



EnerHarv 2018



Closing Remarks

Soundbites from the birth of our Ecosystem

Brian Zahnstecher, PowerRox

The Ecosystem: How does it look now?

Mike Hayes, Tyndall National Institute



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“The Ingredients of an Ecosystem”

- **Curiosity → Interest → Initiative → Drive Change**
- **Turning Skepticism Into Awareness & Excitement**
 - Common Misperceptions
 - Negligible Power, Academic / Lab Experiment, No Production, Too Expensive
- **Ambition + PSMA Energy Harvesting Committee = “EH Soulmates”**
 - **YEAR 1:** Growth from 10 to 30 People, Particularly from Industry
 - **YEAR 2+:** 2 APEC Industry Sessions, 3 Webinars, & 1 Technology Roadmap later...**HERE WE ARE!**
- **There is a Palpable Shift Out There**
 - Skepticism → Cautious Optimism → Support Requests for Real IoT Applications
- **Marketing Friends Created the Hype and Identified the Major Opportunities**
 - IIoT, Wireless Sensor Networks (WSN), Conditional Monitoring, Factory Automation, Autonomous Vehicles, Smart Medical Devices, etc.
- **Now is the Critical Juncture**
- **Technologists Have the Vision to Make the Ecosystem a Reality**



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OUTPUTS

- **Themes**
 - **DAY 1:** Energy Sources, Transducers
 - **DAY 2:** Power Management, Storage
 - **DAY 3:** System Integration

“Skeptical at first”

“EOaaS”

“Consider dynamic thermal harvesting”

“Surprised by PV P-2-P variation”

“Need broad consideration, like packaging & SW.”

“10yrs ago, can put in car? Now, can put on skin?”

“What was a competitor is now a collaborator.”

“It depends!”

- **Before & After**



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- **The world's best and brightest minds in energy harvesting are gathered here in an unprecedented fashion (neither purely commercial nor academic).**
- **Industry & Academia, enablers of the ecosystem sitting at a very unique event that aspires to build the **CRITICAL** synergies that are lacking today.**
- **The program for this workshop was carefully crafted to...**
 - ...give a comprehensive overview of what is out there.
 - ...encourage you to broaden your perspective of what are 'energy harvesting' related technologies and applications.
 - ...outline benefits.
 - ...outline how we can all work together here to cultivate relationships and collaborations into a mature, energy harvesting ecosystem.
- **IoT, IIoT, EH, and 5G...the perfect storm of technologies, financial backing, technical infrastructure, and marketing/consumer interest.**
 - It is our jobs to recognize this golden opportunity and work together to convert optimism to reality.
- **My Challenge to You**
 - Continue to challenge me to help enable you to bring these optimistic projections into tangible realities.



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EnerHarv was created with the vision to....

- Create an ECOSYSTEM to 'power the internet of things'

A community of experts to collaboratively develop next generation energy harvesting, energy storage, micro-power management solutions

- ✓ Share knowledge and best practices, define roadmaps
 - ✓ Foster collaborations and identify synergies
 - ✓ Efficiently use ambient energies where available
 - ✓ Reduce power consumption of IoT devices to minimize component and battery size
- The ecosystem we presented at the start of the workshop was....



