabriel Barrientos, Nowi (moved) Sergiy Tykhonov, FRABA Baoxing Chen, Analog Devices Dinesh Kithany, Wired & Wireless Cem Som, Wurth John Flannery, Tyndall Andreas Beckes, FRABA Dusan Vuckovic, Zvertech Lorandt Foelkel, Wurth	Lisa Horzepa, PSMA Peter Spies, Fraunhofer IIS Denis Pasero, Ilika George Slama, Wurth Renee Yawger, EPC Ronald DeGraaf, NAWA (moved) Technologies David Tang, Netbit Michalis Kiziroglou, Imperial College London Steve Savulak, Collins Aerospace Gary Johnson, Ilika Toby Best, FRABA Johan Pederson, Ignion Nathan Jackson, Univ of New Mexico Mike Donnelly, Mentor/Siemens Christian Pennisi, Jennova TBD, Wisepower Ningning Wang, Hangzhou DU Norm Elias, Norm Elias Model/Sim

(Co-chairs in bold font) (New/First-time members indicated in GREEN)

Next meeting:- Mon 9th Oct 9 am Central Mike to chair, Brian to type.

Agenda

1. Welcome any new members/guests.
2. EnerHarv 2024. **Request for Proposals – TAKE 2**
3. APEC 2024 – **IS speaker recruiting**
4. Industry Event Watch & List of EH companies
5. Media activities
6. Norm/Gabriel Collaboration Update
7. ‘Treasure Chest’ at end of the minutes.

1. Welcome new members

Cristina Rusu & Jean Michel Bidault.

2. EnerHarv 2024 planning Ref www.enerharv.com and [Energy Harvesting Forum | Power Sources Manufacturers Association \(psma.com\)](http://Energy Harvesting Forum | Power Sources Manufacturers Association (psma.com))

- **SEPARATE** Workshop committee created & meetings underway
- Will be EUROPE based, probably May-June.
 - Austrian/German consortium:- Thomas can pull together a bid at short notice if Italy bids fall through.
 - UK:- Alex can pull together a UK bid if Italy bids through.
 - Italian:- Championed by Roberto —ADI and NXP willing to participate, sponsorship TBD. Roberto reached out to ADI about supporting and will coordinate with Baoxing Chen.
- **Roberto & Mike in contact with POLITICO (Torino) & Univ. of Perugia (legacy hosting experience, known good resources/hotels/etc.) as potential hosts. They are both part of IUNET Italian consortium of universities so can work together with one of them as physical host. Both preparing bids (combination of the outline budget and filling out the questionnaire) and will support each other regardless of outcome. Perugia will give 2 options, 1 in May & 1 co-locating with their annual summer school (typ. 2nd wk July) as May will not work for most students.**
 - **OTHERS – U of Valencia: Victor Martinez... no response to date, will remove from list unless we hear otherwise end of this week.**
- Will be submitting a proposal to PSMA board. Then will be an RFP process. Target down selection of RFP process and recommendation for BoD special project form by end-May and open call till 16th June – 14th July ... final few days...**extended for new bidders and targeting mid Sept to collect bids.** Final awardee of RFP contingent on BoD approval of special project mid **Oct.**
- Typ. 2.5-3 day event. Will need 4 day venue access.
- John also notes APEC '24 is a little earlier (Feb 25-29, 2024, Long Beach, CA, USA) than normal.

3. APEC 2024 - PSMA Energy Harvesting Industry Session

APEC '24 will be early next year (<https://apec-conf.org/>, Feb 25-29, 2024, Long Beach, CA).

- EHC being designated a 7 slot session (6 presentations + 1 demo session) on Tues or Wed – TBD by APEC (not PSMA). Congrats to everyone for their efforts!
- There will be a 4 slot Emerging applications session (Thurs) – we have offered to give an EH presentation if so invited. Awaiting feedback from Ada.
- **EHC CALL TO ACTION TO START SOLICITING SPEAKERS(6)/DEMOS!**
 - Tyndall will provide one of each
 - Francesco, how about the IEEE HIR???
 - Note we may not get so many EU offers due to proximity to EnerHarv.
- Committee will select speakers
- Will get official notification ~ 9th Oct (& we need to confirm acceptance).
- **Mike & Brian will put together some target dates for nominations, abstracts, list of confirmed speakers, 1st draft of slides, list of demos, etc.**
- Schedule/Key Milestones:
 - **10/9/23** = APEC notification of official acceptance/slotting
 - **11/10/23** = target for confirming all six speakers
 - **12/8/23** = PPT DRAFT due to EHC (**not APEC**)
 - **12/15/23** = PPT draft feedback deadline
 - **1/9/24** = PPT **FINAL due to EHC** (**not APEC**)
 - **1/12/24** = PPT FINAL feedback deadline
 - **1/19/24** = APEC hard deadline for camera-ready PPT upload (to get into proceedings)
 - **2/27/24 OR 2/28/24** = Industry Session will be on one of these two days

4. Industry Event Watch & List of EH companies

- **Event tracker**
 - Revisit/update the list of good industry events for tracking. EnABLES turned into EU proposals for new research infrastructure (feasibility study) projects RISEnergy (retrofit EH powered WSN), Infrachip (Si on chip) ... will start in 2024. More details to follow late 2023.
 - **Next update target Nov '23.**
- **Company ecosystem** (*review quarterly, next due Oct-ish '23*)
 - **BZ CONTINUES TO UPDATE AS INFO TRICKLES IN. BZ WILL ADD SOME COMP CONTRIBUTORS TO HIR CONTENT.**

5. MEDIA ACTIVITIES

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

- IEEE HIR 2023. HIR = heterogeneous integration roadmap, packaging and system integration focus
 - Effort led by Francesco Carobolante. Possible APEC presentation?
 - Final draft candidate 8/8/23. **BZ/MH WILL SHARE LINK WITH TEAM WHEN PUBLISHED.**
- Toshi Yamamoto, Nichicon – LTO Battery Tech. Possibly leverage material related to Sensors Converge (already has ~50% of required content)? Upgrade & share overview with team by next meeting (Oct?).
- Lorandt Foelkel, Würth – EH Tech Update. **LORANDT SHARED PREVIOUS DIGIKEY WEBINAR FOR REFERENCE.** Mike & Brian feel it is good but needs higher % of new material – under review.
- Prateek Asthana, Tyndall. **MH SHARED PREVIEW PPT** (attached to Aug minutes). **Slot of 19th Oct agreed, expect advertising >2 weeks in advance.**
- Leverage Ranajit Sai presentation for 2024 (he has already lined up to give a magnetics PTR)
- Ed considering and will revert
- Any other topics?

(b) Conferences/workshops

- Lorandt will be at IEEE EMC conference, let him know if interested..... <https://emc2023.org/>. Good event, ~50 attendees, talked to lots of folks, not sure of any new PSMA interest.
- PSMA PwrSoC (<https://www.pdma.com/index.php/conferences/PwrSoC>), September 27 thru 29, 2023, Hannover, Germany **EHC CALL TO ACTION: ANYONE GOING/INVOLVED PLS KEEP EYE OUT FOR SPEAKERS/TOPICS TO LEVERAGE**
- CAFE (<https://2023.ieee-cafe.org/>), September 25 thru 27, 2023, Torino, Italy (Roberto will have presence)
 - Output of IEEE Transactions on Agrifood electronics (TAFE), (EiC: Danilo De Marchi)

(c) Publications

- 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

6. Norm/Gabriel Collaboration Update

TREASURE CHEST

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

8A. 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.”

7B. 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).

7C. 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,
11th Sept 2023.