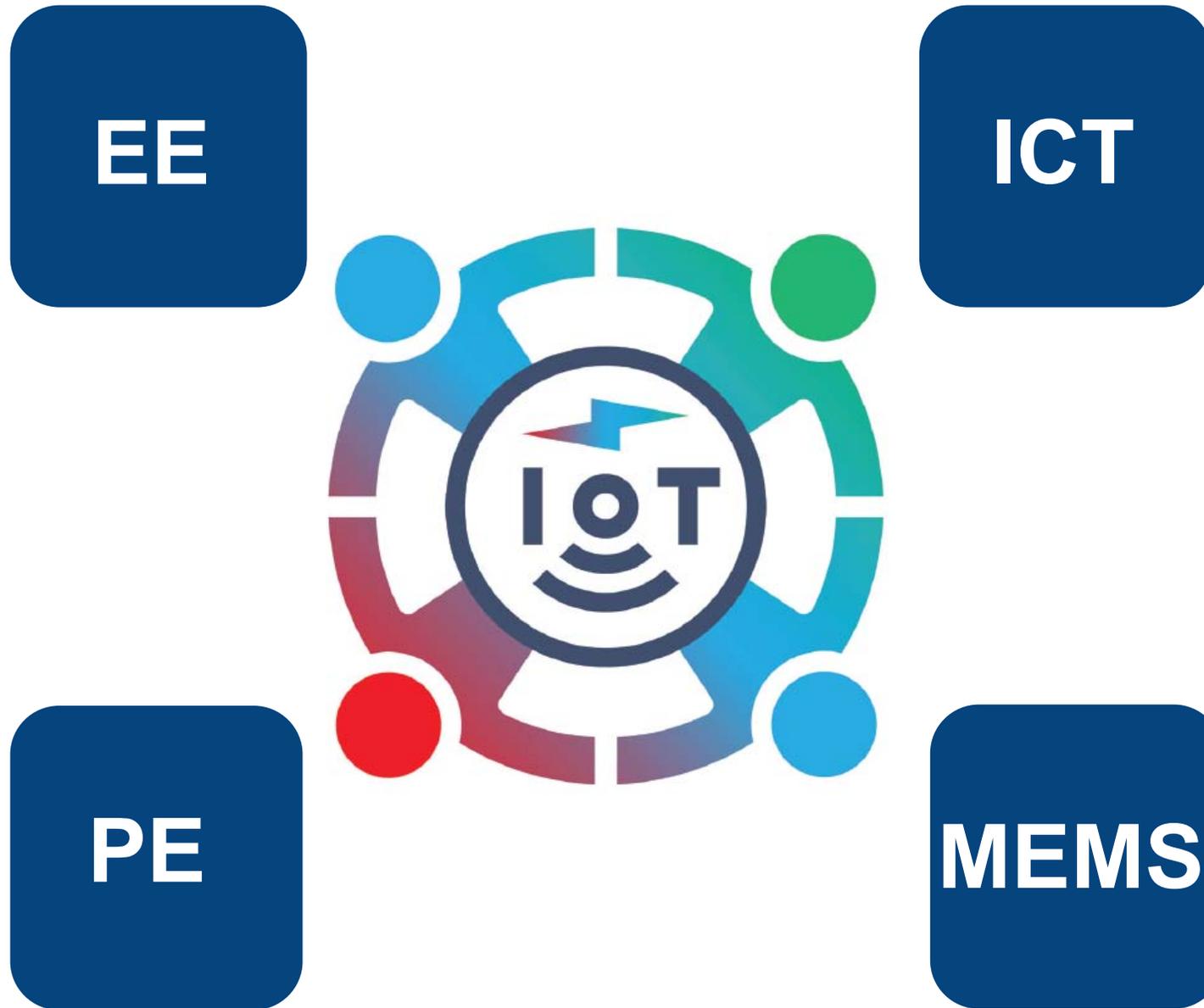
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An **Ecosystem** of Energy Harvesting/Power Management Related Technologies



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An **Ecosystem** of Enabling Technologies



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Developers



Integrators



Suppliers



Users



An **Ecosystem** of Stakeholders



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We can draw this in many more ways, e.g. applications, tools for development and deployment

Does this look the same to you now or do you see it in a new light?

How do we fill out the ecosystem better balanced, e.g. more users?

Does EnerHarv move us towards the vision?

Is it a tool/mechanism to inform, guide and drive collaborative research?

e.g. create awareness, make better informed decisions?

You were part of an experiment. How well did it work?

Tech sessions

Panel sessions

Posters

Demos

Networking

Please tell us via questionnaire, verbal feedback, emails, etc.



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What does we need to add to our ecosystem?

- ***A lot more SW? (protocols, EH centric architecture, being smarter how we process data)***
- ***More granularity in MEMs contribution – packaging, industrial design, system level multi-modal modelling?***
- ***Bring develops or sensor, microcontollers to the table and ensure their parts are energy harvesting centric***

New members to our Energy harvesting committee are very welcome.

1hr conference all every month, around 30 member, typically 10 on every call

Big GO RAIBH MAITH ABAIBH (thank you) to Enerv Committee and tech sponsors



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We hope you leave EnerHarv informed, connected and inspired

...and INVOLVED

Welcome to our EnerHarv powering IoT ecosystem

Hope to see you at future events & activities....

e.g. PSMA Energy Harvesting Committee

e.g. Should we have an EnerHarv 2020?



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Thank you!

Welcome to Our Ecosystem!!!

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